

**THE OCCURRENCE AND EXPERIENCE OF IMPULSIVITY AND  
EXTREME POSITIVE MOOD IN A NON-CLINICAL SAMPLE**

**JODIE RAWLINGS, BSc (Hons).**

**Thesis submitted to the University of Nottingham for the  
degree of Doctor of Philosophy**

**JULY 2012**



## ABSTRACT

The literature has struggled to reach an acceptable definition for the construct of impulsivity. Different models have variously suggested that the crux of the impulsivity construct lies in lack of planning, difficulties in concentration, failure of inhibition or attraction to sensation or immediate reward. More recently, research has suggested that impulsivity is increased in conditions of extreme affect, either positive or negative. The development of a novel measure of affective impulsivity, termed the UPPS-P Impulsive Behaviour Questionnaire, has enabled quantitative investigation of the construct.

In spite of difficulties in defining impulsivity, there is a broad consensus as to the clinical utility of the construct. It has been shown to be highly predictive of a wide range of so-called impulsive behaviours, which include suicide, binge eating and substance use. At the same time, impulsivity is also an important trans-diagnostic construct. Trait impulsivity is elevated in many psychiatric disorders, including borderline personality disorder and attention deficit hyperactivity disorder. There is also strong evidence that both state and trait impulsivity are elevated in bipolar disorder, and that this elevation may explain a number of common comorbidities and behaviours found within the disorder.

The thesis begins with a review of the literature, examining six key perspectives on impulsivity and their corresponding measures within **Chapter One**. **Chapter Three** also explores the construct and measurement of emotion-mediated, affective impulsivity. The literature linking impulsivity to behaviour in both

clinical and non-clinical samples is reviewed within **Chapter Two**. Within

**Chapter Four** the evidence supporting continuum models of psychiatric disorder is introduced, with particular discussion of the bipolar spectrum.

**Chapter Five** brings together the preceding chapters, reviewing the literature supporting an interaction between psychiatric disorder, affect, impulsivity and behaviour.

The first study of this thesis, a cross-sectional questionnaire study which can be found in **Chapter Six**, looked to extend these findings by exploring the presence and role of impulsivity in a wider bipolar spectrum sample. Experience of extreme positive mood state, as measured by the Mood Disorder Questionnaire, was found to relate to increased trait impulsivity and elevated engagement in a range of impulsive behaviour. A structural equation model demonstrated that impulsivity could be separated into cognitive and affective components, with affective impulsivity a key predictor of impulsive behaviour. Affective impulsivity was also shown to moderate the relationship between extreme mood experience and impulsive behaviour.

The second study, found in **Chapter Seven**, used semi-structured interviews and thematic analysis to develop an understanding of the individual's experience of impulsivity and impulsive behaviour. The themes arising from these data (preparatory set, influence of the environment and others, intense emotional state, (lack of) agency, premonitory urge, reflexive action and sensation seeking) suggested that context plays an important role in the prediction of impulsive behaviour, with the physical and social environment of the individual



an important factor in their behaviour. Results also supported the validity of the affective impulsivity construct. Individuals described their emotional state as having a large impact upon their decision to act impulsively, either using behaviour as a tool to moderate their affective state or experiencing cognitive difficulties as a result of it. Finally, data suggested a link between impulsivity and loss of control. Models were developed which indicate the presence of a 'risky mood state' in which individuals feel unable to control or predict their behaviour.

Together the studies highlight the complexity of impulsivity, and the importance of a wide variety of other factors related to the construct. This is particularly true of affective state, which was seen through both studies to have a large impact on both the occurrence and experience of impulsivity and impulsive behaviour. The studies support the validity of the bipolar spectrum, with similar experiences found in our sample as in clinical samples. The finding that impulsivity is related to a wide range of high-risk behaviours, and that many of these behaviours are ego-syntonic, has important implications for the treatment of impulsivity.



## ACKNOWLEDGEMENTS

My thanks go first and foremost to Richard Morriss and Rhiannon Corcoran, my supervisors, who have truly been the most wonderful support throughout my PhD. Their enthusiasm and excitement for the world of research has been both infectious and inspiring, and I owe them both my deepest gratitude.

I would also like to extend my thanks to all in the Division of Psychiatry for creating such a wonderful place to work. For their contributions to the work found in this thesis, I must extend particular gratitude to Bert Park, who constructed the beautiful Structural Equation Model found in Chapter Six, and Victoria Tischler, Colin Gell and Brendan Stone, for their insights as part of the coding panel in Study Two. Honourable mentions must also go to Susan Hull, erstwhile captain of the good ship Div Psych, and Lorna McWilliams, my comrade in arms, who both continued to make me smile even on the toughest days.

This thesis is only made possible by the honesty and kindness of all the participants. I am truly indebted for the time and energy they spent contributing to this research, and I cannot thank them enough.

On a more personal note, a huge thank you is owed to all my friends. Scattered as we may be across the country and the globe, your love, laughter and support has been beyond invaluable. I would also like to thank from the very bottom of my heart my family. To my mum, whose selfless love and dedication is a force to behold; my dad, whose huge heart guides everything he does; and my sister, Hannah, the strongest, cleverest and most loyal person I know: your faith in and support of me keeps me striving. I hope I can make you proud.

Finally, my husband Dave. Words really cannot describe how much you mean to me. It is thanks to your warmth, your love, your patience, your sense of humour and adventure, that I have reached this point. Thank you so much for everything you are. All my love, forever.

*'Our impulses are too strong for our judgement sometimes.'*

Thomas Hardy, *Tess of the d'Urbervilles*

## TABLE OF CONTENTS

ABSTRACT.....	i
ACKNOWLEDGEMENTS .....	v
TABLE OF CONTENTS.....	vii
EXTENDED TABLE OF CONTENTS .....	viii
INDEX OF FIGURES .....	xi
INDEX OF TABLES .....	xii
CHAPTER 1: ESTABLISHED MODELS OF IMPULSIVITY .....	1
1.1 INTRODUCTION TO THE CONCEPT OF IMPULSIVITY .....	1
1.2 KEY MODELS OF IMPULSIVITY .....	2
1.3 CONCLUSIONS .....	27
CHAPTER 2: IMPULSIVE BEHAVIOUR .....	30
2.1 INTRODUCTION TO IMPULSIVE BEHAVIOUR.....	30
2.2 IMPULSE CONTROL DISORDERS .....	30
2.3 IMPULSE CONTROL DISORDERS NOT OTHERWISE SPECIFIED .....	38
2.4 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS ESTABLISHED .....	43
2.5 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS PROPOSED.....	57
2.6 CONCLUSIONS .....	62
CHAPTER 3: AFFECTIVE IMPULSIVITY.....	64
3.1 INTRODUCTION TO AFFECTIVE IMPULSIVITY .....	64
3.2 DEVELOPMENT OF THE CONCEPT OF URGENCY .....	67
3.3 CONCLUSIONS .....	73
CHAPTER 4: SPECTRA OF MOOD.....	75
4.1 INTRODUCTION TO CONTINUUM MODELS.....	75
4.2 SPECTRUMS OF MOOD IN PSYCHIATRIC DISORDER.....	79
4.3 CONCLUSIONS .....	95
CHAPTER 5: CLINICAL PRESENTATIONS OF IMPULSIVITY AND MOOD.....	97
5.1 INTRODUCTION TO IMPULSIVITY AND MOOD .....	97
5.2 IMPULSIVITY AND BORDERLINE PERSONALITY DISORDER.....	97
5.3 IMPULSIVITY AND BIPOLAR DISORDER .....	103
5.4 CONCLUSIONS .....	117
CHAPTER 6: STUDY ONE.....	118
6.1 INTRODUCTION TO STUDY ONE .....	118
6.2 AIMS AND HYPOTHESES.....	119
6.3 METHODS.....	120
6.4 RESULTS.....	154
6.5 DISCUSSION.....	187
CHAPTER 7: STUDY TWO .....	207
7.1 INTRODUCTION TO STUDY TWO .....	207
7.2 AIMS .....	208
7.3 METHODS.....	208
7.4 RESULTS.....	228
7.5 DISCUSSION.....	290
CHAPTER EIGHT: GENERAL DISCUSSION .....	316
8.1 SUMMARY OF FINDINGS .....	316
8.2 STRENGTHS AND LIMITATIONS .....	320
8.3 IMPLICATIONS .....	322
8.4 NEXT STEPS .....	328
8.5 CONCLUSIONS .....	332
REFERENCES.....	335
APPENDICES .....	370

## EXTENDED TABLE OF CONTENTS

ABSTRACT .....	i
ACKNOWLEDGEMENTS.....	v
TABLE OF CONTENTS .....	vii
EXTENDED TABLE OF CONTENTS .....	viii
INDEX OF FIGURES .....	xi
INDEX OF TABLES .....	xii
CHAPTER 1: ESTABLISHED MODELS OF IMPULSIVITY .....	1
1.1 INTRODUCTION TO THE CONCEPT OF IMPULSIVITY .....	1
1.2 KEY MODELS OF IMPULSIVITY.....	2
1.2.1 Non-Planning Models of Impulsivity .....	2
1.2.2 Attentional Models of Impulsivity .....	9
1.2.3 Motor Models of Impulsivity .....	14
1.2.4 Reward Models of Impulsivity .....	17
1.2.5 Sensation Seeking Models of Impulsivity.....	23
1.2.6 Positive Models of Impulsivity .....	25
1.3 CONCLUSIONS.....	27
CHAPTER 2: IMPULSIVE BEHAVIOUR .....	30
2.1 INTRODUCTION TO IMPULSIVE BEHAVIOUR .....	30
2.2 IMPULSE CONTROL DISORDERS .....	30
2.2.1 Intermittent Explosive Disorder.....	32
2.2.2 Kleptomania.....	34
2.2.3 Pathological Gambling .....	35
2.2.4 Pyromania.....	36
2.2.5 Trichotillomania .....	37
2.3 IMPULSE CONTROL DISORDERS NOT OTHERWISE SPECIFIED.....	38
2.3.1 Risky Sexual Behaviour .....	38
2.3.2 Compulsive Buying.....	40
2.3.3 Internet Addiction.....	41
2.4 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS ESTABLISHED...	43
2.4.1 Suicide.....	43
2.4.2 Non Suicidal Self-Injury .....	49
2.4.3 Substance Use.....	51
2.4.4 Alcohol Use .....	53
2.4.5 Disordered and Binge Eating .....	54
2.5 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS PROPOSED .....	57
2.5.1 Financial Risk-Taking .....	57
2.5.2 Going AWOL.....	58
2.5.3 Sudden Appearance Change .....	59
2.5.4 Reckless Driving .....	60
2.5.5 Tactlessness .....	61
2.5.6 Creative Thought .....	62
2.6 CONCLUSIONS.....	62
CHAPTER 3: AFFECTIVE IMPULSIVITY.....	64
3.1 INTRODUCTION TO AFFECTIVE IMPULSIVITY.....	64

3.2	DEVELOPMENT OF THE CONCEPT OF URGENCY.....	67
3.2.1	Negative Urgency.....	67
3.2.1	Positive Urgency .....	70
3.3	CONCLUSIONS.....	73
CHAPTER 4: SPECTRA OF MOOD.....		75
4.1	INTRODUCTION TO CONTINUUM MODELS .....	75
4.2	SPECTRUMS OF MOOD IN PSYCHIATRIC DISORDER .....	79
4.2.1	Characteristics of Bipolar Disorder and the Bipolar Spectrum .	79
4.2.2	Psychological Mechanisms of Bipolar Disorder .....	82
4.2.3	Widening the Bipolar Spectrum.....	90
4.3	CONCLUSIONS.....	95
CHAPTER 5: CLINICAL PRESENTATIONS OF IMPULSIVITY AND MOOD .....		97
5.1	INTRODUCTION TO IMPULSIVITY AND MOOD.....	97
5.2	IMPULSIVITY AND BORDERLINE PERSONALITY DISORDER.....	97
5.3	IMPULSIVITY AND BIPOLAR DISORDER .....	103
5.3.1	Bipolar Disorder Course of Illness: State and Trait Impulsivity	103
5.3.2	Impulsivity and Comorbidity in Bipolar Disorder .....	106
5.3.3	Impulsivity and Behaviour in Bipolar Disorder .....	112
5.4	CONCLUSIONS.....	117
CHAPTER 6: STUDY ONE.....		118
6.1	INTRODUCTION TO STUDY ONE.....	118
6.2	AIMS AND HYPOTHESES .....	119
6.3	METHODS .....	120
6.3.1	Design .....	120
6.3.2	Ethics.....	120
6.3.3	Participants .....	121
6.3.4	Materials and Measures .....	124
6.3.5	Procedure .....	139
6.3.6	Analysis .....	143
6.4	RESULTS .....	154
6.4.1	Basic Demographics .....	154
6.4.2	Experience of Hypomania .....	157
6.4.3	Impulsivity.....	160
6.4.4	Behaviour.....	162
6.4.5	Mood, Personality and the Experience of Hypomania .....	165
6.4.6	Impulsivity and the Experience of Hypomania .....	169
6.4.7	Impulsivity and Behaviour .....	173
6.4.8	Behaviour and the Experience of Hypomania.....	177
6.4.9	Impulsivity, Mood and Suicidal Behaviour.....	182
6.4.10	Structural Equation Modelling .....	184
6.5	DISCUSSION .....	187
6.5.1	Summary of Findings .....	187
6.5.2	Strengths and Limitations .....	196
6.5.3	Implications .....	202
6.5.4	Next Steps.....	204
CHAPTER 7: STUDY TWO.....		207
7.1	INTRODUCTION TO STUDY TWO.....	207

7.2	AIMS.....	208
7.3	METHODS .....	208
7.3.1	Design .....	209
7.3.2	Ethics.....	209
7.3.3	Participants .....	210
7.3.4	Materials and Measures .....	211
7.3.5	Procedure .....	216
7.3.6	Analysis .....	220
7.4	RESULTS .....	228
7.4.1	Quantitative Data .....	228
7.4.2	Qualitative Data: Thematic Analysis .....	234
7.5	DISCUSSION .....	290
7.5.1	Summary of Findings .....	290
7.5.2	Strengths and Limitations .....	302
7.5.3	Implications .....	308
7.5.4	Next Steps.....	312
	CHAPTER EIGHT: GENERAL DISCUSSION.....	316
8.1	SUMMARY OF FINDINGS.....	316
8.2	STRENGTHS AND LIMITATIONS.....	320
8.2.1	Limitations .....	320
8.2.2	Strengths.....	321
8.3	IMPLICATIONS.....	322
8.3.1	Theoretical Implications .....	322
8.3.2	Clinical Implications .....	324
8.4	NEXT STEPS .....	328
8.5	CONCLUSIONS.....	332
	REFERENCES.....	335
	APPENDICES.....	370



## INDEX OF FIGURES

FIGURE ONE: Reward Discounting Curves (Ainslie, 1975) .....	20
FIGURE TWO: Stress-Diathesis Model of Suicide (Mann et al., 1999) .....	47
FIGURE THREE: Impulsivity within the Interpersonal-Psychological Theory of Suicide (Bender et al., 2011).....	48
FIGURE FOUR: The Interaction Between Distress Tolerance and Urgency in the Prediction of Bulimic Symptoms (Anestis et al., 2007a).....	56
FIGURE FIVE: Goal Regulation Model of Ascent into Mania (Johnson, 2005b) ..	86
FIGURE SIX: Integrative Cognitive Model of Bipolar Disorder (Mansell et al., 2007).....	89
FIGURE SEVEN: The Relationship Between Bipolar Disorder and Impulse Control Disorders (McElroy et al., 1996) .....	108
FIGURE EIGHT: Interactions Between Substance Misuse, Impulsivity, Aggression, Hostility and Suicide Attempts (Sublette et al., 2009) .....	116
FIGURE NINE: Flow Chart of Participant Dropout within the Survey.....	124
FIGURE TEN: Questionnaire Investigating Impulsive Behaviour.....	136
FIGURE ELEVEN: Survey Procedure.....	141
FIGURE TWELVE: Example of Motivational Section within Survey .....	143
FIGURE THIRTEEN: Histogram - HADS Anxiety Stratified by MDQ Status.....	168
FIGURE FOURTEEN: Histogram - HADS Depression Stratified by MDQ Status ..	168
FIGURE FIFTEEN: Histogram – Rosenberg Self-Esteem Stratified by MDQ Status .....	169
FIGURE SIXTEEN: Histogram – UPPS Facets Stratified by MDQ Status .....	172
FIGURE SEVENTEEN: Histogram – BIS Facets Stratified by MDQ Status .....	173
FIGURE EIGHTEEN: Scatter Plots – Urgency Facets and Number of Behaviours .....	174
FIGURE NINETEEN: Mean Number of Behaviours Across MDQ Status Groups	178
FIGURE TWENTY: Mean Level of Urge Across MDQ Status Groups.....	179
FIGURE TWENTY-ONE: Mean Frequency of Behaviour Across MDQ Status Groups .....	179
FIGURE TWENTY-TWO: Structural Equation Model for the Relationship between Impulsivity, Negative Affect, Experience of Hypomania and Mood ..	186
FIGURE TWENTY-THREE: Flow Chart of Participation in Study Two .....	211
FIGURE TWENTY-FOUR: Behaviours Suggested for Discussion within Study Two .....	218
FIGURE TWENTY-FIVE: Thematic Analysis of Interview Data.....	223
FIGURE TWENTY-SIX: Example Timeline .....	225
FIGURE TWENTY-SEVEN: Themes and Sub-Themes .....	235
FIGURE TWENTY-EIGHT: Temporal Relationships Between Themes.....	290
FIGURE TWENTY-NINE: Proposed Model of the Temporal Relationship Between Themes in Impulsive Behaviour.....	300
FIGURE THIRTY: Proposed Model of the Temporal Relationship Between Themes in Self Harm.....	302
FIGURE THIRTY-ONE: Proposed Model of the Temporal Relationship Between Themes in Suicidal Behaviour .....	302

## INDEX OF TABLES

TABLE ONE: Summary of Various Pathways to Impulsivity and their Measures .....	28
TABLE TWO: Psychometric Properties of Questionnaires .....	155
TABLE THREE: Summary of Full Sample Data Relating to Demographic and Periphery Variables.....	156
TABLE FOUR: Comparison of Non-Completers and Completers.....	157
TABLE FIVE: MDQ Responses Stratified According to Group.....	159
TABLE SIX: Years in Education, Age and Gender Stratified by MDQ Grouping .	160
TABLE SEVEN: Impulsivity Scores for Total Group .....	161
TABLE EIGHT: Psychometric Properties of Impulsivity Questionnaires .....	161
TABLE NINE: Impulsivity Scores Stratified by Gender .....	162
TABLE TEN: Percentages (%) of Participants Engaging or Having Urges to Engage in Behaviour, the Frequency of Engagement and the Associated Level of Planning.....	164
TABLE ELEVEN: Difference in Mood and Personality Measures Across the Three MDQ Status Groups.....	167
TABLE TWELVE: Difference in Impulsivity Across the Three MDQ Status Groups .....	171
TABLE THIRTEEN: Correlations Between Impulsivity and Number of Behaviours .....	174
TABLE FOURTEEN: Relationship Between Urgency and Behaviour .....	176
TABLE FIFTEEN: Impulsive-Type Behaviour Variables Stratified by MDQ Status .....	178
TABLE SIXTEEN: Chi-squared of Behaviours Stratified by MDQ Status.....	181
TABLE SEVENTEEN: Odds Ratios (and Confidence Intervals) for Behaviours in the Three MDQ Groups .....	182
TABLE EIGHTEEN: Impulsivity Levels in MDQ+/sub Individuals Stratified by Suicidal Behaviour .....	183
TABLE NINETEEN: Proportion of Variance in Latent Variables as Explained by Indicators .....	184
TABLE TWENTY: Measures of Model Fit .....	185
TABLE TWENTY-ONE: Characteristics of Study Two Participants .....	230
TABLE TWENTY-TWO: Changes in MDQ Responses Between Study One and Study Two .....	231
TABLE TWENTY-THREE: Changes in BIS Impulsivity Scores Between Study One and Study Two.....	232
TABLE TWENTY-FOUR: Changes in UPPS-P Impulsivity Scores Between Study One and Study Two.....	233
TABLE TWENTY-FIVE: Changes in HADS Scores Between Study One and Study Two .....	234

## CHAPTER 1: ESTABLISHED MODELS OF IMPULSIVITY

### 1.1 INTRODUCTION TO THE CONCEPT OF IMPULSIVITY

In recent years impulsivity has gained recognition as a concept with significant clinical and practical relevance. Despite this, researchers have not been able to agree on a universal definition or structure for the concept, and have instead proposed a wider range of different, and frequently conflicting, definitions. These variously describe impulsivity as a *'neurophysiologically based inability to conform behaviour to its context or consequences'* (Barratt and Patton, 1983); as resulting in actions which are *'poorly conceived, prematurely expressed, unduly risky, or inappropriate to the situation and that often result in undesirable outcomes'* (p.1, Evenden, 1999); or as a *'predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others'* (p.2, Moeller et al., 2001a).

Most recently, some researchers have proposed that impulsivity is in fact indefinable as a single construct (Moeller et al., 2001a) and is perhaps better understood as a selection of constructs which may or may not be correlated with one another (Whiteside and Lynam, 2001). It therefore seems pertinent to review the literature in such a way as to describe the development of these varying theoretical viewpoints and to evaluate their

relevance. This chapter aims to describe six of the key theoretical perspectives on impulsivity – non-planning; attentional; motor; reward and positive models of impulsivity – and to assess their contribution to the field.

## **1.2 KEY MODELS OF IMPULSIVITY**

### **1.2.1 Non-Planning Models of Impulsivity**

Non-planning perspectives on impulsivity emphasise the absence of forward planning or careful consideration as a root cause of impulsivity. Its proponents posit that individuals who are highly impulsive are keenly oriented towards the present and as a result do not consider the long-term consequences of their actions. Non-planning models are those which most clearly chime with lay perceptions of impulsivity and are indeed the *'best and most widely represented'* of impulsivity perspectives within the literature (p.685, Whiteside and Lynam, 2001).

The most widely used model of impulsivity is that developed by Barratt and colleagues in an attempt to understand the relationships between impulsivity, anxiety and psychomotor efficiency (Barratt, 1959, Barratt, 1972). The model originally considered impulsivity as a unidimensional factor orthogonal to anxiety (Barratt, 1972). However, later revisions - informed by development and factor analyses of Barratt's measure of impulsivity, the Barratt Impulsiveness Scale (BIS) - resulted in a

multidimensional model. The current eleventh form of the BIS consists of three second order facets termed motor, attentional and non-planning impulsivity. While motor and attentional impulsivity will be considered in further detail later in this chapter, the non-planning factor will be considered here.

Barratt's non-planning impulsivity is defined as the absence of forethought or future planning. This is measured by eleven items on the BIS-11, including '*I plan trips well ahead of time*' and '*I am more interested in the present than the future*'. BIS non-planning is a second order factor comprising self control and cognitive complexity. Although this factor has generally been well replicated across factor analysis studies of the scale (Patton et al., 1995), there is some evidence to the contrary. Luengo and colleagues (1991) performed principal components analysis of 307 participants' responses on the BIS-10 and the Eysenck Impulsivity Scale (17; Eysenck and Eysenck, 1978), finding that non-planning items from Barratt's scale did not load together and were instead scattered across the resulting factors with multiple loadings. They concluded that non-planning as measured by the BIS was flawed, but that the concept of non-planning was a fundamental aspect of impulsivity.

This sentiment is echoed by Ireland and Archer (2008), who performed exploratory factor analysis on responses to the BIS-11. They found once more that non-planning emerged as a key factor but did not however

contain the same items as those recommended by Barratt. Along with six non-planning items, the newly created scale contained five items previously found in the attentional subscale and one motor subscale item. The BIS non-planning subscale drew further criticism from the authors for its apparent lack of ecological validity, containing as it does items such as '*I change where I live*' and '*I plan for job security*'. It was felt by the authors that these items were not appropriate to use for their incarcerated participants and were therefore removed for their study. As impulsivity is most likely to be elevated in forensic and clinical populations, and that therefore these populations are clear targets for impulsivity research, it is important to select impulsivity scales that are most relevant to them.

A further model which contains a non-planning perspective on impulsivity is the UPPS Impulsive Behaviour Scale. Developed by Whiteside and Lynam (2001), the UPPS Impulsive Behaviour Scale was created through exploratory factor analysis of several pre-existing impulsivity scales (including the BIS) alongside some novel ideas about what impulsivity might be, informed by the Five Factor Model of personality (FFM; McCrae and Costa, 1990). The outcome was a model of impulsivity comprising four distinct 'pathways' to impulsivity: urgency, premeditation, perseveration and sensation seeking. The scale was developed with an understanding of the trans-diagnostic implications of impulsivity, and that it should correlate with psychiatric disorder and behaviour. Research to date has supported the ability of the scale to do this, with the various pathways playing a role in the

prediction of behaviours such as disordered eating (Anestis et al., 2007a, Anestis et al., 2007b, Claes et al., 2005, Fischer et al., 2008), compulsive buying (Billieux et al., 2008), smoking (Billieux et al., 2007), gambling (Cyders and Smith, 2008a), alcohol use (Magid and Colder, 2007, Fischer and Smith, 2008, Whiteside and Lynam, 2003) and substance use (Verdejo-García et al., 2007). Alongside the predictive value of the scale, the psychometric properties of the UPPS are sound, with studies replicating the four factor structure (Magid and Colder, 2007, Schmidt et al., 2008, Van der Linden et al., 2006).

The impulsive behaviour pathway of the UPPS which is most akin in definition to Barratt's non-planning is (lack of) premeditation. Premeditation is defined by Whiteside and Lynam as the '*tendency to delay action in favour of careful thinking and planning*' (p.677, Whiteside and Lynam, 2001).

Whiteside and Lynam consider (lack of) premeditation to be the most common pre-existing perspective on impulsivity. Their novel contribution to the non-planning/premeditation field is to both suggest and to present evidence that links this facet to psychopathology - notably anti-social personality disorder (Whiteside et al., 2005) - demonstrating the important role the UPPS plays in linking the measurement of impulsivity to real-world implications.

Alongside the real-world value of the premeditation scale, there has also been some evidence of its relevance experimentally. Kämpfe and Mitte

(2009) demonstrated a small but statistically significant relationship between self-report scores on the premeditation facet and performance on an impulsivity-relevant cognitive task (perceptual speed; Horn, 1983). This finding emphasises the validity of a self-report scale that has potential to predict behaviour. Given the difficulties relating laboratory behavioural to self-report measures of impulsivity (see for example Section 1.2.3 below; Dougherty et al., 2005), the potential relevance of the premeditation scale in this regard is certainly worthy of further investigation.

A further model of impulsivity that contains a non-planning element was introduced by Eysenck and Eysenck (1978). The model was developed in close alignment with the PEN (psychoticism, extraversion, neuroticism) system of personality, and originally focused upon four factors: narrow impulsivity, risk taking, non-planning and liveliness. Further factor analysis of the Eysenck Impulsivity Scale (I7; Eysenck et al., 1985) alongside items relating to sensation seeking indicated that impulsivity best fitted a dual factor structure of venturesomeness and narrow impulsivity.

Venturesomeness relates to risk taking and pleasure or sensation seeking. Narrow impulsivity is closely related to the non-planning forms of impulsivity discussed here and is defined as behaving without thinking. The two aspects are differentiated on the basis of risk awareness, with high venturesomeness individuals having awareness of risk and proceeding with behaviour regardless, while individuals who score highly for narrow impulsivity do not consider the potential risks and consequences. The I7 also



contains items pertaining to the measurement of empathy, in part to increase divergent validity and at the same time reduce the monotony of the questionnaire but also to further explore the relationships between PEN subscales.

The good psychometric properties of the I7 have been widely demonstrated, with the factor structure commonly replicated and reliability demonstrated (Caci et al., 2003, Miller et al., 2004b). There is also evidence of relationships between narrow impulsivity and behavioural measures of reflection impulsivity (Glow et al., 1983; using Kagan and colleagues' (1964) Matching Familiar Figures Test). Some criticism of the scale has focused upon the low correlations between venturesomeness and narrow impulsivity (as low as 0.18, see Luengo et al., 1991). These results are taken as an indication that the two factors do not relate to one another and so cannot together form a meaningful, comprehensive model of impulsivity. Furthermore, although the definition of narrow impulsivity is widely accepted within the literature, and its relationships to other forms of non-planning impulsivity are clear, the foundations of Eysenck's model in a single theory of personality (the PEN model) have meant its wider theoretical clarity has been called into question.

The final widely used model which contains an element of non-planning impulsivity is that of Dickman (1990). This model was created to better represent potential outcomes of impulsivity that could be considered

positive. As alluded to already, definitions of impulsivity frequently assume that impulsivity leads to suboptimal decision making and, as a result of this, it will generally lead to negative outcomes. However, Dickman believes that being able to act quickly has the clear potential for positive benefits, such as performing better within time-constrained contexts. Dickman therefore defines his facets of impulsivity on the basis of their outcomes, resulting in a model made up of functional and dysfunctional impulsivity. Dysfunctional impulsivity is defined as the *'tendency to act with less forethought than most people of equal ability when this tendency is a source of difficulty'*, while functional impulsivity is the *'tendency to act with relatively little forethought when such a style is optimal'* (p.1). Clearly, such outcomes can only be classified upon completion of action, and are highly dependent on the context within which the act occurred, meaning measurement – particularly using self report questionnaires – is problematic.

The two facets of Dickman's model, measured by Dickman's Impulsivity Inventory (DII; Dickman, 1990), both represent a tendency to take action without prior deliberation and as such both reflect non-planning impulsivity. As these are exclusively non-planning facets within a single model, it is interesting to consider the relationship between them. Dickman himself claims that the two aspects of impulsivity differ more notably than their definition may suggest, and that they relate independently to various other cognitive constructs and personality traits. There is some evidence for this in the experimental literature, which has demonstrated a low intercorrelation

between the two facets (0.22, Whiteside and Lynam, 2001) along with a reliable factor structure (Claes et al., 2000, Miller et al., 2004b). However, some criticism has maintained that the two aspects differ from one another purely on the basis of intelligence, with more intelligent individuals better able to make decisions at speed (Reeve, 2007). This has been supported by the finding of a relationship between education level and functional impulsivity (Claes et al., 2000), suggesting that learning potentially enables more productive swift decision making. While these findings do not necessarily detract from the validity of non-planning impulsivity as a concept, they do highlight the need for further investigation into the wider impact of cognitive ability and other factors on impulsivity.

In conclusion, most widely used models refer to the absence of forward planning as being a key process driving impulsivity and impulsive behaviour. This concurs with lay perspectives on impulsivity, and furthermore appears to be ecologically relevant in terms of the prediction of behaviour (particularly when using the UPPS model). Finally, there is some indication that non-planning is measurable using both self-report and behavioural techniques.

### **1.2.2 Attentional Models of Impulsivity**

Attentional impulsivity is concerned with a difficulty in concentrating and focusing attention. Attentional impulsivity is most clearly included within

the BIS and UPPS models of impulsivity, and they will be described in more depth here.

Barratt's concept of attentional impulsivity is defined as an inability to concentrate, and is comprised of the first order factors of cognitive instability and attention. This factor is a relatively new addition to the BIS model, only coming into use in the BIS-11 (Patton et al., 1995). Previously the third factor in the BIS model was termed cognitive impulsivity, a factor that attempted to quantify an individual's tendency to make decisions quickly. Conceptually and experimentally this factor has clear links to non-planning impulsivity. Luengo and colleagues (1991) demonstrated that cognitive impulsivity was conceptually weak, with factor analysis resulting in loadings across all factors. The authors concluded with the recommendation that those items relating to concentration ability be further investigated as a cognitive aspect of impulsivity in their own right. It is these items that led to the development of the attentional subscale.

The BIS-11 attentional subscale has on the whole been well received. Christodoulou and colleagues (2006) tested twenty-five bipolar disorder patients with the Hayling Sentence Completion Task (HSCT) and Iowa Gambling Task (IGT), along with the BIS, finding a negative correlation ( $r = -0.32$ ) between the HSCT and attentional subscores on the BIS. This was taken by the authors as evidence of a difficulty in high scoring attentional impulsivity individuals to inhibit responses. Keilp and colleagues (2005) also

stated that BIS attentional impulsivity correlates well with certain laboratory tasks.

While BIS attentional appears a relevant pathway to impulsivity, it also has some clear drawbacks. The change in factor from cognitive to attentional impulsivity via an intermediate form of the BIS known as BIS-11a has not been well documented within the wider literature, and the two terms and three scales are often used interchangeably and with little clarity (see Gorlyn et al., 2005). This is obviously a source of confusion and limits the ability of researchers to bring together relevant results. Greater awareness of the two constructs, and clear acknowledgment of which has been used will reduce confusion in the field.

There is some evidence of gender differences in attentional impulsivity. Using a large sample of 1103 participants, Ireland and Archer (2008) performed factor analysis on responses to the BIS. Although a three-factor solution showed good fit in male participants, it did not fit for female participants. The best fitting factor structure for women was in fact a two-factor structure, necessitating the removal of the 'distractibility' (i.e. attentional) factor. As well as highlighting the possibility of gender differences in the wider impulsivity construct, this also indicates that attentional impulsivity requires further investigation into its value as an experimental and theoretical tool across gender.

Whiteside and Lynam's UPPS model also includes a related pathway, named (lack of) perseverance and defined as the '*(in)ability to remain focused on a task that may be boring or difficult*' (p.685, Whiteside and Lynam, 2001).

Whiteside and Lynam highlight perseverance as a pathway to impulsivity which, though relevant and clearly emphasised within the NEO-PI-R, has been somewhat neglected within the rest of the impulsivity literature. As a result they suggested that it may be particularly open to revision as research involving the UPPS progresses. In fact, perseverance has been shown to be robust in the majority of experimental work in which it has been employed and has particularly demonstrated its usefulness as a clinically relevant measure for the prediction of behaviour in clinical populations. Various studies have shown elevated perseverance scores (i.e. increased impulsivity in relation to this pathway) in compulsive buying (Billieux et al., 2008), disordered eating (Claes et al., 2005, Mobbs et al., 2008), Alzheimer's disease (Rochat et al., 2008) and substance dependence (Verdejo-García et al., 2007). Whiteside and Lynam have also predicted that perseverance will be of particular predictive validity in ADHD (Whiteside and Lynam, 2001).

There is some evidence of a relationship between perseverance scores and performance on certain laboratory tasks. Kämpfe and Mitte (2009) demonstrated a significant relationship between perceptual speed and perseverance score. Gay and colleagues (2009) investigated the relationship between UPPS impulsivity and tests of inhibition, with the finding that individuals with high scores on the (lack of) perseverance facet particularly

struggled to inhibit previously relevant information during directed forgetting tasks. They go on to suggest that a difficulty in restricting the flow of information in to consciousness may be the mechanism by which low perseverance is formed. As such, individuals who have high impulsivity in relation to this facet are unable to prevent their mind from 'wandering' to other thoughts, away from the task in hand. Direct investigation of this proposition is likely to yield some interesting results.

Recent literature favours an understanding of impulsivity as multi-faceted, with potentially unrelated pathways grouped together under the loose banner of impulsivity (Enticott and Ogloff, 2006). However, the independence of perseverance as a pathway has been criticised, with Whiteside and colleagues themselves noting the strong correlation between perseveration and premeditation ( $r=0.65$ , Whiteside et al., 2005). Cyders and Smith (2007) have extended this finding using confirmatory factor analysis of the UPPS scale along with the positive urgency scale (to be described in more detail within **Chapter 3**; Cyders et al., 2007). Their results indicate that the UPPS model best fits a three factor structure, with premeditation and perseveration combining as a single factor named 'deficits in conscientiousness'. The independence of perseverance as a pathway to impulsivity therefore requires further investigation, including perhaps an investigation in to the neurocircuitry associated with these two pathways.

### **1.2.3 Motor Models of Impulsivity**

Another perspective on impulsivity, termed motor impulsivity, focuses on an apparent inability to inhibit behaviours or actions. Again, this bears some conceptual similarity to both the non-planning and attentional models.

However, this model is of greater relevance to behavioural tasks in that it involves specifically a difficulty in the inhibition of learned responses (Arce and Santisteban, 2006). As has already been mentioned, there is a division between those perspectives that hinge upon self-report measures, and those that tie more closely with laboratory measures. Each stance has its own benefits and drawbacks. The self-report models are most commonly used, presumably due to the fact they are quick, easy, cheap and resource-light. The fact they are so often used experimentally also means that there is often a range of relevant experimental data. However, these measurement techniques ask a great deal of their completers, who must have insight in to their own behaviour over a wide time frame. The use of a wide time frame constructs impulsivity as a stable personality trait, which also means it is difficult to reuse these questionnaires. This therefore limits their application, for example, to effectively measure changes in impulsivity with treatment.

Conversely, laboratory measures are able to accurately quantify state fluctuations in impulsivity (for example Swann et al., 2001). Furthermore, these models have their origins in animal experimental paradigms and are



easily modifiable and adjustable to various populations (see for example, Groom and colleagues use of the Stop Signal Tasks with children, which are framed as space themed computer games; Liddle et al., 2009).

Measurement is however rather less pure than is desirable, with testing paradigms frequently conflating impulsivity with other constructs (e.g. working memory, executive function, reward). At the same time, the laboratory context of these measures diminishes their ecological validity. These measurements have also shown less relevance to other potential pathways to impulsivity, and indeed appear to be less predictive of the real-life consequences of elevated impulsivity (Dougherty et al., 2005). Given the differences in the origin and experimental methods of these two schools of thought, it is perhaps unsurprising that measures from the two perspectives rarely correlate (Dougherty et al., 2005, Helmers et al., 1995, Reynolds et al., 2006).

There are both laboratory and self report measures of motor impulsivity. The most relevant self report measure is the BIS motor impulsivity subscale, which is defined as acting '*without thinking*' (Stanford et al., 2009) or '*on the spur of the moment*' (Moeller et al., 2001a). It comprises the first order factors motor and perseverance. Motor impulsivity has been robust within the experimental literature, with its reliability consistently replicated (Patton et al., 1995). BIS motor also has a clear clinical relevance, with elevated BIS motor scores in internet addiction (Cao et al., 2007), binge drinking (Carlson et al., 2010) and individuals who have attempted suicide

(Dougherty et al., 2004a, Mann, 1999). The relationship between motor impulsivity and mania is also very clear. This was particularly demonstrated by Swann and colleagues (Swann et al., 2008) who reported a correlation of 0.39 between BIS motor impulsivity and SADS-C mania scores in a sample of seventy four participants with a diagnosis of bipolar I disorder. The other two BIS factors (non-planning and attentional impulsivity) were both solely correlated with depression scores.

Rapid response tasks, also referred to as response inhibition tasks, are designed to tap in to motor impulsivity. They look to measure actions and responses which occur before thorough information processing has taken place. Several different forms of these tasks exist, though by far the most popular is the Go/No-go task, described by Arce and Santisteban as the *'action/inhibition task per excellence for motor impulsivity'* (p.217, Arce and Santisteban, 2006). In this task, participants are trained to respond to a specific stimulus, such as a letter, with a particular response, such as a key press. The stimuli is presented frequently and participants become habituated to this association and therefore quick to respond. Impulsivity is then tested by the presentation of a rarer 'no go' signal, frequently a colour change or accompanying sound, alongside the target stimulus, meaning the participant must inhibit their learned response. The Go/No-go therefore constitutes a 'race' between the two possible responses: the impetus to respond to the trained association competes with the inhibitory process attempting to stop the trained response (Crean et al., 2000). The Go/No-go

task is widely accepted and is considered to be a sound and relatively pure measure of impulsivity, comparatively untainted by other executive processes or individual variables. Furthermore, functional imaging studies have related Go/No-go task performance with neuronal activity (e.g. in the orbitofrontal cortex, Keilp et al., 2005).

The BIS motor impulsivity scale and response inhibition tasks define impulsivity in similar ways, and this is supported by correlations of scores on the two measures. Studies by both Keilp and colleagues (Keilp et al., 2005) and Gorlyn and colleagues (Gorlyn et al., 2005) found a robust 0.34 correlation between motor impulsivity scores on the BIS and commission errors on Go/No-go tasks.

#### **1.2.4 Reward Models of Impulsivity**

Reward models of impulsivity posit that highly impulsive individuals experience reward intensely, and as such they will behave 'impulsively' in the pursuit of reward. As with motor models of impulsivity, such models are open to investigation using both self report and behavioural measures, as will be discussed here. This conceptualisation of impulsivity contrasts with the models discussed so far, which focus primarily on the individual's cognitive ability and the impact of this on decision making.

The primary self report measures of reward used within the literature are the BIS/BAS scales, developed by Carver and White (1994) on the basis of Gray's (1981) reinforcement sensitivity theory. This theory proposes that two motivational systems underlie behaviour: a behavioural activation system (BAS) which promotes goal-directed action and is considered in some ways analogous to impulsivity; and a behavioural inhibition system (BIS), aligned with anxiety, which manifests as punishment aversion. The inhibition subscale is unifactorial, while the BAS comprises three subscales: fun-seeking, reward responsiveness and drive.

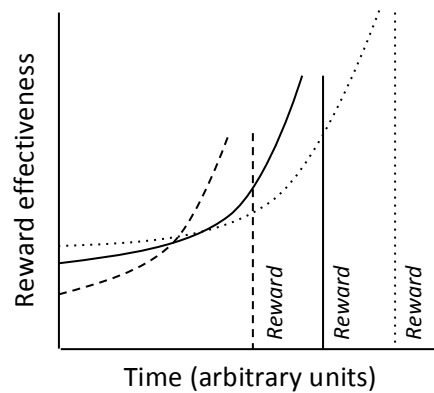
Although the BAS was named by Gray as the impulsivity dimension, more recent research suggests that impulsivity is perhaps better defined as a balance between the two measures, with high impulsive individuals likely to be both high in BAS and low in BIS. This was to some extent explored experimentally by Smillie and Jackson (2006), who discovered that functional impulsivity (introduced within **Section 1.2.1**, Dickman, 1990) was both positively correlated with BAS ( $r=0.31$ ) and negatively correlated with the inhibition subscale ( $r=-0.47$ ). This suggests that highly impulsive individuals are both sensitive to reward and insensitive to punishment, causing them to seek rewarding experiences without being deterred by potential negative outcomes.

Other researchers have disagreed, stating that although there are clear relationships between measures of impulsivity and reward, the two are

distinct constructs. Franken and Muris (2006) used a principal components analysis of the BIS/BAS scales and other measures of sensitivity to reward and/or punishment (including Tridimensional Personality Questionnaire scales of harm avoidance, novelty seeking and reward dependence). These authors found that sensitivity to reward consists of both reward sensitivity and rash impulsiveness. The two dimensions are independently and specifically correlated to other scales, including the positive and negative affect scales (PANAS) and the Eysenck personality questionnaire (EPQ). Sensitivity to punishment was confirmed as consisting of single factor. This suggests that while reward and impulsivity are uniquely related to one another, they are not a single construct. Franken and Muris go on to suggest that the two dimensions may also be dissociable at the level of brain circuitry, with impulsivity more closely tied to the frontal lobes and reward sensitivity located within the mesolimbic dopamine system.

As well as the use of the BIS/BAS scales, reward sensitivity has been investigated within the impulsivity literature using reward discounting paradigms. Such paradigms were introduced following Ainslie's (1975) investigation of animal models of reward, which employed hyperbolic curves to describe and explain impulsivity. These curves demonstrate a decline in the effectiveness of rewards over time, such that small immediate rewards are more effective than large rewards given after a time delay. Impulsive individuals are less able than the general population to delay rewards, and will consistently opt for behaviour that is rewarding within the

short term. This theory has clear clinical applications in the understanding of behaviours such a gambling, drug taking and risky sex. See **Figure One** for a graph summarising the interaction between reward effectiveness and time.



**FIGURE ONE: Reward Discounting Curves (Ainslie, 1975)**

Evenden has described the clear advantages of using laboratory reward paradigms to investigate impulsivity, stating, *'delay of reinforcement is easily defined in the laboratory, it can be examined in both humans and other species – while it also encompasses quite a lot of frequently exhibited human behaviour'* (p.354, Evenden, 1999). The flexibility of the reward paradigm is demonstrated by the multiple behavioural tasks that have been developed. These include the single key impulsivity paradigm (SKIP; Mathias et al., 2002), during which participants are invited to click the mouse button as often as they desire within a given time frame. Each click earns the participant a small amount of money, with longer delays between clicks resulting in a larger amount of money (e.g. 1p for a delay of two seconds, and 10p for a delay of 20 seconds). Relative 'impulsive' responding is measured by the number of clicks within the time frame and the longest

delay between clicks, with the least impulsive participants responding relatively few times and with a long delay between clicks.

The two-choice reward task (TCRT; Marsh et al., 2002) also measures delay sensitivity. In this task participants are given the choice between two shapes; one of which is associated with a short delay and a small reward (e.g. 5p after a 5 second delay) and another, which is associated with a longer delay, and a larger reward (e.g. 15p after 15 second delay). Participants must endure the delay before the money is added to their total. For this task, impulsivity is measured using the total number of choices for small immediate reward during the task, although the task can be adapted using a variable delay schedule to ascertain the 'breakpoint' of the reward (Dougherty et al., 2005). Other tasks involve directly asking participants for their hypothetical preference, for example; 'Would you prefer to receive £10 today or £50 in three weeks?' (see Alessi and Petry, 2003) or providing a choice of rewarding objects (e.g. food; see Mischel, Shoda and Rodriguez, 1989). Again, such paradigms can then be modified to identify accurately the point at which individuals become ambivalent (the so called breakpoint).

Evidence for the usefulness of these tasks in the investigation of impulsivity is mixed. Some studies have demonstrated that such tasks are able to distinguish between high- and low-impulsivity populations. One example is a study conducted by Swann and colleagues (2009a), in which 112 participants with a diagnosis of bipolar disorder, and as such considered to

have elevated trait impulsivity (to be discussed in more detail in **Chapter 5**), were shown to make more responses on the SKIP and leave shorter time between clicks when compared to 71 healthy community controls. Similar results have been shown in other apparently impulsive populations, such as pathological gamblers (Alessi and Petry, 2003).

In contrast Marsh and colleagues' (2002) study of low and high impulsivity groups, as defined by a median split of scores on the I7, did not find a significant difference between the two groups. Similarly, results from Swann and colleagues (2002) demonstrated the absence of a correlation between BIS scores and reward discounting (measured by both the TCRT and SKIP) in a sample of parents of children with conduct disorder. Such results appear to demonstrate that while reward discounting is likely to play a role in clinical populations with elevated impulsivity, it is not analogous to impulsivity itself. However, further research is needed to clarify this statement and the strong evidence regarding the importance of reward to impulsivity suggests that it is a relevant facet that needs to be taken into account in experimental work. Crean, de Wit and Richards suggest that delay discounting tasks may be '*sensitive to at least one form of impulsive behaviour*' (p.155, Crean et al., 2000) and the SKIP is included as one of four key tasks in the measurement of impulsivity by Dougherty and colleagues (2005). While sensitivity to reward may not be de facto impulsivity, it is at the very least a closely related concept, and one that should continue to inform the impulsivity literature.



### 1.2.5 Sensation Seeking Models of Impulsivity

Sensation seeking is an individual's tendency to seek out pleasurable and rewarding experiences, and is associated with a willingness to take risks in pursuit of these experiences. Historically, sensation seeking has often been used as an independent analogue for impulsivity. An example of this is Helmers and colleagues use of Zuckerman's Sensation Seeking Scale (SSS, Zuckerman et al., 1978) within factor analysis of several key measures of impulsivity (Helmers et al., 1995). Steinberg and colleagues (2008) reject the 'conflation' of sensation seeking and impulsivity, on the basis that they follow different developmental trajectories and likely neural systems. However, they seem to be linked in that they predict similar behaviours (e.g. risky sex, Donohew et al., 2000). Many constructions of impulsivity now include sensation seeking as a facet of impulsivity, including the sensation seeking facet of the UPPS and the venturesomeness facet of the I7.

I7 venturesomeness was borne out of factor analysis of the Eysenck Personality Questionnaire and the SSS. The factor contains items relating to adventure- and thrill-seeking and risk taking (Zuckerman et al., 1978) and is closely aligned with extraversion within Eysenck's model of personality (Eysenck and Eysenck, 1978). It is one of the two factors within Eysenck's description of impulsivity; the other being narrow impulsivity, as described earlier within **Section 1.2.1**. Venturesomeness differs from narrow

impulsivity on the basis of risk awareness, with individuals high in venturesomeness likely to take risks deliberately and with full awareness of potential consequences (Miller et al., 2004b, Evenden, 1999). Both venturesomeness and narrow impulsivity are considered by Eysenck to be representative of common ideas regarding impulsivity, though they are also described as separate and 'relatively independent' as pathways (p.144, Eysenck, 1993). This has been criticised by other authors, who have found strong correlations between the two factors (Luengo et al., 1991) or indeed a loading of the two on a single factor (Leshem and Glicksohn, 2007). Gender differences have been demonstrated in venturesomeness, with males showing increased venturesomeness (e.g.  $t = 4.11$ ,  $p < 0.001$ ; Luengo et al., 1991).

The UPPS model also includes sensation seeking as an individual pathway to impulsivity. It is defined by Whiteside and Lynam as both the '*tendency to enjoy and pursue activities that are exciting*' and '*an openness to trying new experiences that may or may not be dangerous*' (p. 686, Whiteside and Lynam, 2001). It is aligned with the excitement-seeking facet of extraversion within the Five Factor Model (Cyders and Smith, 2008b). The psychometric properties of the sensation seeking pathway are sound and it has been well replicated within the literature thus far (Van der Linden et al., 2006, Whiteside et al., 2005), although the scale has low correlations with the other three pathways to impulsivity contained within the UPPS; 0.00 with premeditation, 0.18 with urgency and -0.14 with perseverance (Whiteside

and Lynam, 2001). This suggests an independent facet, though other authors emphasise its function as an independent pathway within the model (Cyders and Smith, 2007). The clinical validity of the pathway has been clearly demonstrated, with sensation seeking predictive of problem gambling and problem drinking (Cyders et al., 2007, Fischer and Smith, 2008, Whiteside and Lynam, 2003), general risky behaviour (Cyders and Smith, 2008a), bulimia nervosa (Claes et al., 2005, Fischer et al., 2008, Fischer and Smith, 2008), 'positive' risk taking (Fischer and Smith, 2004) and generalised deviance (Lynam, 2004). The predictive value in these studies is often additive or in some way distinct to the other pathways. For example, in a study conducted by Cyders and colleagues (2007), sensation seeking was predictive of increases in students' drinking frequency over the first year of college, while positive urgency was predictive of the quantity of alcohol drunk and drinking problems over the first year. This pattern of sensation seeking being predictive of engagement in behaviour while other aspects of impulsivity influence the negative impact of the behaviour, has been replicated across other studies (e.g. differentiating nicotine use and dependence, Spillane et al., 2010), suggesting sensation seeking makes a valuable and independent contribution to our understanding of impulsivity and related behaviours.

#### **1.2.6 Positive Models of Impulsivity**

The final perspective on impulsivity to be considered in this chapter is that of impulsivity as a positive force. This is frequently absent within the literature, with impulsivity '*viewed as counterproductive by society*' (p.1, Stanford et al., 2009) and its relations to 'negative' and deviant behaviours most commonly researched. While the relationship between impulsivity and these forms of behaviour are clear, as shown by some of the literature referenced within this chapter, it is nevertheless likely that impulsivity has some adaptive functions, particularly in terms of sociability and ability to respond quickly (Gullo and Dawe, 2008).

Dickman's model of impulsivity, as discussed earlier, contains two pathways to impulsive behaviour: functional and dysfunctional impulsivity. Although both these facets emphasise a non-planning form of impulsivity ('*the tendency to act with relatively little forethought*', p.1; Dickman, 1990), functional impulsivity is the only major description to emphasise positive consequences, and as such also requires noting here. Dickman described functional impulsivity as relating to the ability to respond quickly and accurately during complex, time limited tasks. As was noted earlier, it is not clear whether positive impulsivity is purely a function of intelligence (Reeve, 2007). Regardless, it is likely that the positive consequences of impulsivity are wider ranging than Dickman's description encompasses (Claes et al., 2000). The positive and adaptive functions of impulsivity, both objectively and from the perspective of the individual, are in great need of further investigation.

### 1.3 CONCLUSIONS

The various models of impulsivity discussed within this chapter, and their associated measures, are summarised in **Table One** below.

<b>Non-Planning Models of Impulsivity:</b>	
<i>Impulsivity resulting from lack of forward planning or careful thinking</i>	
Non-Planning Impulsivity	Barratt Impulsiveness Scale (BIS; Barratt, 1959)
(Lack of) Premeditation	UPPS Impulsive Behaviour Questionnaire (UPPS; Whiteside and Lynam, 2001)
Narrow Impulsivity	Eysenck Impulsivity Scale (Eysenck and Eysenck, 1978)
Functional Impulsivity/ Dysfunctional Impulsivity	Dickman's Impulsivity Inventory (Dickman, 1990)
Reflection Impulsivity	Matching Familiar Figures Test (Kagan et al., 1964)
<b>Attentional Models of Impulsivity</b>	
<i>Impulsivity resulting from difficulty concentrating and focusing attention</i>	
Attentional Impulsivity	BIS (Barratt, 1959)
(Lack of) Perseverance	UPPS (Whiteside and Lynam, 2001)
<b>Motor Models of Impulsivity</b>	
<i>Impulsivity resulting from an inability to inhibit behaviours or actions</i>	
Motor Impulsivity	BIS (Barratt, 1959)
Response Inhibition	Go/No Go Task (Crean, de Wit and Richards, 2000)
<b>Reward Models of Impulsivity</b>	
<i>Impulsivity resulting from intense pursuit of reward</i>	
Behavioural Activation/ Behavioural Inhibition	BIS/BAS Scales (Carver and White, 1994)
Reward Discounting	Single Key Impulsivity Paradigm (Mathias, Dougherty, Marsh et al, 2002) Two-choice Reward Task (Marsh, Dougherty, Mathias et al, 2002) Delay of Gratification tasks (Mischel, Shoda and Rodriguez, 1989)
<b>Sensation Seeking Models of Impulsivity</b>	
<i>Impulsivity resulting from a willingness to take risks in pursuit of pleasurable experiences</i>	
Venturesomeness	Eysenck Impulsivity Scale (Eysenck and Eysenck, 1978)
Sensation Seeking	UPPS (Whiteside and Lynam, 2001)
<b>Positive Models of Impulsivity</b>	
<i>Impulsivity as containing the potential for positive outcomes</i>	
Functional Impulsivity	Dickman's Impulsivity Inventory (Dickman, 1990)

**TABLE ONE: Summary of Various Pathways to Impulsivity and their Measures**

This chapter has attempted to describe six of the key perspectives on impulsivity: non-planning, attentional, motor, reward, sensation seeking and positive. These perspectives have clear overlaps with one another, both within the same model and across different models, though models differ in the aspects of impulsivity they emphasise. Some models use different terms to describe similar aspects of impulsivity, while others use the same term but mean quite different things (so called 'jingle' and 'jangle' fallacies, see Whiteside and Lynam, 2001). What is clear is that the term impulsivity covers a wide range of different concepts, with no firm conclusion as to a single definition or model. The strongest consensus appears to be of an impulsivity consisting of multiple forms, which vary both within and between individuals. For the field to continue to progress, greater care is needed from authors in acknowledging precisely which aspect or aspects of impulsivity they may be investigating.

## CHAPTER 2: IMPULSIVE BEHAVIOUR

### 2.1 INTRODUCTION TO IMPULSIVE BEHAVIOUR

‘Impulsive behaviour’ is not well defined, though it encapsulates those behaviours which are not well thought through by the individual and which often result in negative or unexpected outcomes. Individuals who have elevated levels of impulsivity have been shown to frequently engage in multiple such behaviours, as will be described within this chapter. While there is a wide literature relating impulsivity to numerous psychiatric disorders - namely attention deficit hyperactivity disorder, borderline personality disorder and bipolar disorder – these will, where relevant, be discussed in later chapters (specifically **Chapter 5**) and not within this section. Impulse Control Disorders will be covered here (**Section 2.2**). It is important to note that impulsivity is distinct from activity level, with the two variables having different genetic and environmental influences (Loos et al., 2009). Impulsive individuals can therefore be seen to engage in certain behaviours as a result of impulsive processes, and not simply because they are more likely to engage in behaviour as a result of increased activity.

### 2.2 IMPULSE CONTROL DISORDERS

While impulsivity is a core feature of many psychiatric disorders, it is also the key diagnostic criterion for the Impulse Control Disorders (ICDs) within the Diagnostic and Statistical Manual Version IV (DSM-IV, American



Psychiatric Association, 1994). These disorders are characterised by an inability to resist the urge to engage in particular behaviours which have negative long term consequences (*'the failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others'*; American Psychiatric Association, 1994). This encompasses a wide range of behaviours, some defined within the category and others which fall under the title of ICDs Not Otherwise Specified. These various behaviours will be described in a little more detail throughout this subsection.

ICDs as a whole are very common as comorbidities within psychiatric populations. Grant and colleagues (2005) used the Minnesota Impulsive Disorders Interview to investigate the prevalence of ICDs within a sample of 204 randomly selected psychiatric inpatients. In the sample, 30.9% of patients met diagnostic criteria for at least one current ICD, while 20.6% showed symptoms of two or more. These results demonstrate the relevance of ICDs to psychiatric populations.

While studies such as Grant's demonstrate the value of ICDs as an area of interest, their place within the DSM-IV is controversial. The impending publication of DSM-V has prompted debate regarding the structure and function of the ICDs. While defined by their impulsive nature, ICDs have consistently been shown to demonstrate compulsive elements, leading some researchers to recommend the re-naming of the ICDs as 'Impulsive/Compulsive Spectrum Disorders'. Evidence in support of this

includes increased obsessive-compulsive cognitions in ICD patients (Iancu et al., 2007) while individuals displaying compulsive sexual behaviour also demonstrate impulsive tendencies (Raymond et al., 2003).

Most recent proposed revisions for DSM-V have described the movement of certain ICDs to other categories. Pathological gambling is likely to be reclassified as an Addiction Disorder, while trichotillomania looks set to move to Anxiety and Obsessive-Compulsive Spectrum Disorders (American Psychiatric Association, 2010). Given these changes it is interesting to consider whether impulsivity is fundamental to the behaviours described and indeed to what extent these disorders are the product of impulse dyscontrol.

### **2.2.1 Intermittent Explosive Disorder**

Intermittent Explosive Disorder (IED) is defined within the DSM-IV as the presence of rage or aggression, which is out of proportion to given stressors, and which is not better explained by substance use or another disorder. While not particularly well studied, prevalence rates have shown that it is fairly common. As part of the National Comorbidity Survey Replication Kessler and colleagues (2006) found the lifetime rate of IED in a general population sample to be 7.3%, while Grant and colleagues (2005) identified current IED in 6.9% of their psychiatric inpatient sample. IED is associated

with high negative impact, with average costs of property damage reaching \$1359 and an increased risk of injury (Kessler et al., 2006).

Along with IED, aggression has been more widely linked to impulsivity.

Models of impulsive aggression - in which individuals behave aggressively when provoked, without premeditation or consideration of the consequences of their aggressive actions - play a key role within aggression literature and are considered extremely relevant to crime prevention (Barratt and Slaughter, 1998). While some experimental investigations of the link between impulsivity and aggression have provided negligible results (e.g. Seibert et al., 2010), most have indicated the presence of a strong relationship between the two. This has been most clearly demonstrated in studies that investigate impulsivity in aggressive/violent populations. For example, Kumari and colleagues (2009) discovered significantly increased 17 impulsiveness scores in patients with schizophrenia and a history of violence as compared to both healthy controls and patients with schizophrenia but no history of violence. Mathias and colleagues (2002) also looked at impulsivity and aggression, but used laboratory behavioural assessments (SKIP and the Immediate/Delayed Memory Task) in women on parole. They found that women with a history of aggression had significantly higher impulsivity than those without. The close links between these two traits, as demonstrated in these and similar studies, has led to the conclusion that the two - while distinct - are very closely related (García-Forero et al., 2009).

### 2.2.2 Kleptomania

Kleptomania is considered to be the theft of an item, which has no personal or monetary value to the individual. Thefts are often accompanied by a building of tension before the act, which dissipates once the item is taken. Such items hold no intrinsic value to the individual and are frequently discarded or replaced once the emotional state has passed. Estimates of diagnosed kleptomania within the general population are low (e.g. 0.6%, Dannon et al., 2004), although rates are noticeably higher in impulsive clinical populations (e.g. 4.5% prevalence in a sample of women with Binge Eating Disorder; Fernández-Aranda et al., 2008).

While kleptomania is a specific ICD, there is evidence that impulsivity is more widely related to general shoplifting. Shoplifting itself is fairly common with a comprehensive general population survey estimating the lifetime prevalence to be upwards of 11% (Blanco, 2008). Blanco's prevalence study, which used data relating to 43000 participants from the National Epidemiologic Survey on Alcohol and Related Conditions, demonstrated high comorbidities between shoplifting and other disorders of impulse control, such as pathological gambling, as well as other disorders related to impulsivity (e.g. substance use, bipolar disorder; Blanco, 2008). Further evidence of the role of impulsivity in shoplifting came in an interesting study by Sarasalo and colleagues (1997), who asked shoplifters and individuals diagnosed with kleptomania to rate their perceived impulsivity and level of

planning, as well as their emotional experiences of theft, on Visual Analogue Scales (VAS). They discovered that shoplifting and kleptomania were qualitatively similar, with both groups reporting high impulsivity and low planning before a theft. Both groups also reported high tension preceding and relief succeeding the act, suggesting that kleptomania and shoplifting both have similar impulsive motivations.

### **2.2.3 Pathological Gambling**

Pathological gambling (PG) is the inability to resist urges to gamble, which leads to negative impacts on social and occupational functioning. Although PG is currently categorised as an ICD within DSM-IV it has been flagged for reclassification as an Addiction Disorder in DSM-V. This is due to the conceptual links with substance and alcohol addiction (in terms of e.g. tolerance and withdrawal; see Raylu and Oei, 2002), which have led to PG being described as a '*non-pharmacological addiction*'. Again, PG is more common in psychiatric than general populations, with estimates around 3.9% in the general population (Shaffer et al., 1999) and 6.9% within a psychiatric population (Grant et al., 2005).

There is a wealth of evidence suggesting that impulsivity is a key mechanism in PG. Alessi and Petry (2003) investigated the impulsivity levels of sixty-two out-patient pathological gamblers using both laboratory behavioural (delay discounting) and self-report (I7) measures. They found that more severe

pathological gamblers (according to a median split of the sample using the South Oaks Gambling Screen) discounted delayed rewards more steeply than less severe pathological gamblers i.e. severe gamblers gave greater weight to immediate small rewards than smaller rewards in the long term. Self report measures of impulsivity have also been shown to be elevated in samples of pathological gamblers (e.g. I7 and BIS; Petry, 2001).

Impulsivity also appears to be of particular importance as regards treatment of PG. Effective treatment for pathological gambling results in decreases in impulsivity, as shown by Blanco and colleagues (2009). The authors argue that the clinical impact, i.e. abstention from gambling behaviour, of paroxetine treatment is primarily mediated by this decrease in impulsivity. It is however possible that this impact is mediated by the influence of paroxetine on mood, which – as will be discussed within **Chapter 3** – may also have an impact on impulsivity. Impulsivity has also been shown to have an impact on the individual's ability to engage effectively in treatment, with studies indicating that impulsivity is both predictive of poor response to treatment (Maccallum et al., 2007) and of relapse (Goudriaan et al., 2008).

#### **2.2.4 Pyromania**

Despite one study reporting a fairly high lifetime prevalence rate within a general psychiatric sample (5.9%; Grant et al., 2005), pyromania is widely cited as being rare and, as such, difficult to investigate. Differentiated from

arson or simple fire setting, pyromania is the setting of fire with the intention of gaining pleasure and/or relief from the act itself (i.e. the act is not criminally motivated) and is often associated with a fascination with fire. While there is not a wide literature available on the subject of pyromania, a recent study by Labree and colleagues (2010) used the Psychopathy Checklist-Revised (PCL-R) to investigate inability to control impulses in a sample of convicted arsonists. Although not a direct measure of impulsivity, the authors took elevated scores on the PCL-R subscale of 'unstable and socially deviant lifestyle' as a marker for the high levels of impulsivity predicted in a fire setting sample. It is difficult to tell whether the lack of evidence of impulsivity within this ICD is due to the difficulty in accessing the population or because of a lack of association.

#### **2.2.5 Trichotillomania**

Trichotillomania is an individual's repetitive pulling of their own hair, often resulting in bald patches on the head, eyelids or other areas of skin. There is a lifetime prevalence of 4.4% in an adult psychiatric sample (Grant et al., 2005), though prevalence in the general population is much lower (around 1%, though many estimates are as low as 0.6%; see Duke et al., 2010).

While the compulsive aspects of this impulse control disorder have been noted, there does appear to be a clear impulsive element. Ferraro and colleagues (2006) used a newly developed self report rating scale -

Multidimensional Impulsive-Compulsive Spectrum Assessment Instrument (MICSAI) - to investigate the impulsive and compulsive aspects of trichotillomania and skin picking as compared to obsessive compulsive disorder (OCD). They found that trichotillomania and skin picking were more 'impulsive' than OCD as regards the level of planning before the act, the length of time the act could be postponed for, the guilt experienced both before and after engaging in the act, the ritualistic performance of the act and the perceived benefits or otherwise of engaging in the behaviour (Ferrao et al., 2006). Chamberlain and colleagues also found increased reward-moderated impulsivity in a reflection-impulsivity task (the Information Sampling Task) in individuals with trichotillomania (Chamberlain et al., 2007). Results such as these indicate the impulsive aspects to this seemingly compulsive act.

## **2.3 IMPULSE CONTROL DISORDERS NOT OTHERWISE SPECIFIED**

While the behaviours discussed above constitute defined DSM ICD diagnoses, there are other potential ICDs which are presented under the ICD Not Otherwise Specified (ICD-NOS) category within the DSM-IV. Given increasing research into these types of behaviours, and reports of high prevalence rates, there is a growing argument for the inclusion of these constructs as defined ICDs within DSM-V.

### **2.3.1 Risky Sexual Behaviour**



Risky sexual behaviour consists of sexual behaviour for which the potential negative consequences, in terms of the individual's safety and/or health, have not been considered. Examples include a failure to use appropriate protection or engaging in intercourse with high-risk partners. Again, the prevalence of these behaviours among a psychiatric population is high at 4.9% (Grant et al., 2005). Specific psychiatric disorders appear to confer particular risk for engaging in impulsive sexual behaviour, with one study showing that 69% of individuals with a diagnosis of both bipolar disorder and substance abuse had engaged in unprotected sex in the past six months. Further analysis using regression models also indicated that sexual risk taking was related to psychiatric states, with elevated sexual risk taking linked to a recent manic episode (Meade et al., 2008). Risky sexual behaviour is also likely to be elevated among young people and adolescents, which has led to an increase in research and prevention strategies targeted at this age group (Donohew et al., 2000).

While risky sexual behaviour is interchangeably described as compulsive sexual behaviour, the relevance of impulsivity as an underlying mechanism is clear in the literature. Raymond, Coleman and Miner (2003) used the Minnesota Personality Questionnaire (MPQ) and a semi-structured interview to investigate the relative impulsivity and compulsivity of what they termed 'compulsive sexual behaviour'. Their sample of twenty-five individuals with compulsive sexual behaviour showed decreased scores

compared to a normative sample on the control subscale of the MPQ, which the authors took to indicate elevated impulsivity. The authors also identified a subgroup of their sample whose sexual behaviour was expressly 'impulsive'; individuals in this group endorsed an absence of rumination regarding the behaviours and acting immediately upon their urges. Results from an investigation by Donohew and colleagues (2000) of sexually risky behaviour in a high school sample supports this finding. Using an adapted form of Zuckerman's Sensation Seeking Scale and a non-standardised impulsivity scale (reported by the authors as similar in scope and psychometric properties to the I7), the authors found that sensation seeking and impulsivity were highly predictive of participants' self reported risky sexual behaviour, both individually and additively.

### **2.3.2 Compulsive Buying**

Compulsive buying is the absence of control over one's own spending with resultant financial difficulties. As with other ICDs, incidents of spending are often preceded by increasing tension and a growing urge to engage in the behaviour and followed by a relief of tension along with high levels of guilt once the behaviour is complete. Prevalence in developed countries is very high, with a recent study estimating that 5.8% of the general US population had problematic levels of compulsive buying (Koran et al., 2006). Grant et al.'s (2005) in-depth ICD prevalence study showed rates in a psychiatric population to be as high as 9.3%. Compulsive buying is particularly common

in women with binge eating disorder (BED), another psychiatric disorder characterised by high levels of impulsivity. Fernández-Aranda and colleagues (2008) found compulsive buying disorder to be the most common ICD in individuals with eating disorders, with 11.8% of their sample meeting criteria for compulsive buying over their lifetime.

Despite the high prevalence of compulsive buying, research in the area is still in its infancy. An interesting study, conducted by Billieux and colleagues (2008), involved the collection of scores on the UPPS and the Questionnaire about Buying Behaviour (QABB), a measure of compulsive buying tendencies. They found that in a general population sample increased compulsive buying tendency was related to increased scores on several facets of the UPPS, specifically urgency, premeditation and perseverance. This suggests that high levels of impulsivity may underlie compulsive buying behaviour, a finding that is reinforced in a study by Christenson and colleagues (1994). This small study of twenty-four compulsive buyers (contrasted with twenty-four matched controls) graded descriptions of out of control buying as either compulsive or impulsive, with 23 of the individuals describing buying behaviour that was graded as primarily impulsive.

### **2.3.3 Internet Addiction**

Internet addiction (IA) is the overuse of computers and the internet to a level which is pathological and which results in negative consequences for the individual. Unsurprisingly, this addiction has not long been recognised but has already generated a good deal of research interest. Researchers have called for the inclusion of IA as a named disorder within the DSM-V, stating the evidence of an apparently growing worldwide incidence and even mortality (Wu and Cheng, 2007). The prevalence is widely cited as being 'high', with Cao and colleagues reporting prevalence rates of 2.4% in their sample of 2620 high school students (Cao et al., 2007).

Many researchers, including Block (2008), have argued that internet addiction, like pathological gambling, is a behavioural addiction. IA appears to contain key addiction hallmarks of withdrawal and tolerance, along with the persistence of the individual to engage in the behaviour in spite of negative repercussions resulting from it. A study conducted by Bernardi and Pallanti (2010) reported a strong correlation between Internet Addiction Scale (IAS) scores and scores on the Yale-Brown Obsessive Compulsive Severity Scale (YBOCS) ( $r=0.771$ ,  $p>.001$ ), suggesting that compulsivity may in some way underpin IA. While direct research looking at impulsivity in IA is less common, Cao et al.'s (2007) study in Chinese high school students did provide some evidence for the role of impulsivity in IA. They found significant positive correlations between the Diagnostic Questionnaire for Internet Addiction (YDQ) and all facets of the BIS-11, as well as inhibition failures on a Go/No Go task. Clearly, more research is required to better

understand the exact impulsive, compulsive and addictive features of IA, with current evidence suggesting all three elements are likely to contribute to the disorder.

## **2.4 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS ESTABLISHED**

While the ICDs form a major part of the impulsivity presence within the DSM-IV, there are many other behaviours in which the role of impulsivity has been established. These behaviours appear commonly in individuals with high levels of trait impulsivity and may also be linked to state fluctuations in impulsivity.

### **2.4.1 Suicide**

Suicide, the act of taking one's own life, is a leading cause of death worldwide (Giegling et al., 2009) with a high economic and social burden (Kashner et al., 2000). A large scale study using data from 5877 respondents to the National Comorbidity Survey found lifetime suicidal ideation in 13.5% of participants, with 4.6% of the sample making an attempt. Rates of completed suicide are far less, and there appears to be a clear distinction between suicide attempts and suicide completion; with attempts more common in females using drug ingestion as a method, while completed suicides tend to employ more violent methods (e.g. firearms) and are seen more commonly in males (Iribarren et al., 2000). Despite clear differences,

both suicide attempt and completion have been reliably demonstrated to be predicted by hopelessness, depression and prior suicidal ideation or attempts (Brown et al., 2000).

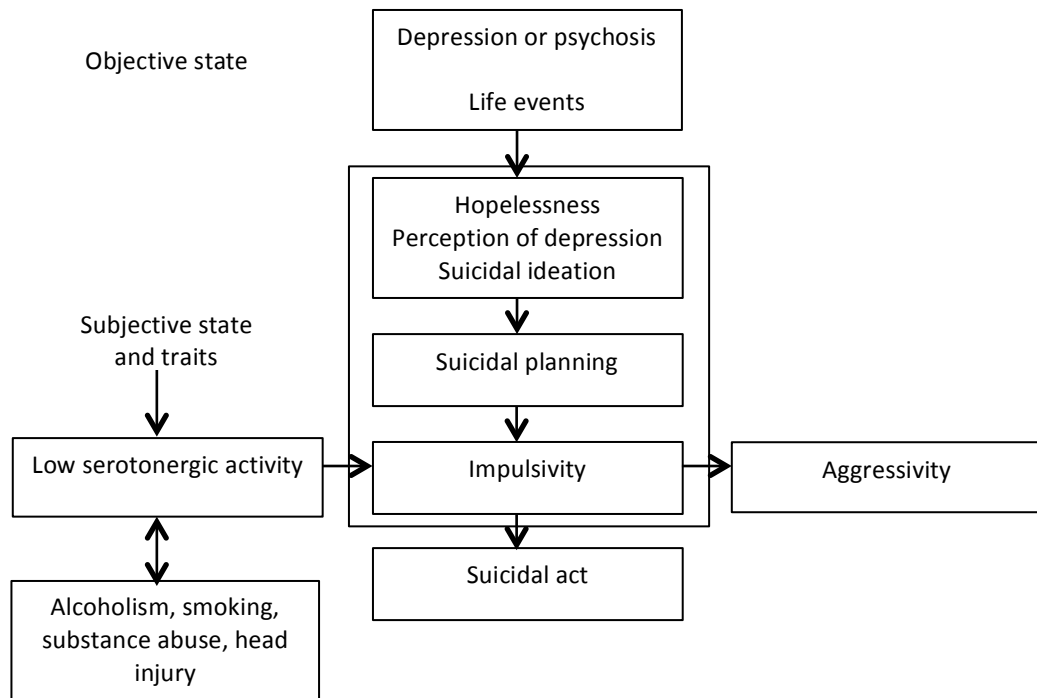
While the risk factors for suicide are both clear and reliably replicated - particularly hopelessness (Beck et al., 1985) - recent research has provided evidence for the importance of impulsivity as a further relevant risk factor (Dalton et al., 2003). Individuals who have attempted suicide regularly score significantly higher than individuals who have not attempted suicide on both self report and behavioural measures of impulsivity (Dougherty et al., 2004a). In a second 2004 study, Dougherty and colleagues used the Immediate and Delayed Memory Tasks (IMT/DMT) - modified versions of the Continuous Performance Task measuring response inhibition in a similar fashion to G/NG tasks – to investigate impulsivity in three groups: individuals who had never attempted suicide (n=10), individuals who had attempted suicide once (n=20) and individuals who had multiple suicide attempts (n=10). Commission errors, where individuals respond inaccurately to a letter string very similar to but not matching the target stimulus, were highest in individuals with a history of multiple attempts and decreased significantly in those with both a single and no prior attempts. They also found a difference in BIS motor scores across the three groups (Dougherty et al., 2004b). Results like these indicate that impulsivity is likely to be important in the prediction of suicidal behaviour.

The mechanism by which impulsivity is linked to suicidality is unclear (Gvion and Apter, 2011). Initial research focused upon attempts or completed suicides which themselves could be defined as impulsive (i.e. those suicidal acts which are unplanned by the individual). An in-depth study by Wyder and De Leo (2007) examined the phenomenon of impulsive suicide, including exploring which variables best differentiated impulsive from non-impulsive suicide attempts. In their community sample of 112 Australian adults, they found 26% of attempts could be described as impulsive, fitting as they did their operational definition of an impulsive attempt as unplanned with fluctuating suicidal ideation. These attempts were associated with lower suicidal ideation and depression, and with the individual less sure that their attempt would lead to death. However, there appeared to be no difference between trait impulsivity (measured by the Plutchik Impulsivity Scale; Plutchik and Van Praag, 1989) in individuals with impulsive attempts and those with non-impulsive attempts. These findings contrast with results from a study conducted by Wojnar and colleagues (2009) who used more common measures of impulsivity to compare groups of individuals who endorsed impulsive (defined as less than thirty minutes planning) compared to non-impulsive suicide attempts. While there was no difference between the trait impulsivity of the two groups (measured by both the BIS and the Revised NEO Personality Inventory, NEO-PI-R; Costa and McCrae, 1992), the two groups did differ significantly in terms of impulsive responding on the Stop-Signal task, suggesting that state – and not trait - impulsivity is predictive of attempts which are in themselves

impulsive (see also Swann et al., 2005). This is reinforced by models of suicide that emphasise state aspects of impulsivity as triggering suicide attempts. One example of this is Baumeister's (1990) escape model, which posits that experiences which cause the individual to have negative self-evaluation or -awareness lead to negative affect, which in turn causes the individual to wish to escape. Escape is achieved via a state of decreased functioning, so called 'cognitive deconstruction'. While in this state individuals are less embodied, with meanings disengaged from action, and as a result they are able to act in ways which are disinhibited or impulsive, thus allowing a suicidal act to take place.

In contrast to the state models of impulsivity in suicide, there are also models which take into account the evidence on increased trait impulsivity of individuals who have attempted suicide (Giegling et al., 2009, Swann et al., 2005). One example is Mann's stress-diathesis model, which developed out of the research group's own work indicating trait impulsivity was highly predictive of past suicide attempt (Mann et al., 1999). This model considers impulsivity to be a fundamental underlying personality trait, which - along with other personality factors and affective states such as hopelessness - interacts with life events or psychiatric states (primarily depression and psychosis) to promote suicidal acts (see **Figure Two**).

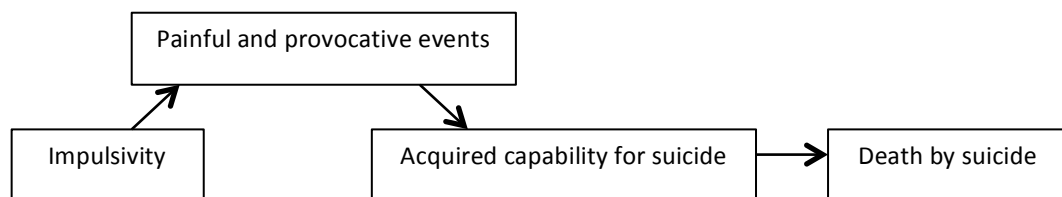




**FIGURE TWO: Stress-Diathesis Model of Suicide (Mann et al., 1999)**

In contrast is Joiner's (2005) interpersonal-psychological model. This model rests on the importance of three variables: perceived burdensomeness, thwarted belongingness and the acquired capability to commit suicide. Within the model, 'perceived burdensomeness' and 'thwarted belongingness' are variables which explain the individuals desire to attempt suicide, and the presence of 'acquired capability to commit suicide' explains their ability to take action to do so. In a recent study, Anestis and Joiner (2011) explored the ways in which impulsivity may influence the impact of these three variables on decisions to attempt suicide. They found that the three-way interaction between the model variables significantly predicted number of lifetime attempts in individuals with above-median scores on the negative urgency facet of the UPPS (see **Chapter 3** for further exploration of

negative urgency). In their discussion of these findings, the authors describe impulsivity as a catalyst, increasing the risk of suicide attempt when the three key model variables are elevated. They also hypothesise a role for impulsivity in acclimatising individuals to painful events – they suggest highly impulsive individuals have an increased likelihood of engaging in dangerous or painful behaviour - and therefore increasing their acquired capability for suicide. This is explored experimentally by Bender and colleagues (2011), who found that BIS impulsivity indirectly predicted acquired capability for suicide, with lifetime experience of painful and provocative events mediating this relationship (see **Figure Three**). The model therefore appears to hold potential for incorporating impulsivity in several ways, but further research is required to confirm these findings.



**FIGURE THREE: Impulsivity within the Interpersonal-Psychological Theory of Suicide (Bender et al., 2011)**

It is clear that impulsivity plays an important role in suicidal behaviour, though more research is needed to disentangle the state and trait aspects relevant to suicidal behaviour, as well as the potential indirect pathways

through which impulsivity may influence the decision to engage in suicidal behaviour.

#### **2.4.2 Non Suicidal Self-Injury**

Non suicidal self-injury (NSSI), also referred to simply as self-harm, is defined as deliberately harming the self in the absence of a wish to die. While there is a degree of potential overlap with suicidal behaviour (i.e. in those situations where the individuals' suicidal intent is unclear e.g. they take action which may cause death but express ambivalence as to the lethality of the outcome), NSSI is a distinct category of behaviour, with independent risk factors and motivations (Muehlenkamp and Gutierrez, 2004). Self-injury can take numerous forms, with cutting and burning particularly common (72% and 35% of self-injurious behaviour respectively; Duffy, 2009). As a behaviour that is commonly kept hidden, accurate prevalence rates are hard to obtain; however the limited available data indicates that the prevalence in the general population is very high. A recent large-scale survey looking at a sample of 2008 Scottish adolescents found 13.8% of the sample endorsed self-harming at some point in their lifetime, with a further 14.4% seriously considering self-harming at some point in the previous year without actually doing so (O'Connor et al., 2009).

Research has been broadly supportive of the role of impulsivity in self-injury. Herpetz and colleagues' (1997b) use of the BIS-10 in a group of 'self-

mutilators' - individuals who had a history of at least three instances of deliberate damage of body tissue without suicidal intent – found that these individuals had elevated non-planning, motor and total BIS impulsivity scores compared to controls. More recently, Carli and colleagues (2010) compared offenders separated in to high and low impulsivity groups by 25<sup>th</sup> and 75<sup>th</sup> percentile cut-offs of the BIS-7b. They found significantly higher rates of self harm in the high impulsive group (12.6% compared to 22.5%;  $p < 0.001$ ). Given that this indicated relationship between impulsivity and self harm was eliminated when other psychological variables (e.g. depression) were controlled for, the authors tentatively proposed a model in which impulsivity is indirectly related to self harm, with aggression and resilience as potential modifiers of this relationship. Other studies have also suggested that impulsivity may interact with negative mood to promote self-injury (Glenn and Klonsky, 2010).

Other studies have focused on behavioural measures of impulsivity, with promising results. Dougherty and colleagues (2009) found impulsivity measured by the Two-Choice Impulsivity Paradigm (TCIP, a reward-discounting measure) but not the Go-Stop (a response inhibition task) was elevated in individuals who have both self-harmed and attempted suicide compared to those who purely self-harm. While this primarily reinforces statements made above regarding the role of impulsivity in suicidal behaviour, the high scores in both groups on both these measures indicates

that comparisons of behavioural impulsivity in self-injuring and general population samples would be informative.

### **2.4.3 Substance Use**

Within the DSM-IV substance use disorders are separated into substance abuse and substance dependence. Both describe substance use which is continued despite negative consequences for the individual, but with substance dependence additionally requiring the individual to be either physiologically or psychologically dependent on the substance, frequently indicated by the presence of tolerance of and symptoms of withdrawal from the substance. Taking the large sample of 43 093 general population adults who participated in the United States National Epidemiologic Survey on Alcohol and Related Conditions, Compton et al. (2007) found lifetime drug abuse prevalence rates of 7.7% and lifetime drug dependence of 2.6%.

Research into impulsivity in substance use is complicated by the neurological impact of prolonged substance abuse. Frontal lobe damage caused by on-going drug or alcohol use may potentially increase impulsivity, particularly where the orbitofrontal cortex has been compromised (see Rahman et al., 2001), leaving many studies unable to identify whether or not high impulsivity levels are a pre-morbid and potentially causal personality trait of individuals who go on to abuse substances. Researchers have tackled this issue in various innovative ways; with some studies noting

the high levels of substance use in other disorders characterised by impulsivity (e.g. with impulsivity proposed as the underlying link between bipolar disorder and substance abuse; Swann et al., 2004), while others have looked at impulsivity levels across various forms of substance abuse, finding high levels of impulsivity regardless of preferred substance (Clark et al., 2006). Clark et al.'s study also showed that high levels of impulsivity were persistent even in former substance users, suggesting either long term impact from substance use or pre-morbid levels of trait impulsivity which persist across the life span.

Researchers at the University of Texas conducted a particularly informative study into the association between impulsivity and substance use. This study examined the trait impulsivity of 50 treatment-seeking cocaine dependent participants using the BIS-11, and explored the relationships between these scores and measures of dependence severity and response to treatment. When severity of addiction was measured using total money spent per day, significant positive correlations with both total and non-planning BIS impulsivity were found. However, when severity of use was measured using a 13 item scale of cocaine withdrawal, correlations with all three subscales and the total BIS score were found. Furthermore, high baseline impulsivity (above the median for the sample) was predictive of shorter duration in treatment as well as dropping out of treatment (Moeller et al., 2001b). The authors conclude that the findings are supportive of an important role of

impulsivity in substance use, and suggest impulsivity should be a key target for intervention to reduce harmful substance use.

#### **2.4.4 Alcohol Use**

Excessive alcohol use is included within substance use in the DSM-IV classification. Research looking specifically at alcoholism also supports a link with impulsivity (Ketzenberger and Forrest, 2000). However, research also suggests that impulsivity is of particular importance to binge drinking. Binge drinking is defined as drinking a large volume of alcohol in a single session (generally 8+ units for men and 6+ units for women) or drinking with the express intention of getting drunk. The prevalence of binge drinking is so widespread now to be described in one study as '*common among most strata of US adults*' (p.70; Naimi et al., 2003). This study also reported an average of 7.4 binge drinking episodes per person per year in their sample of American adults.

The link between impulsivity and binge drinking coming out of the literature suggests the need for further investigation. Magid and Colder (2007) used a sample of 257 undergraduate students to investigate the role of the various UPPS pathways in excessive drinking. Their interesting findings indicated a strong relationship between alcohol use (in terms of quantity and frequency) and both sensation seeking and (lack of) premeditation, indicating that individuals will drink high quantities of alcohol in order to

promote positive arousal while not considering the consequences of excessive alcohol consumption. At the same time (lack of) perseverance and urgency were both related to increased drinking-related problems (e.g. unable to complete academic work; as measured by Rutgers Alcohol Problem Index, White and Labouvie, 1989), suggesting these facets are in some way related to the negative consequences of the individuals' drinking. The UPPS pathways also relate to the individual's motivations to engage in drinking, with research by Anestis and colleagues (2007b) demonstrating that urgency was predictive of drinking to cope, while Cyders (2008) has shown that students high in trait levels of positive urgency (a form of urgency which relates to the individuals' tendency to behave impulsively under conditions of positive affect; to be discussed in more detail in **Chapter 3**) drink a larger volume of alcohol in pursuit of maintaining their positive affective state. Clearly, further research into the relationship between impulsivity and binge drinking will produce further findings of interest.

#### **2.4.5 Disordered and Binge Eating**

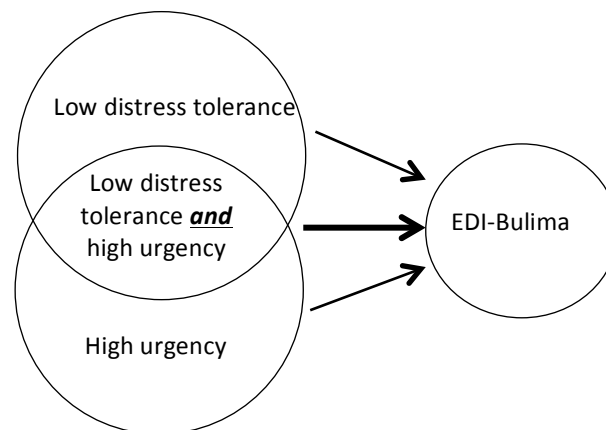
Binge eating is defined as eating, within a restricted time frame (generally less than a two hour period) a larger quantity of food than would be considered normal (DSM-IV). These binges are usually accompanied by a feeling that the eating is out of the individual's control and are generally followed by feelings of regret. Binges can be, but are not exclusively, followed by purging (ridding the body of the food using e.g. exercise,



laxatives, vomiting). Data from the National Comorbidity Survey Replication suggest 3.5% of women and 2.0% of men meet lifetime criteria for binge eating disorder (Hudson et al., 2007), while other studies indicate prevalence rates of binge eating to be upwards of 9% in a sample of normal weight females (French et al., 1999).

Much of the research regarding impulsivity in disordered eating has focused upon individuals who have experienced bulimia nervosa (BN). Claes, Vandereycken and Vertommen (2005) compared impulsivity in bulimia nervosa patients with bingeing-purging anorexia nervosa patients and restrictive anorexia nervosa patients, finding that BN patients had higher levels of all four UPPS impulsivity pathways than both of the other groups. Bingeing-purging AN patients, while having decreased impulsivity comparative to BN patients, had significant higher impulsivity than restrictive AN patients. These results indicate that impulsivity may specifically relate to the binge eating aspects of disordered eating psychopathologies. This is reinforced by further research in individuals who have experienced BN, which has examined the concept of multi-impulsivity, whereby individuals who have BN are also more likely to regularly engage in other so-called impulsive behaviours; including binge drinking, suicide attempts, self harm, risky sexual behaviour and shoplifting (Nagata et al., 2000). Rates of ICDs also appear to be high in these individuals, with one study suggesting a lifetime prevalence rate of 16.6% (Fernández-Aranda et al., 2008).

Impulsivity also appears to be predictive of binge eating within general population samples. Whiteside and colleagues (2007) found that urgency better predicted binge eating (measured by the Eating Disorders Diagnostic Scale; Stice et al., 2000) in a sample of 695 undergraduate students than did gender, food restriction and intense personal evaluations of weight and shape. The findings are reinforced by Anestis et al (2007a), who replicated the relationship between urgency and binge eating (this time using the Eating Disorders Inventory), showing that urgency interacts with distress tolerance to best predict binge eating and bulimic symptoms. See **Figure Four** for the model.



**FIGURE FOUR: The Interaction Between Distress Tolerance and Urgency in the Prediction of Bulimic Symptoms (Anestis et al., 2007a)**

The above evidence appears to suggest that impulsivity plays a key role in disordered eating, especially in binge eating, both within the context of bulimia nervosa and throughout the continuum of binge eating found in the general population.

## **2.5 BEHAVIOURS WHERE A ROLE FOR IMPULSIVITY IS PROPOSED**

The above literature demonstrates the well-documented importance of impulsivity to a wide range of disorders and behaviours. Aside from these behaviours, there is also an understanding within the literature that impulsivity may be an important factor in various other behaviours. This subsection will briefly summarise some behaviours with characteristics that suggest that impulsivity may play a role in their aetiology.

### **2.5.1 Financial Risk-Taking**

Financial risk-taking clearly relates to the literature on pathological gambling. However, financial risk-taking includes a wider variety of behaviours such as risky business investments and spending money on luxury items one cannot easily afford. Financial risk taking comprises behaviours that are common in everyday life, and which can be considered necessary to succeed in a business setting, and it is therefore by no means pathological. It is instead preferable to regard it as existing on a continuum of behaviour where the level of risk and the consequence of the risk to the individual may vary and where these factors determine the extent of psychopathology.

Financial risk taking is likely to have a clear relationship with both reward and sensation seeking perspectives on impulsivity, with individuals taking risks in pursuit of financial or emotional reward. Wong and Carducci (1991) found high sensation seekers displayed greater financial risk taking compared to low sensation seekers when asked to report their responses to a series of everyday financial decisions. These findings require replication and extension to explore more closely the role of other pathways to impulsivity in financial risk taking.

### **2.5.2 Going AWOL**

Going absent without leave can be described as in some way departing from one's usual geographical base for a period of upwards of several hours without telling other people; for example work or housemates or family. Although running away is commonly considered an impulsive behaviour within the literature (see for example Favaro et al., 2004), specifically targeted research investigating impulsivity as a promoter of going AWOL is virtually non-existent. However, some existing models of impulsive behaviour seem to relate well to this phenomenon and may be applicable. For example, Baumeister (1990) related impulsivity to the need to escape within the context of suicidal behaviour, and it is possible that running away may serve a similar function and be determined by a similarly impulsivity-mediated trigger. Again, an inability to consider the potential outcomes of

one's behaviour (e.g. losing one's job, upsetting friends or family) is likely to impact upon decisions to run away. Further research is needed in this area.

### **2.5.3 Sudden Appearance Change**

Drastically and suddenly changing one's appearance, by means of tattoos, piercings, a haircut or other change, is an immediately visible external display of an internal state. This action can of course be taken following a balanced decision making process, but it may also be taken without consideration. In this case, the long-term implications of the action, minimal or otherwise, would not be represented by the individual.

Once again research directly linking impulsivity and appearance change is limited, though there are several large studies that relate other impulsive-type risk taking behaviours to appearance change. One example is the study of Deschesnes, Finès and Demers (2006), which used a large sample of 2700 high school students. The study showed that adolescents with tattoos or piercings (aside from earlobe piercing) were more likely than their non-body modified peers to engage in multiple externalising behaviours such as problem gambling and drug use. As these others behaviours are associated impulsivity, it is possible that impulsivity might be an underlying factor in sudden appearance change in some cases. The findings are reinforced by data indicating an increased incidence of tattooing in both individuals with eating disorder symptoms (Preti et al., 2006) and individuals who have

committed suicide (Dhossche et al., 2000). Again, there is no evidence currently to support these propositions and more research is required to elucidate any relationships that exist between sudden appearance change and the facets of impulsivity.

#### **2.5.4 Reckless Driving**

Reckless or risky driving includes driving under the influence of drink or drugs, failing to wear a seatbelt and speeding. An inability to foresee the consequences of actions, a desire for high thrill sensations or a tendency to act without thinking when upset or in a positive mood are all possibly relevant to these types of behaviours.

Although there is not a great deal of research in this area, the limited published evidence is strong. For example, Stanford et al. (1996) separated school and university students into high and low impulsivity groups using a mean split of scores on the BIS-11. They found that high-school students in the high impulsivity group were between 4.4 (males) and 8.4 (females) times more likely to drive drunk and between 2.5 (males) and 3.5 (females) times less likely to wear a seatbelt than their low-impulsive counterparts. Results for college students were also strong. Similar findings come from Ryb et al. (2006), who used a non-standardised set of impulsivity questions to identify high impulsivity individuals within a sample of patients who had experienced non-penetrative injury. Again, high impulsive individuals were

significantly more likely than low-impulsive participants to not wear a seatbelt or to drive drunk. Additionally, the authors found that these participants were also much more likely - 2.9 times more than low impulsive individuals - to speed for the thrill, suggesting a particular potential pathway for sensation seeking to certain risky driving behaviours. There is certainly room for future research in this area to look more specifically at the roles of the distinct pathways to impulsivity in predicting risky driving behaviour.

### **2.5.5 Tactlessness**

Tactlessness can be described more simply as ‘blurting out’, and is speaking in a way that is undiplomatic and may be considered offensive. An inability to clearly consider the potential consequences of one’s speech and actions neatly fits with non-planning models of impulsivity. Furthermore, given that unconsidered speech often manifests without the full intention of the speaker, models of inhibitory control are likely to be relevant. In these cases the instant urge to speak one’s mind would succeed before top-down regulatory processes attempting to inhibit the utterance could be activated. Such potential pathways are of relevance to many disorders characterised by high impulsivity including Attention Deficit-Hyperactivity Disorder, where *‘blurting out answers before questions have been completed’* is considered a diagnostic criterion for the impulsivity facet of the disorder (American Psychiatric Association, 1994). Again, more experimental work is needed to better understand these relationships.

### **2.5.6 Creative Thought**

Creative thought and artistic creativity have long been related to psychiatric disorder. This is particularly true of bipolar disorder (Jamison, 1995, Rothenberg, 2001), a disorder with robust links to impulsivity (Swann et al., 2003). It may be particularly pertinent when considering the role of impulsivity in creativity to consider Dickman's (1990) ideas about functional impulsivity, whereby the ability to think and respond quickly and fluidly is considered an aspect of impulsivity.

However, little published research has directly investigated the role of impulsivity in creative thinking. Some studies do refer in vague terms to the potential for impulsivity to influence creativity. As one example, Funk and colleagues (1993) refer to the potential loss of creativity in ADHD when impulsivity is lessened by medication. A recent study conducted by Kipper, Green and Prorak (2010), looked more specifically at the relationships between spontaneity, creativity and impulsivity. The authors found a small positive correlation between creativity (measured by the Creative Personality Scale; Gough, 1979) and (lack of) perseverance, suggesting further research in the area may uncover significant relationships.

## **2.6 CONCLUSIONS**



Behaviour that occurs without planning and consideration of potential outcomes may appropriately be referred to as impulsive behaviour. This describes a diverse range of behaviours, which includes DSM-IV diagnoses of Impulse Control Disorders along with other serious behaviours such as suicidal behaviour and everyday behaviours such as overspending and taking minor financial risks. Equally as diverse is the range of research, with some behaviours having a well documented and established evidence base while others have not been fully explored. It is clear that as researchers' understanding of impulsivity improves, so the number of studies exploring the potential of impulsivity to predict specific behaviours will grow. This growing and developing body of evidence, underpinned by a more sophisticated understanding of this multidimensional concept should result in impulsivity being targeted as a basis for cognitive-behavioural interventions (Moeller et al., 2001a).

It is clear from the preceding literature review that while impulsivity may be necessary for individuals to engage in certain behaviours, it is by no means sufficient, with various other factors relevant to the enactment of the behaviours. For example, compulsivity appears alongside impulsivity as a factor in many of these behaviours. The literature also suggests that the context of behaviour, both internal and external to the individual, influences its course. This is particularly true of the individual's mood state. In the next chapter the literature regarding the influence of mood on impulsivity will be evaluated.

## CHAPTER 3: AFFECTIVE IMPULSIVITY

### 3.1 INTRODUCTION TO AFFECTIVE IMPULSIVITY

Pervasive throughout the decision making literature is an understanding of the impact an individual's mood may have upon their decision making processes (Yuen and Lee, 2003). Similar consideration of the role of affect in impulsivity has been notably absent in recent years. However, many of the very earliest descriptions of impulsivity vividly evoke an impulsivity that is imbued with emotion. One excellent example of this is Esquirol's (1838) description of the *'irresistible impulses'* which *'show all of the features of passion elevated to the point of delirium; the patients, furious or otherwise, are drawn irresistibly to act, which they then repudiate'* (as cited in Ferrao et al., 2006). This frenetic, emotive impulsivity was directly rejected by Barratt, in favour of an impulsivity in which cognitive, not affective, aspects are emphasised (see Barratt and Patton, 1983).

The absence of affect from key models and measures of impulsivity has meant that there is a relatively small field of experimental evidence examining the role of affect in impulsivity. One notable study by Colder and Chassin (1997) used a modified version of the Eysenck Impulsiveness Questionnaire (I7) to investigate how impulsivity may relate to affect, and how these two aspects of temperament may be predictive of alcohol use. Their sample of 427 adolescents (12-18 years old) included 224 children who

had at least one parent with 'alcoholism'. They found that impulsivity modified the relationship between affect and alcohol use, with individuals who have high impulsivity and low positive affect being likely to have both high alcohol use and high alcohol-related impairment (consequences of alcohol use such as having difficulty with schoolwork, etc.). The same study found that individuals with high impulsivity and high levels of negative affect are also likely to have high levels of alcohol use. These relationships persisted when parental alcohol use and participant's age and gender were controlled for. While this study primarily used non-validated scales and was cross-sectional in design, the finding that impulsivity and affect may interact to predict behaviour is important.

Despite the paucity of research exploring a specific mediating or moderating role of impulsivity in the relationship between affect and behaviour, there is good evidence supporting the relationship between affect and behaviour. Negative affect – the experiences of emotions such as guilt, sadness or fear, which are negative for the individual (Watson et al., 1988) - has been shown to be particularly predictive of 'impulsive-type' behaviours such as those described in chapter two (e.g. substance use; James and Taylor, 2007). One theory for the mechanism behind this is proposed by Selby and colleagues (2008), who describe 'emotional cascades' linking negative affect and what they term 'dysregulated' behaviours. Dysregulated behaviour encompasses those behaviours performed by the individual in attempts to regulate their own emotional state. There is a clear overlap between dysregulated

behaviours and what has here been termed impulsive behaviour, suggesting that emotional cascades may be the mechanism behind such impulsive type behaviours as self-harm, binge eating and drinking. An emotional cascade is triggered when an individual experiences negative affect, which they then ruminate upon. This rumination increases negative affect at the same time as decreasing opportunities to use positive emotion regulation strategies (e.g. positive reappraisal, focusing on planning strategies). As a result individuals engage in dysregulated behaviour as a tool for distraction from negative and ruminative thoughts.

Similar ideas have been proposed by Tice and colleagues (2001), who describe a model of emotion distress regulation. This model proposes that impulse control is impaired during emotional distress as a result of a shift in priorities, whereby the individual's focus moves to the alleviation of their current negative affective state, and not upon longer-term needs and goals. In other words, affect regulation - in the form of increased positive mood – takes precedence over self-regulation and the individual engages in behaviours that are immediately rewarding but may be in conflict with their longer-term needs and/or goals. In their article Tice and colleagues show evidence supporting the role of the model in binge eating and procrastination, though it is also likely to be relevant to a wide range of behaviours, particularly those that may be immediately rewarding such as drug use, self injury or risky sexual behaviour. It is possible that individuals who engage in affect regulation in these ways have higher self-reported

impulsivity. Whether or not negative affect results in impulsive-type behaviour as a result of the individual seeking distraction (see the emotional cascades of Selby et al., 2008) or to directly alleviate their negative emotions using rewarding experience (as is described within the emotional distress regulation of Tice et al., 2001), it is clear that negative affect frequently results in impulsive type behaviours and it is therefore likely that the inclusion of affect within models of impulsivity would add predictive value to the models.

### **3.2 DEVELOPMENT OF THE CONCEPT OF URGENCY**

Whiteside and Lynam's (2001) UPPS model developed ideas of an affective impulsivity through the concept of urgency. These ideas have been further developed by Cyders and colleagues (2007), leading to the existence of two affect focused pathways to impulsivity: negative and positive urgency. The contribution of these two constructs to the field of impulsivity will be evaluated in the following sections.

#### **3.2.1 Negative Urgency**

Whiteside and Lynam's (2001) UPPS model was created through the factor analysis (FA) of many relevant impulsivity scales (EASI-III Impulsivity Scales, Dickman's Impulsivity Inventory, Barratt Impulsiveness Scale, Eysenck Impulsiveness Questionnaire, Sensation Seeking Scale) alongside personality

scales such as the revised NEO personality inventory (NEO-PI-R) and the Temperament and Character Inventory (TCI). Also included in the FA were novel items that pilot work suggested were related to impulsivity. The FA indicated the presence of a pathway to impulsivity that included questionnaire items such as 'When I feel bad, I will often do things I later regret in order to make myself feel better now' and 'When I am upset I often act without thinking.' The authors termed this pathway urgency, which they go on to define as the '*tendency to experience strong impulses, frequently under conditions of negative affect*' (p.685). Urgency creates a behaviour pathway to impulsivity in which impulsive behaviour is preceded and triggered by negative affect, and in which an impulsive choice is made on the basis of a desire to alleviate the negative mood state. This pathway is the element of the UPPS that is considered to be the most novel.

In their original paper, Whiteside and Lynam predicted that urgency was likely to be especially relevant to psychiatric disorder and psychopathology. Although the facet and the relevant items on the UPPS Impulsive Behaviour Scale have only been in existence for a relatively short while, what research there has been appears to support this prediction. Studies have shown elevated urgency in psychopathy (Anestis et al., 2009), binge eating (Anestis et al., 2007a), substance dependence (Verdejo-García et al., 2007), pathological gambling (Whiteside et al., 2005), bulimia (Fischer et al., 2008) and in individuals with obsessive compulsive symptoms (Zermatten and Van der Linden, 2008). Furthermore, urgency also appears to be particularly

predictive of impulsive type behaviours such as compulsive buying (Billieux et al., 2008), binge drinking (Fischer and Smith, 2008) and sexual risk taking (Simons et al., 2010). An interesting study conducted by Smith and colleagues (2007) has shown that while sensation seeking specifically relates to the frequency of engagement in risky type behaviour (the study in question focused upon gambling, drinking and binge eating), urgency is especially predictive of problem-level involvement in these behaviours. The authors propose that this pattern is supported by the negative reinforcing potential of such behaviours for the individual, leading them to return to these behaviours without learning more positive coping strategies.

As well as having clear predictive validity, urgency is unusual for impulsivity self report measures in that it demonstrates significant relationships with behavioural measures. Gay and colleagues (2008) collected scores on the UPPS from 126 adult participants, as well as data from two forms of the SART – a Go/No-Go task of response inhibition – and the recent-negative task (RNT), a test of proactive interference. Regression analysis of all UPPS facets along with age and gender found urgency to be the best predictor of commission errors at a slowed version (with infrequent No-Go stimuli) of the SART. The authors state that this indicates that urgency is related to having increased difficulty in inhibiting pre-potent responses. Given the rarity of relationships between self report and laboratory measures of impulsivity (as described in **Chapter 1**), this is an important finding. One possible avenue to investigate would be whether state fluctuations in affect

are accordingly reflected in state fluctuations in response inhibition as a function of trait levels of urgency. Anestis and colleagues (2007b) state that *'urgency may not be an immutable trait'* (p.3027), but that its potential state characteristics make it a good target for impulsivity reducing interventions. Longitudinal studies alongside appropriate measures of state urgency will be needed for further investigation.

### 3.2.1 Positive Urgency

Positive urgency can be considered the complementary opposite to 'negative' urgency in that it considers the *'propensity to act rashly in response to positive affective states'* (Cyders et al., 2007). A fourteen-item measure was created for use alongside the original UPPS Impulsive Behaviour Scale, together called the UPPS-P. The fourteen items can also be used independently, when it is termed the Positive Urgency Measure (PUM). The PUM includes such items as *'When I am very happy, I tend to do things that may cause problems in my life.'* A study by Cyders and Smith (2007) using the UPPS-P explored the position of positive urgency within the UPPS structure. Using confirmatory factor analysis (CFA), the authors discovered a three-factor structure, with three independent factors: sensation seeking, mood-based disposition to rash action and deficits in conscientiousness. The mood-based disposition to rash action factor compromises both positive and negative urgency, while (lack of) perseverance and (lack of) premeditation are facets of the deficits in conscientiousness factor.



As with negative urgency, positive urgency has been shown to be particularly predictive of behaviour. Studies have shown elevated positive urgency predictive of longitudinal increases in gambling behaviour (Cyders and Smith, 2008a), nicotine dependence (Spillane et al., 2010), increased consumption of alcohol when in a positive mood (Cyders, 2008), illegal drug use and risky sexual behaviour (Zapolski et al., 2009). Smith et al.'s (2007) study, as described above, indicated that negative urgency particularly predicts the negative consequences of risky behaviour. These findings have been replicated using positive urgency, which was shown to predict the quantity of alcohol drunk during a drinking episode as well as negative drinking outcomes (measured by the negative outcomes subset of the Drinking Styles Questionnaire; Cyders et al., 2009). Finally, a significant relationship has been shown to exist between the PUM and the Balloon Analogue Risk Task (BART; Cyders, 2008). The BART asks participants to click their mouse to blow up an animated balloon. Each click earns participants a small amount of money, though at a variable point the balloon bursts and all money for that turn is lost. Participants must therefore balance the number of money-earning clicks with an increased likelihood of the balloon popping (see Bornovalova et al., 2009).

Criticism of urgency as an impulsivity construct has suggested that urgency may be simply the tendency to experience either high levels of intense emotion (either positive or negative) or experience such affective states

frequently. This would mean that the concept of urgency would not be a pure description of impulsivity and would therefore have no incremental validity over relevant affect measures. Research has gone some way to refuting this opinion. Cyders and Coskunpinar (2010) collated results on the UPPS-P, the drinking motives questionnaire and the drinking styles questionnaire, alongside questions regarding the frequency and intensity of mood states and engagement in risky behaviour in a large sample of 520 undergraduate students. Hierarchical regression analyses with behaviours engaged in during extreme mood states as the dependent variable indicated that negative and positive urgency added significant predictive value to the model after inclusion of (lack of) premeditation and emotional experience (5.4% and 8.5% of the variance respectively). This suggests positive and negative urgency make unique contributions to the prediction of risky (or 'impulsive') behaviour, over and above the individual's personal experience of emotion.

While it may be accepted that positive and negative urgency together constitute an independent pathway to impulsivity, it is also appropriate to consider to what extent they are distinct from one another. As was already mentioned, one study used CFA of the UPPS-P to reach the conclusion that positive and negative urgency are both facets of the wider disposition to rash action factor (Cyders and Smith, 2007). It is however possible that positive and negative urgency are only differentiated on the basis of the mood being experienced, and do not exist as separable personality traits.

During development of the PUM, positive urgency was described as distinct from the other four UPPS facets and as possessing incremental validity through improved prediction of behaviour (Cyders et al., 2007). In Cyders and Smith's (2007) paper they also describe a study that investigated the divergent validity of the two facets. Again using the UPPS-P, the drinking motives questionnaire and questions regarding risk-taking behaviour and experience of mood, Cyders and Smith used hierarchical regression to predict mood based rash action. They discovered that rash action while in a positive mood was significantly predicted by positive urgency ( $p < 0.001$ , 12.5% of the variance) but not negative urgency (ns, 1.9% of variance). Conversely, rash action taken while in a negative mood was strongly and significantly predicted by negative urgency ( $P < 0.001$ ) but not positive urgency. Such data suggest that the two facets are separable and distinct, though further investigations using mood manipulations within experimental paradigms are required to support the findings.

### **3.3 CONCLUSIONS**

This chapter has attempted to describe the evidence and theoretical perspectives pertaining to affective impulsivity. Much of this work appears to support the notion that impulsive behaviour is frequently triggered by extreme emotional states, with the individual acting impulsively as a coping mechanism to either dissipate or distract from the emotion. Experimental work should aim to more closely describe and define the specific pathways

to affective impulsive behaviour, particularly in terms of how mood and impulsivity may intertwine to predict risk taking behaviour.

Many major models of impulsivity neglect to include affect as a relevant factor. However Whiteside and Lynam, along with Cyders, have incorporated affective impulsivity within their UPPS model of impulsive behaviour. Urgency, as the pathway is termed, is described as the tendency to behave impulsively under conditions of either positive or negative affect. Both positive and negative urgency appear to be effective predictors of impulsive behaviour and psychopathology, though further work is needed to explore their state and trait properties. **Chapter 5** will look more closely at the potential interactions between mood, and state and trait impulsivity and behaviour within specific psychiatric disorders.

## CHAPTER 4: SPECTRA OF MOOD

### 4.1 INTRODUCTION TO CONTINUUM MODELS

Categorical models of psychiatric diagnosis - in which an individual is considered to either have or to not have a psychiatric disorder - have dominated the field of psychiatry. This dichotomy is in many ways practical, in that the simplification of diagnosis enables clinicians to understand, in short hand, the general experience of the service user, and follow straight-forward clinical pathways in terms of recommended treatment (Helzer et al., 2006). The Diagnostic and Statistical Manual-IV (DSM-IV) states that '*a categorical approach to classification works best when all members of a diagnostic class are homogenous, when there are clear boundaries between classes, and when the different classes are mutually exclusive.*' (p.xxii; American Psychiatric Association, 1994). Recent research has indicated that the disorders within the DSM-IV do not conform to this ideal structure, particularly in terms of the common overlap and co-morbidity between disorders. Widiger and Samuel (2005) refer to the attempts of such diagnostic tools as the DSM-IV and the International Classification of Diseases (ICD-10; World Health Organization, 1992) to classify disorders according to a categorical model as '*the misleading, unstable and illusory efforts to carve psychological functioning at nonexistent discrete joints*' (p. 500), explaining that in reality psychological disorders frequently exist in tandem with one another and do not often occur as pure and independent 'diseases'.

The proposed alternative within mental health is the adoption of a continuum or dimensional understanding of mental health and wellbeing, a model in which there is no discrete cut-off between illness and health. Instead, experience of psychological symptoms varies throughout the population, with some flexibility as to what constitutes a clinically relevant experience. Although a distinct departure from historical perspectives on mental health, there is evidence that this perspective is gaining ground, both clinically and within research. In clinical terms, dimensional models have been cited as being better able to encapsulate the '*clinical reality*' of disorder experience (p.110; Smith and Ghaemi, 2006). As such, health care professionals are able to access relevant information – such as measures of disorder severity or chronicity – easily, and in a manner which accurately represents the clinical situation (Watson, 2005). At the same time, such models allow for a continuum of treatment options best matched to the needs of the individual (Helzer et al., 2006). It is perhaps then unsurprising that there has been consideration of a move towards dimensional models within the impending DSM-V (Regier, 2007).

As well as having clear benefits for clinical work, dimensional models are being increasingly used within research. Sher and Trull (1996), in their discussion of methodological issues involved in research into psychopathology, note that '*if one assumes a continuity between abnormal and normal functioning, it then becomes possible to sample individuals who*

*may not meet diagnostic criteria for a particular disorder.'* (p.387) This deceptively simple observation underpins a wide range of possibilities within mental health research, all based on the assumption that individuals who do not meet the clinical criteria for a given disorder, but experience symptoms associated with it, are in some way qualitatively analogous to those individuals who have a diagnostic label. As such, these non-clinical individuals provide an opportunity to investigate the mechanisms and experiences that underlie disorders. In a thorough evaluation of the use of students with symptoms of depression as an analogue for clinical depression Vredenburg, Flett and Krames (1993) not only explore the factors that present students as an appropriate population for such studies (in terms of their relative homogeneity as a population group, as well as their high levels of psychopathology, both clinical and non-clinical) but also demonstrate that analogue samples can indeed be representative of clinical disorders. The validity of analogue samples to predict mechanisms underlying clinically-diagnosed disorders has been supported in other samples, such as bipolar disorder (Thomas et al., 2007), obsessive-compulsive disorder (Salkovskis and Harrison, 1984) and schizophrenia (Gordon et al., 1995)

It should be noted at this point that Sher and Trull's (1996) suggestion of a unity between clinical and 'normal' experience does not contradict findings that additional processes may have a role in clinical - as compared to healthy population - expressions of a disorder (e.g. psychomotor retardation is additionally present in severe as compared to mild depression; Flint et al.,

1993). Research in to the processes underlying continuum models of a given disorder must, however, maintain an awareness of the extent to which any identified mechanisms can produce a complete model of clinical disorder. Even in situations where continuum models do not provide the full picture, they are likely to contribute to the understanding of the clinical disorder as well as guiding the identification of areas in which clinical disorder may differ from healthy population experience. These additional aspects will in turn be important areas for further research and intervention.

Continuum models are of benefit to the research field in numerous pragmatic ways. Avoiding the dichotomy between the presence and absence of a disorder by viewing symptom experience along a continuum prevents the oversimplification of data, and as such increases statistical power (Helzer et al., 2006). Furthermore, it also enables researchers to investigate what is in some ways a more ‘typical’ representation of disorder, given that comorbidities can be easily noted and represented, instead of being a cause for exclusion from a study (Cuthbert, 2005). At the same time, allowing for a wider conceptualisation of disorder experience widens the potential sample population, meaning that studies using analogue samples are frequently well powered and statistically robust. As psychiatry research continues to examine features of a disorder – in terms of genetics, phenotypes and neurology – ever more closely, it seems highly likely that the larger and more varied sample provided by continuum models will continue to be attractive.



## 4.2 SPECTRUMS OF MOOD IN PSYCHIATRIC DISORDER

The experience of mood, both positive and negative, unites the general population. At the same time it is widely acknowledged that mood can vary widely both within and between people. Plato described '*the movement [of mood] from balance into excess*', suggesting that this variety had been recognised as far back as the fourth century BCE (Plato, 427–347 BCE; in Pies, 2007). Mood is relevant to many psychiatric disorders, notably depression - characterised by depressed mood and an absence of enjoyment - and borderline personality disorder, for which lability of mood is a key diagnostic feature. The remainder of this chapter will, however, focus upon bipolar disorder and the wider bipolar spectrum, as a key disorder that is characterised by experiences of extreme mood states.

### 4.2.1 Characteristics of Bipolar Disorder and the Bipolar Spectrum

Bipolar disorder exists in the DSM-IV in two key forms: bipolar I disorder (BDI), characterised by periods of mania usually interspersed with periods of depression, and bipolar II disorder (BDII), characterised by episodes of depression and one or more periods of hypomania. Depression consists of an extended period of depressed mood, in which the individual has decreased interest in enjoyable activities. Conversely, a manic episode is described within the DSM-IV as '*a distinct period of abnormally and*

*persistently elevated, expansive, or irritable mood, lasting at least one week*’, during which time the individual may be more distractible, irritable or talkative than their usual non-manic state (American Psychiatric Association, 1994). A hypomanic episode is qualitatively similar, but is to some degree muted and shorter, with an episode of four days duration required to meet diagnostic criteria. This is also controversial, with many researchers and clinicians stating that a hypomanic episode of two days duration should be sufficient to meet clinical criteria, explaining that the requirement for a longer duration is neither empirically founded nor sufficiently sensitive (Akiskal, 2003, Akiskal et al., 2000, Angst, 2007, Angst et al., 2003). There is further debate surrounding the existence of hypomanic personality (in which hypomanic elements exist within the individual in stable, trait form; with a similar relationship to hypomania as dysthymia has to depression. See Kwapil et al., 2000), and the non-clinical experience of hypomania within the general population (Seal et al., 2008), as well as drug-associated hypomania (Phelps et al., 2008). The debate as to the construction of the wider bipolar spectrum will be tackled in more detail later in this chapter.

This broad spectrum of bipolarity produces a wide range of prevalence estimates. Large epidemiological studies, such as the National Comorbidity Survey (NCS) and the US Epidemiologic Catchment Area (ECA) database, have estimated lifetime prevalence of BD I and II at just over 1%, figures which have long been accepted as indicators of the relative rarity of bipolar disorder (Kessler et al., 1994, Regier et al., 1984). Even if considered a rare

disorder, costs of bipolar disorder are high, with the National Institute for Health and Clinical Excellence estimating the cost of BD to the UK to be around £2billion annually (NICE, 2006). These high costs are exacerbated by the chronic course of bipolar disorder, in which full remission is rare (Angst and Sellaro, 2000) and social dysfunction common (Raymont et al., 2003). Recently, re-analysis of the NCS and ECA samples have looked at the wider bipolar spectrum in order to better evaluate prevalence. The ECA database provides a prevalence rate for the entire bipolar spectrum of 6.4% when subsyndromal experience is included (Judd and Akiskal, 2003) while the NCS the lifetime prevalence estimate is slightly lower at 4.5% for the bipolar spectrum (Merikangas et al., 2007). The potential financial impact of this increased prevalence has not yet been investigated.

Bipolar disorder also has high rates of comorbidity. Studies have shown high levels of comorbid kleptomania (BD is 2.37 times as likely in shoplifters compared to individuals who do not shoplift; Blanco et al., 2008), pathological gambling (6.3% of individuals with BD meet diagnostic criteria for PG compared to 2.0% of the general population; McIntyre et al., 2007) and other impulse control disorders (McElroy et al., 1996). Data also suggest high levels of comorbid eating disorders (particularly bulimia nervosa, sufferers of which are 4.5 times more likely to suffer from BD than healthy controls; Lunde et al., 2008) and a striking overlap with borderline personality disorder (see Gunderson et al., 2006; the overlap between BPD and BD will be discussed in more detail in **Chapter 5**). Particularly common is

the co-occurrence of bipolar disorder and substance use. An in-depth systematic review conducted by Cerullo and Strakowski (2007) concluded that rates of lifetime substance abuse were upwards of 40% in BDI, even referring to studies that found rates above 60%. Merikangas et al (2008) highlight the importance of this comorbidity to illness course, particularly in terms of developing interventions that are relevant to both bipolar disorder and associated substance abuse. This is particularly important when we consider the role of substance abuse on increasing the already high suicide rates found in BD (Dalton et al., 2003, Sublette et al., 2009). Numerous reasons have been proposed for the high comorbidity between BD and substance use, with patients themselves describing idiosyncratic motivations which ranged between self-medication, enjoyment and stress management (Healey et al., 2009). The role of impulsivity as the potential underlying mechanism uniting these two disorders will be discussed in

**Chapter 5.** Finally, Merikangas and colleagues (2007) note the most common comorbidity in BD to be with anxiety disorders. As with substance disorders, comorbidity of anxiety disorder is considered to have a negative impact on illness course, in terms of symptom intensity (McIntyre et al., 2006) and impact on behaviour (e.g. suicidal behaviour; Simon et al., 2007).

#### **4.2.2 Psychological Mechanisms of Bipolar Disorder**

There have been numerous attempts to elucidate the psychological mechanisms behind bipolar disorder. The literature appears to demonstrate

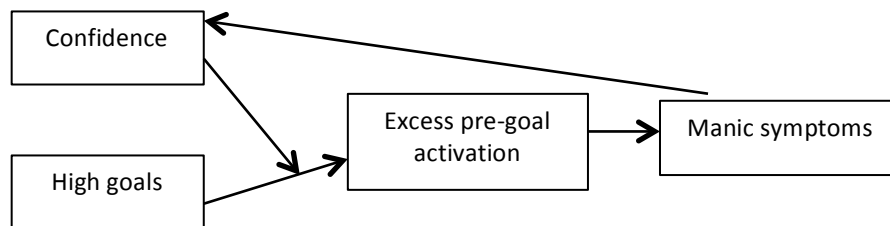
that mechanisms differ with respect to both mania and depression, with bipolar depression but not mania predicted by self esteem and low social support (Johnson et al., 2000), negative cognitive styles (Carver and Johnson, 2009), negative expressed emotion (Miklowitz et al., 2005) and negative life events (Johnson, 2005a). The independence of predictors of mania and of depression has led to proposals that the two aspects are in fact distinct and separable and not, as may be assumed given the disorder's name, two points at either end of a single continuum. In an 18-month longitudinal study of BD patients, Johnson and colleagues (2011) found that depressive and manic symptoms were unrelated to one another, particularly in terms of the negative correlations predicted by a strictly 'bipolar' model. The authors therefore suggest that mania and depression are '*separable symptom dimensions*' (p.209), which fluctuate without recourse to one another.

Independent predictors of mania include responsiveness to reward. Using Carver and White's (1994) BIS/BAS scales (see **Chapter 1**), Van der Gucht et al. (2009) and Jones and Day (2008) have demonstrated correlations between BAS subscales and current mania scores, while Meyer and colleagues (2001) demonstrated that the BAS subscale of reward responsiveness was predictive of increased mania over time. This finding appears to hold throughout the bipolar spectrum, with Alloy et al. (2008) reporting baseline BAS scores being predictive of a shorter time to onset of (hypo)manic episodes within a bipolar spectrum sample followed up over a

period of more than two years. Together these findings suggest the validity of BAS dysregulation models, which suggest that high BAS sensitivity can be used to explain both manic and depressive episodes within BD (Alloy & Abramson, 2010).

There is also behavioural evidence for increased reward response, with a study by Sutton and Johnson (2002) in individuals with a tendency toward mania (individuals scoring >2 standard deviations above the mean on the Hypomania Personality Scale) showing increased attenuation of startle eye blink responses for positive compared to negative International Affective Picture System (IAPS) images. In a study of 12 bipolar patients with a recent manic episode, 12 patients with schizophrenia and 12 healthy controls, Abler et al. (2008) found that patients with bipolar disorder showed a lack of differentiation in their behavioural response to varying degrees of reward (i.e. had similar reaction times to trials with low, medium and high reward). This behavioural finding is echoed in their fMRI data, in which the activation of striatal reward system circuitry in bipolar patients did not differ across the various trials, or even when an expected reward was omitted. Conversely, both schizophrenia patients and healthy controls showed differential activation dependent on size of the expected reward. The authors suggest that this is evidence of difficulties in reward processing in bipolar disorder.

Various authors have also suggested that an elevated pursuit of goals - which may in many ways be related to reward responsivity - may be a further underlying psychological mechanism for mania. Johnson and colleagues (Johnson and Carver, 2006, Johnson et al., 2009) have found that scores on the Hypomanic Personality Scale, a measure of the experience of hypomanic symptoms and a clear predictor of later mania, correlate with the number of extremely high financial and fame-related goals (e.g. 'I will make more than \$20million'; 'Someone will write a book about my life') endorsed as part of the Willingly Approached Set of Statistically Unlikely Pursuits (WASSUP) questionnaire. In her thorough review of this area, Johnson (2005b) persuasively argues the theoretical case for a model of ascent into mania in which the individual harbours stable high goals, regardless of their episodic state. After moderate life successes (shown in the literature to be triggering for a manic episode; Stern and Berrenberg, 1979), or perhaps with the onset of mild hypomanic symptoms, the individual experiences vast leaps in confidence regarding their ability to achieve these goals. Steps they may then take in pursuit of the goal further exacerbate the developing symptoms, and a full manic episode is triggered. See **Figure Five** for Johnson's diagrammatic explanation of this model.



**FIGURE FIVE: Goal Regulation Model of Ascent into Mania (Johnson, 2005b)**

While this model appears to have face validity, it is clear that more research is needed to explore the temporal relationship between these factors using longitudinal studies. It is possible that extreme goal setting and consequential high achievement may go some way to explain the unusually high rates of mania in higher compared to lower socioeconomic statuses (see Weissman and Meyers, 1978) and the high lifetime educational achievement of individuals with bipolar disorder compared to the general population (Pettersson, 1977) as well as their relatives (Coryell et al., 1989).

Somewhat in contrast to the mechanisms described so far, other authors have suggested that mania is triggered as a device to manage negative mood. Focusing on hypomania, Bowins (2008) explores the evolutionary benefit of experiencing increased activity and sociability when the alternative may be depressive inhibition, resulting in low activity. Within this model, a hypomanic episode is triggered by the potential beginnings of a depressive episode as a mechanism to protect against the loss of fitness



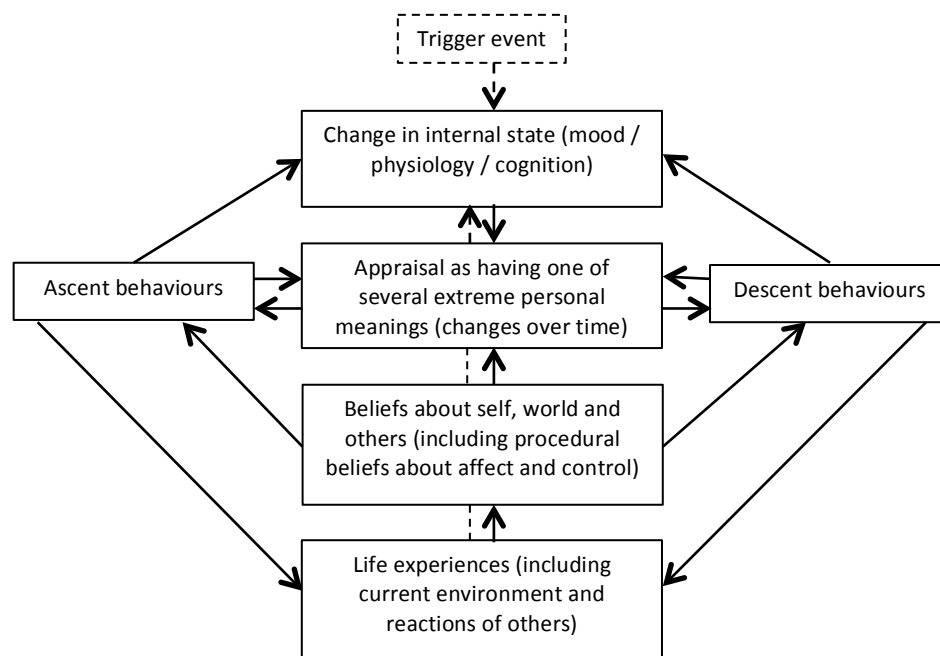
depression imparts. As such, Bowins constructs hypomania as a positive and protective experience and not something clinicians should attempt to control. While an interesting perspective - and certainly one which goes some way to explaining the continued presence of hypomania in the population as well acknowledging it as the positive experience many individuals find episodes of hypomania to be - it is less clear how full blown mania may develop, or how (hypo)mania may manifest in individuals who have no experience of depression (Solomon et al., 2003). Furthermore, it should be noted that while many individuals who experience hypomania may be seen to have high levels of positive experiences, this achievement may come at some cost to them, particularly in terms of interpersonal relationships (Morriss et al., 2007).

Using a more empirically grounded approach, Knowles et al. (2005) explored the concept of 'manic defence', originally proposed by Abraham (1911/1927) and Neale (1988). Similar to Bowins' proposition, the manic defence sees mania as arising directly from coping styles of individuals to prodromes of depression. Using a sample of 528 undergraduate students, Knowles and colleagues found strong correlations between the Hypomanic Personality Questionnaire (Eckblad and Chapman, 1986) and both the rumination and risk taking subscales of the Response Styles to Depression Questionnaire (Nolen-Hoeksema, 1991). From this they posit a cyclical relationship between depression, risk taking, rumination and hypomania, in which rumination on depressive feelings leads to risk taking as a mechanism

to restore positivity and self worth. The positive emotions brought about by this risk taking (typically those behaviours which are rewarding in the short term but have negative longer term consequences) may promote an episode of hypomania or even full blown mania. However, at the same time they highlight a further correlation between hypomania and adaptive coping, reinforcing Bowins' perspective that mania is likely to be in many ways adaptive. Thomas and colleagues have since replicated these findings in student samples (Thomas and Bentall, 2002) and a patient sample (Thomas et al., 2007), going on to link this model with reward theories by suggesting that the risk taking engaged in to combat negative/depressive emotions results in over-stimulation of the Behavioural Activation System (BAS).

It is likely that the mechanisms described here, along with others not described here or as yet unidentified, together all play some part in the development of manic episodes. Some relevant attempts have been made to develop cohesive models of ascent in to mania. One such example is Mansell's integrative cognitive model (Mansell et al., 2007, Mansell and Pedley, 2008), which neatly coheres many of the evidenced psychological processes within a single iterative process. In this process, an individual experiences a triggering event, either internal or external, which promotes changes in physiology, cognition or affective state. The individual interprets such changes in a dramatic and extreme manner, such that they are taken to have significant personal meaning, either negative (i.e. 'I cannot cope

feeling sad even for a short while’) or positive (‘I can make everyone around me admire me’) (See Dodd et al., 2011 for further description of this process). These interpretations in turn interact with the individuals’ metacognitive beliefs about themselves within the social world (overgeneralisation, see Eisner et al., 2008) and their experience of their own and others behaviour (‘life events’). In an effort to moderate their attributions individuals may engage in either ascent (goal-focused and active behaviours which promote manic symptoms) or descent (avoidant behaviours which promote depressive states) behaviours. This cycle is summarized in **Figure Six**, which demonstrates the iterative process leading up to experiences of extreme mood.



**FIGURE SIX: Integrative Cognitive Model of Bipolar Disorder (Mansell et al., 2007)**

A strength of Mansell's model is its ability to draw upon the existing evidence base. Manic defense models are integrated within the 'ascent behaviours' arm of the model, and the inclusion of the individuals' beliefs about 'themselves, the world and others' recognizes that the individual may already hold extreme goals for themselves, which are then exacerbated by changes in their confidence in achieving these goals and consequential ascent behaviours. However, while the model is able to evidence its various components convincingly, there has been less investigation into the model as a whole, and it will be interesting to see how longitudinal research designs are able to provide evidence for its cohesive existence.

#### **4.2.3 Widening the Bipolar Spectrum**

Much of the data that informs the models described above has come from investigations using analogue samples. This is representative of a movement - primarily within the research literature but also in certain clinical settings - towards a wider, more dimensional conceptualisation of bipolar disorder. The debate surrounding the reaches of a bipolar spectrum is heated, with various authors arguing vehemently in the defence of a spectrum that spans both everyday and clinical experience. Pies (2007) gives a particularly impassioned argument. He cites Kraepelin's (1921, in Pies, 2007) assertion that manic-depression includes *'certain slight and slightest colorings of mood, some of them periodic, some of them continuously morbid, which on the one hand are to be regarded as the rudiment of more severe disorders;*

*on the other hand, pass without sharp boundary into the domain of personal predisposition. In the course of the years I have become more and more convinced that all the above mentioned states only represent manifestations of a single morbid process.'* Using this alongside other historical assertions of a bipolar spectrum, Pies goes on to summarise *'Tracing the arc of the bipolar spectrum concept — from Aristotle to Areteus to Falret to Kraepelin — we find a broad conceptual coherence that points to something enduring and substantial.'* (p.10). Other authors have written in support of the bipolar spectrum as something more tangible than a simple theoretical truth, and cite support for the spectrum from clinical (Angst, 2007, Vieta and Suppes, 2008), epidemiological and genetic (Cassano et al., 2004) fields.

That is not to say that the move to a dimensional understanding of bipolar disorder is without criticism. Healy (2006) warns that a move away from recognizing BD on the basis of its disabling impact is *'creating an "epidemic" of bipolar disorder'* (p. 433), highlighting too the vested interest of drug companies involved in the promotion of the bipolar spectrum. Baldessarini (2000) similarly warns against diluting the construct to such an extent as to make it *'meaningless'* (p.4) in both clinical and academic settings. Phelps et al (2008) also endorse this view, suggesting the integrity of the disorder construct is required for it to be of use in research. While a broad spectrum currently appears to be providing more than it is obscuring, it is certainly the case that researchers must be vigilant as to the relevant usefulness of

spectrum, as well as to the social and ethical implications of broadening a psychiatric disorder to encompass normal functioning.

If we are to consider a wider spectrum of bipolarity, the question then arises as to the clinical relevance of this construct. Alongside the difficulties in defining what constitutes clinically relevant experience of hypomania - as mentioned earlier in this chapter - there exists an understanding within the literature that there is an under-diagnosis of hypomania (Angst, 1998).

Various authors have suggested that this is because experiences of hypomania are ego-syntonic, and may be experienced as positive by the individual, and as such are not something they feel is relevant to seek help for (Vieta and Suppes, 2008). Qualitative research supports this conclusion, with Seal et al. (2008) finding '*positive qualities of hypomanic experience*' as one of their key themes in a sample of individuals who regularly experienced hypomania. Positive qualities described by the participants included experiencing hypomania as a positive way to cope during times of difficulty, and as a promoter of self-confidence. There was no corresponding negative theme, and in fact another theme concerned the feeling among participants that their hypomanic episodes were '*not a problem*'. In a fascinating quantitative study looking at individuals with 'pure hypomania' (i.e. hypomania with the absence of any negative mood or full manic states), Gamma and colleagues (2008) discovered such individuals experienced little to no distress as a result of their hypomania, and in fact had higher monthly wages and more secure family set-ups than healthy controls, leading them

to provocatively title their article '*Are hypomanics the happier normals?*'

While such findings as these may suggest there is little clinical validity in extending the bipolar spectrum in to the realms of normal experience, other authors have drawn attention to the fact that even ego-syntonic hypomanic experiences in individuals who have other psychiatric disorders – comorbidity has been seen to be very high even in subthreshold BD (Angst, 1998, Merikangas et al., 2007) – are likely to impact their treatment course. This is particularly pertinent when one considers that antidepressant treatment in individuals with undetected hypomania is likely to exacerbate the hypomanic state (Smith and Ghaemi, 2006), and particularly so when rates of undetected hypomania in populations of patients presenting with depression have been calculated at upwards of 40% (Allilaire et al., 2001) and frequency of hypomanic experience judged to be similar to that of BD I patients (Cassano et al., 2004).

Findings regarding the strikingly high rates of undetected hypomania in clinical settings, and the potential for this to impact upon treatment, have led to an increased interest in measures to screen for hypomania. Scales such as the Mood Disorders Questionnaire (MDQ; Hirschfeld et al., 2000), the Hypomania Check List (HCL-32; Angst et al., 2005), the General Behaviour Inventory (GBI; Depue et al., 1989) and the Bipolar Spectrum Diagnostic Scale (BSDS; Ghaemi et al., 2005) have been developed to allow clinicians to better detect hypomania in clinical settings. Research regarding the psychometric properties of these scales continues, but has thus far been

generally supportive of their ability to both correctly detect those likely, and not likely, to have experienced hypomania. For example, Hirschfeld et al. (2000) found the MDQ to have a sensitivity of .73 and a specificity of .9, concluding that it is a *'useful screening instrument for bipolar spectrum disorder in a psychiatric outpatient population'* (p.1873). The GBI is particularly interesting in its ability to measure hypomanic experience in tandem with experience of dysthymic or depressive mood, and therefore represents an indication of the importance of understanding hypomania alongside other psychopathological experience. Other questionnaire measures, such as Eckblad and Chapman's (1986) Hypomania Personality Scale (HPS) have focused upon hypomania as a personality style. Kwapil and colleagues' (2000) longitudinal study of the HPS found increased rates of clinical bipolar disorder in high scorers compared to low scorers at thirteen-year follow-up, suggesting the HPS may be an appropriate measure for risk of developing future BD.

Alongside their use as a clinical tool, questionnaire measures to detect bipolar disorder have made extremely useful contributions to research. Studies employing these scales have been influential in generating and exploring theories for investigation in bipolar disorder (e.g. genetic markers; Chiaroni et al., 2005, Goodwin and Jamison, 1990), and have been shown to accurately predict findings in clinical samples (Knowles et al., 2007).

Alongside highlighting what might underlie the bipolar spectrum, analogue samples of students also provide opportunities to identify what



differentiates these individuals from those individuals who go on to develop full-blown clinical bipolar disorder, in other words what might be protective (Seal et al., 2008), and as such are a relevant resource in the development of interventions.

### **4.3 CONCLUSIONS**

Continuum models of disorder are gaining weight in both clinical and research realms. Their ability to accurately summarise the personal, idiosyncratic experience of the patient is welcomed in many clinical settings and appears to be the impetus behind a gradual move towards dimensional models within the anticipated DSM-V. At the same time, dimensional models have clear benefits to research, and are used to investigate a wide range of psychiatric disorders.

Bipolar disorder is one such disorder whose potential dimensional properties are being hotly debated within the literature. Arguments as to the cut off point for 'bipolarity' suggest infinitesimal points of potential cleavage, with questions regarding the value in widening the bipolar spectrum and to the ethical concerns inherent in so doing. However, the experience of extreme mood appears to vary widely throughout the population, with a fairly high prevalence of individuals meeting criteria for subclinical experiences of hypomania. This perspective is gently summarised by the British Psychological Society's recent 'Understanding Bipolar

Disorder', in which it is stated '*we are all subject to mood variation, but within this, people range from those who experience relatively few highs or lows to those who tend to experience more extreme mood states. There are both positives and negatives associated with both ends of the continuum*' (British Psychological Society Working Group, 2010). Experiences found throughout this spectrum provide a rich ground for the investigation of wider bipolar disorder and are likely to contribute a great deal to our understanding.

## **CHAPTER 5: CLINICAL PRESENTATIONS OF IMPULSIVITY AND MOOD**

### **5.1 INTRODUCTION TO IMPULSIVITY AND MOOD**

The first three chapters have touched upon the various ways in which impulsivity, mood and behaviour may be seen to relate to one another. The literature indicates that trait impulsivity is associated with certain forms of behaviour, and that impulsive behaviour may arise more often during periods of extreme mood. The previous chapter attempted to summarise some of the literature regarding continuum models of psychiatric disorder, in particular bipolar disorder, which is characterised by experiences of extreme mood. This chapter will attempt to bring together these various strands, and to summarise the evidence regarding trait impulsivity, mood and the occurrence of impulsive-type behaviours within mood-related psychiatric disorders.

### **5.2 IMPULSIVITY AND BORDERLINE PERSONALITY DISORDER**

Borderline personality disorder (BPD) is a cluster B personality disorder, diagnosis of which is based upon instability of self-image and relationships with others. Mood lability is fundamental to the diagnosis of borderline personality disorder, particularly in terms of the experience of anger, irritability and anxiety. Impulsivity is also central to the disorder with one of the DSM-IV criteria being *'Impulsivity in at least two areas that are*

*potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating)*' (American Psychiatric Association, 1994). In fact, impulsivity is considered so key to the presentation of BPD that other diagnostic systems have opted to include impulsivity within their nomenclature. The ICD-10 proposes the existence of an 'Impulsive Type' for their analogous 'Emotionally Unstable Personality Disorder' (World Health Organization, 1992), and the Chinese Classification of Mental Disorders (CCMD-3; Chinese Society of Psychiatry, 2000) refers to 'Impulsive Personality Disorder' (Zhong and Leung, 2009). Widiger and Weissman (1991) suggest prevalence rates of BPD at 0.2-1.8% for the general population and 15% for psychiatric inpatients.

Research supports the presence of impulsivity as a key characteristic of BPD, with studies consistently demonstrating increased self report and laboratory measured impulsivity in patients with BPD when compared to healthy controls (Coffey et al., 2011, Dougherty et al., 1999, Dowson et al., 2004). Fosatti et al (2007), in a study of 461 outpatients diagnosed with personality disorder, found a unique association between impulsivity (both the attention and motor facets of Barratt's Impulsiveness Scale) and BPD, which was not found in other personality disorders. Impulsivity levels in BPD have also been shown to be on a par with those seen in individuals with orbitofrontal cortex lesions (Berlin et al., 2005). These high impulsivity levels are predictive of response to treatment, with Hollander et al. (2005) showing that BPD patients with high impulsivity scores at baseline (BIS score

>73) had increased responsivity (i.e. greater improvement in aggressive behaviour) to valproate semisodium treatment over placebo when compared to those BPD patients who had lower impulsivity levels (BIS  $\leq$ 73). This suggests that an understanding of patients' impulsivity levels is likely to be helpful in deciding upon treatment pathways and areas of potential improvement.

As was discussed in depth within **Chapter 2**, high impulsivity levels are often predictive of certain forms of behaviour. This is also the case within BPD, where high levels of impulsivity have been associated with numerous behaviours. Coffey et al (2011), like Maloney et al (2009), found behavioural impulsivity levels, measured by the BART and a Go/No-Go task, were highest in individuals with BPD and comorbid substance use disorder (SUD) over both BPD patients without comorbid substance use and healthy controls, suggesting impulsivity may underlie both these disorders. This is an observation supported by Bernalova and colleagues (2005), who state *'Impulsivity is clearly a crucial variable in understanding BPD, SUD, and the comorbidity of the two disorders'* (p.805). Soloff et al (2000) have reported similar findings in terms of suicidal behaviour, suggesting that impulsivity is a risk factor for suicide attempts within BPD.

Some particularly interesting recent studies have highlighted the association between the affective instability and impulsivity seen in BPD, and the relevance this may have to behaviour. Using an innovative ecological

momentary assessment (EMA) study design, Engel et al (2007) recorded participants' experiences of bulimic behaviour over a two week period, with the finding that high levels of anger immediately preceded binge eating and that this relationship was particularly clearly defined in individuals who were high in impulsivity. Engel and colleagues suggest that this indicates the use of binge eating as an externalising tool to moderate negative affective states in individuals who are high in impulsivity, noting that those who have low impulsivity levels may be more likely to favour internalising behaviours to manage their affective states. Herpetz et al (1997a) used a short story to induce various mood states in their participants, finding that female patients with a diagnosis of personality disorder (the majority of whom had a diagnosis of BPD) and who also had a personal history of impulsive behaviours - such as self harm - showed greater emotional reactivity than both personality disordered patients who did not demonstrate impulsive behaviour and healthy controls. The authors go on to state that the *'results suggest that poor affect regulation resulting from affective hyper-reactivity to environmental stimuli is a crucial part of impulsivity in patients with self-harming behaviour and probably more generally in patients with BPD'* (p.36), reinforcing the notion that affect and impulsivity are together linked in the predisposition towards behaviour within BPD. This is a perspective reinforced by Bornovalova and colleagues (2005), who in their discussion of the links between substance use and BPD, conclude by calling for greater research into *'how the combination of impulsivity across its various dimensions work[s] in concert with negative affect, leading to the*

*development of comorbid BPD and SUDs'* (p.805). It is certainly the case that broader research is needed to explore these relationships within BPD, and it is likely that innovative methods such as those used by Herpetz et al. and Engel et al. will improve our understanding.

Before discussing similar relationships within bipolar disorder (BD), the literature exploring the overlap between BPD and BD needs to be reviewed. The two disorders are both characterized by extreme shifts in mood and high levels of impulsivity, and as such discussion has arisen as to whether in reality they both exist along a wider bipolar spectrum. There are relatively high rates of co-occurrence, with studies finding BD in 19.4% of BPD patients (Gunderson et al., 2006), and rates of BPD at 12.5% of BD patients (Vieta, 1999). Some authors have discredited the relevance of these findings, stating that rates of BPD in BD are no higher than those found for any other personality disorder (PD; Paris et al., 2007). This is supported by a four year longitudinal study of 629 personality disordered patients by Gunderson et al. (2006), which discovered similar rates of existing and new occurrences of BD in both BPD and other PDs. This led the authors to conclude that while the co-morbidity of the two disorders may have an impact on treatment course, it does not reflect underlying clinical unity.

The issue of treatment is relevant to the debate since appropriate treatment course is dependent upon an accurate diagnosis (Smith and Ghaemi, 2006). Some recent literature has indicated that mood stabilisers are an effective

treatment for both BPD and BD, with Smith et al. (2004) using these data to suggest that uniting the two disorders would have positive outcomes in terms of treatment. It is no surprise that mood stabilisers are efficacious for both disorders, with the majority of literature supportive of an underlying relationship between the two based upon the core mechanism of affective instability. Mackinnon and Pies (2006) describe a theoretical model in which both BD and BPD have their origins in affective instability, but then proceed along different paths determined by environmental experiences (e.g. interpersonal struggles) during childhood. There is some experimental evidence for this perspective. For example, Benazzi (2006) found the BPD symptom factor 'affective instability' – but not the factor 'impulsivity' – was associated with BDII, suggesting that it is this affective instability that unites the two disorders. While Henry and colleagues (2001) also found high levels of affective lability – measured using the Affective Lability Scale (Harvey et al., 1989) – in both BPD and BD patients (compared to patients with other PDs), they found the direction of this affective lability to differ, with BPD patients swinging between euthymia and anger, while the BD patients oscillated around euthymia, depression and elation. Such findings indicate that while affective lability may be relevant to both disorders, the quality of this lability differs.

In a clear and concise review of the literature, Paris et al (2007) summarise data relating to the co-occurrence, underlying phenomenology, family distribution, medication response, aetiology and longitudinal course of both



BD and BPD, concluding that there is no clear evidence from any of these areas that the two are related. In summary, reports are equivocal, with insufficient clear evidence to either confirm or deny the hypothesis that BD and BPD are inherently connected, through affective instability, within a single disorder category (Paris, 2004).

### **5.3 IMPULSIVITY AND BIPOLAR DISORDER**

Impulsivity is so widely cited a factor within BD that a recent review by Najt and colleagues (2007) referred to impulsivity as a potential '*core feature*' of the illness (p.313). The remainder of this chapter will explore the wide literature investigating impulsivity in BD, noting the impacts of episodic state and comorbidities. Finally, the literature regarding the relationship between high levels of impulsivity and behaviour within BD will be summarised.

#### **5.3.1 Bipolar Disorder Course of Illness: State and Trait Impulsivity**

Given the clear picture within the literature of a link between behaviour, psychiatric disorder, mood and impulsivity, it is unsurprising that individuals with bipolar disorder (BD) - a disorder characterised by extremes of both mood and behaviour – are found to have elevated levels of trait impulsivity. Swann and colleagues (2001) compared the Barratt Impulsiveness Scale (BIS) scores of ten medicated BD patients in a euthymic state to ten

matched controls, and found that BIS scores were significantly higher for patients on all subscales and the total score. The finding of higher BIS trait impulsivity in BD patients compared to healthy controls has been replicated in numerous studies since (Holmes et al., 2009, Matsuo et al., 2010, Peluso et al., 2007). Findings also demonstrate increased trait impulsivity in individuals with bipolar-II disorder (BDII; Benazzi, 2007). Recent work has moreover indicated that such findings might be extend throughout the bipolar spectrum, with Jones and Day (2008) reporting increased behavioural activation and decreased behavioural inhibition scores, indicative of high trait impulsivity, on the BIS/BAS in a general population sample of individuals tending towards hypomania. Imaging data suggests that the elevated impulsivity found in BD may be a result of functional anomalies in specific brain regions, notably the prefrontal cortex (Christodoulou et al., 2006, Quraishi and Frangou, 2002), and as such is likely to be a trait feature, existing regardless of episodic state.

There are also data to suggest that state impulsivity fluctuates within individuals as a function of episodic state. Swann et al.'s (2001) article was the first to indicate that the individuals' current episodic state may impact on their impulsivity, demonstrating a correlation between Continuous Performance Test (CPT) false alarms and Mania Rating Scale (MRS) scores. Further work using these empirical tests of impulsivity have supported the notion that state impulsivity does indeed vary with the individuals' mood state, with impulsivity peaking during periods of mania as compared to

periods of euthymia (Swann et al., 2003). Perhaps surprisingly, impulsivity also increases during periods of depression (Corruble et al., 2003). This may originate from the inability of depressed individuals to consider themselves and their actions within the long term, mimicking the present orientation characteristic of non-planning impulsivity. This is supported by data from Swann et al. (2008), who report correlations between the non-planning facet of the BIS and symptoms of depression (measured by the Change version of the Schedule for Affective Disorders and Schizophrenia, SADS-C; Endicott and Spitzer, 1978). Alternatively, the state impulsivity increases associated with depression (Swann et al., 2007) or even euthymic periods (Swann et al., 2008) may be a result of undetected manic symptoms, or active and impulsivity-promoting comorbidities (see **Section 5.3.2**). It may however also be the case that depression is in itself a promoter of impulsivity, as is found by Lewis and colleagues (2009), who state that symptom severity of any kind (manic or depressive) is strongly related to impulsivity scores. As our understanding of the influence of mood upon impulsivity increases better models will emerge to allow us to investigate, explore and explain more effectively the relationship between episodic mood state and impulsivity in BD.

Various studies indicate that such high impulsivity levels impact on the presentation and course of the disorder. Using a dichotomous scale to identify 'impulsive' and 'non-impulsive' individuals with BDII, Benazzi (2007) found individuals who had both BDII and impulsivity were more likely than

their non-impulsive counterparts to have mood swings, a greater number of hypomania symptoms and to engage in more excessively risky behaviour.

Swann and colleagues (Swann et al., 2009a, Swann et al., 2009b) have reported similar findings in BDI, reporting that in individuals with BD, impulsivity (as measured by shorter reaction times to inaccurate stimuli on the CPT) was related to a more severe course of illness, including increased number of episodes, higher comorbidity and suicide attempts. The impact of impulsivity on both comorbidity and behaviour will be discussed in more detail over the next two sections (**5.3.2** and **5.3.3**). Given the influence of impulsivity on disease course, it stands to reason that treatment may in turn influence impulsivity levels (Moeller et al., 2001b, Strakowski et al., 2009).

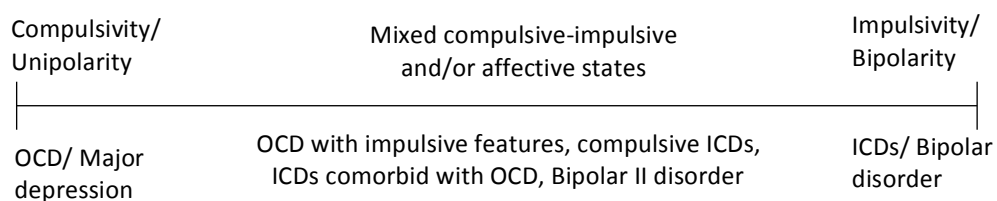
Although there is very little evidence specifically exploring the impact of treatment on impulsivity levels in BD, findings from studies of other disorders indicate that successful treatment is likely to be mirrored in decreases in both state and trait impulsivity (Hollander et al., 2005). At the same time, it is highly likely that impulsivity will itself influence what constitutes a successful treatment, in terms of the patients' ability to engage in treatment (see Moeller et al., 2001b for an exploration of impulsivity as a predictor of treatment drop-out in cocaine users) and the ability of treatment to more widely tackle comorbidities and harmful behaviour (Najt et al., 2007).

### **5.3.2 Impulsivity and Comorbidity in Bipolar Disorder**

As impulsivity has come to be accepted as a core quality of bipolar disorder (BD), its relevance to common comorbidities has begun to be explored. As well as BD, impulsivity is considered a fundamental aspect of numerous disorders – Whiteside and Lynam (2001) have noted that it is the second most common diagnostic criterion in the DSM-IV after subjective distress - and as such has a potentially valuable role in the exploration of trans-diagnostic elements of disorders. This section will focus exclusively upon the evidence for impulsivity as the mechanism behind comorbidities of BD and other disorders. The reader should note that as the relationship between BD and borderline personality disorder was discussed in depth earlier in this chapter (**Section 5.2**) it will not be discussed again within this section.

A useful study conducted by Karakus and Taman (2011), explored the prevalence of Impulse Control Disorders (American Psychiatric Association, 2010; see **Chapter Two** for more detail) in BD. The authors found lifetime comorbid ICDs in 27.4% of their sample of BDI patients, a rate that is much higher than that seen in the general population. Patients with comorbid ICDs were characterised by high levels of impulsivity compared to other patients with BD but without comorbid ICDs. This high impulsivity was demonstrated through significantly higher scores on all facets of the BIS, as well as increased rates of comorbid substance abuse and suicide attempts. Similarly, Di Nicola et al. (2010) found a high prevalence of ‘behavioural addictions’ (similar in content to ICD-not otherwise specified) in their sample of BD patients, with these patients again showing high trait

impulsivity when compared to non-behaviourally addicted BD patients and healthy controls. McElroy et al.'s (1996) in depth evaluation of what unites ICDs and BD reaches the conclusion that particular ICDs are related to BD on the basis of impulsivity, with the explanation that both mania and certain 'impulsive' ICDs are characterised by *'disinhibited or spontaneous thinking and behavior, little insight into dangerousness of symptoms [and] little resistance to impulses and behaviors'* (p.236). 'Impulsive' ICDs considered more likely within BD include intermittent explosive disorder, pathological gambling and compulsive buying. The authors describe other ICDs as having a more compulsive element, and therefore being more closely related to obsessive compulsive disorder (OCD) or depression. This is well summarised within their schematic, reproduced in **Figure Seven** below.



**FIGURE SEVEN: The Relationship Between Bipolar Disorder and Impulse Control Disorders (McElroy et al., 1996)**

It is relevant to note that this model places OCD and other anxiety-related disorders at the opposite end of the spectrum to BD, despite a high comorbidity between BD and anxiety disorders (see **Section 4.2.1**). This may indicate that while the model makes an interesting contribution to our understanding of the relationships between BD and ICDs, it is not flexible

enough to truly encompass the reality of BD comorbidities. There is not a great deal of literature exploring this model, though there is some evidence to suggest that impulsivity is important in uniting BD and pathological gambling (PG), as predicted by the model. McIntyre et al. (2007) found problem gambling rates to be significantly higher in patients with BD compared to both the general population and patients with major depressive disorder, at 6.3% compared to 2.0% and 2.5% respectively. The authors suggest that this is due to an underlying deficit in impulse control. Kim and colleagues (2006) support this view in their review of the association between mood disorders and PG, stating that *'the intertwined relationship between mood disorders and PG may occur, in part, through an underlying common temperament, specifically involving impulsivity'* (p.112). However, once again experimental work is needed to confirm these theories.

There is also evidence that impulsivity may underpin the comorbidity between BD and other disorders, which are not necessarily themselves described as impulsive. It was mentioned within **Section 4.2.1** that anxiety was a particularly common comorbidity in BD (McIntyre et al., 2006). While anxiety - characterised by behavioural inhibition - might in many ways be considered to be orthogonal to impulsivity, one study has found that BD outpatients with comorbid anxiety disorder had higher trait impulsivity compared to BD outpatients without an anxiety disorder (Taylor et al., 2008). Furthermore, the study also found that dimensional measures of

anxiety related strongly to impulsivity, with higher levels of anxiety symptomatology relating to increased impulsivity scores in BD patients. Najt and colleagues (2007) also note a potential role for impulsivity in explaining the co-occurrence of obsessive-compulsive disorder (OCD) and BD. It is relevant to note that there has recently been an increased interest in the potential relationships between impulsivity and concepts such as anxiety and compulsivity, as was described above in McElroy and colleagues' (2005) paper. Evidence such as that of Taylor and colleagues' suggests that impulsivity and these anxious and inhibited concepts may not be as distinct as was originally thought (Hollander, 1996) and may instead overlap. Ferraro et al. (2006) describe the similarities between disorders characterised by impulsivity and compulsivity, reporting that both sets of disorders show decreased ability to control one's own behaviour, particularly in the face of resistance (potentially conceptualised as a lack of agency), and repetition of behaviour, and that they frequently coexist. It will be interesting to see how this line of thinking progresses, and whether theories in this area can explain the co-occurrence of anxiety disorders and BD.

The high comorbidity between BD and substance use disorder was also noted in **Chapter 4**. Again, impulsivity might provide the mechanism to explain this comorbidity. Holmes and colleagues (2009) compared 32 BD patients with a history of alcohol abuse or dependence to 24 BD patients without a history of alcohol misuse and 25 healthy controls, finding that while trait impulsivity was equally elevated in both patient groups compared



to the controls, state impulsivity (measured using the Balloon Analogue Risk Task; BART) was elevated in those patients with alcohol misuse only, regardless of their symptomatic mood state. Swann et al. (2004) explored the interaction between episodic state, substance abuse and impulsivity more closely, specifically comparing BD patients who were between episodes with those who were manic. The authors discovered that state impulsivity (measured using the Continuous Performance Task; CPT) was increased between episodes only in those patients who had previous substance abuse, as compared to those BD patients who had no history of substance misuse. In these patients, the inter-episode impulsivity more closely resembled that seen in the other patients during episodes of mania. This chronic expression of impulsivity, over and above that seen in BD without substance abuse, suggests that impulsivity links the two disorders in some way. Further research is required to establish the causal pathways involved in this relationship.

Finally, there is also a suggestion that impulsivity has a role linking BD with eating disorders, with many authors highlighting the theoretical existence of this relationship (Lunde et al., 2008, Wildes et al., 2008). The most thorough exploration of this is found in McElroy et al. (2005), in which the authors propose that the two disorders share emotional dysregulation difficulties and high levels of impulsivity. Once again, there is a need for experimental evidence to confirm this theory.

### 5.3.3 Impulsivity and Behaviour in Bipolar Disorder

Impulsive behaviour is so fundamental to bipolar disorder that Moeller and colleagues (2001a) have stated that it is '*virtually impossible to meet DSM-IV criteria for a manic episode without impulsive behavior*' (p.1787). While this statement certainly reflects the clinical picture of bipolar disorder, the research literature has been less quick to explore the ways in which impulsivity is enacted in the context of bipolar disorder. For example, Meade and colleagues (2008) make passing reference to the potential role of impulsivity in uniting BD with comorbid substance use and consequentially to risky sexual behaviour. However, these authors are unable to cite any data that directly explores this. There has been some exploration of the idea that the aggressive behaviour occasionally seen in BD is promoted by impulsivity. Najt et al. (2007) have stated that, given the consistent finding of an independent relationship between impulsivity and both aggression and BD, a direct investigation of the three is likely to unearth impulsivity as a strong link between aggression and BD. Preliminary data appears to support this, with Carpinello et al. (2011) finding high scores on scales of impulsivity (BIS-11) and aggression (Aggression Questionnaire; AQ) in a bipolar sample. However, Carpinello and colleagues' study focused on the relationship between these variables in BD as compared to borderline personality disorder (BPD) and therefore neglected to include healthy controls or to directly explore the relationships between impulsivity and aggression within their BD sample.

While literature specifically exploring relationships between bipolar disorder, impulsivity and potentially impulse-mediated behaviour may be sparse for the majority of behaviours, one behaviour has received considerably more attention. Suicide is sadly very common amongst people with BD, with various studies suggesting that between 11% (Angst et al., 2002) and 51% (Valtonen et al., 2005) of people who have experienced bipolar disorder will attempt suicide at some time in their lives. The majority of estimates converge at around 25% (Dalton et al., 2003). Again, given the separate literatures supporting the role of impulsivity in suicidal behaviour (see **Section 2.4.1**) and in bipolar disorder (see **Section 5.3.1**), it follows naturally that the high suicide rate found in BD may at least in part be explained by the high levels of impulsivity found in this population. Research investigations have indeed found this to be the case. Swann and colleagues (2005) looked at the impulsivity levels – using both empirical tasks (Continuous Performance Test, CPT) and self report measures (BIS-11) – of forty-eight BD patients, half of whom had made a suicide attempt (SA). They found that while trait impulsivity levels had a trend towards elevation in those patients who had made an SA compared to those who had not, CPT scores indicated significantly higher impulsivity in patients with an SA, regardless of their history of alcohol abuse or current mood state. This was particularly clear in those subjects whose attempt was classified as being medically severe (judged by discussions with the patients and analysis of their medical records).

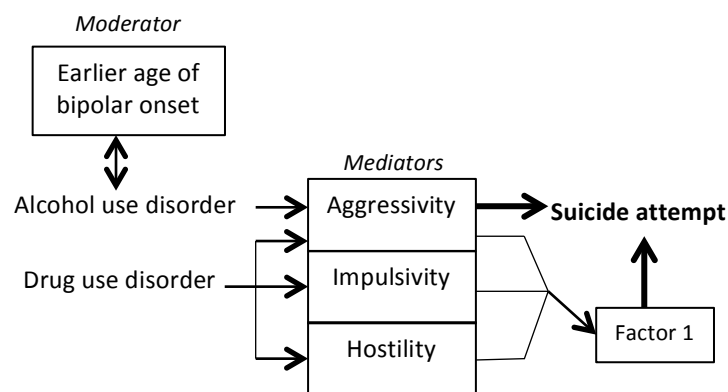
As well as making more severe attempts it is also possible that BD patients with high impulsivity levels make a greater number of attempts, with data from Michaelis et al. (2003) suggesting a trend towards increased trait impulsivity in multiple attempters compared to those individuals with BD who have a single SA. Strong support of the relationship between BD, impulsivity and suicide also comes from Maser and colleagues (2002), whose 14-year longitudinal study of affectively ill patients found impulsivity to be one of the strongest predictors of suicidal behaviour. Matsuo and colleagues (2010) have gone so far as to identify potential neurological underpinnings of the relationship, finding correlations between BIS scores and the anterior genu area in BD patients who had attempted suicide, but not in those BD patients who had not, nor in healthy controls.

This is not to suggest that there is unequivocal support for the relationship between elevated impulsivity and suicidal behaviour in BD. A handful of studies have not found increased impulsivity levels in BD patients with a history of suicide attempts (Oquendo et al., 2000), with the authors of these studies suggesting that impulsivity is already so high in BD as to have reached a ceiling level, with little more variation in scores possible. Given the fact that the majority of studies that have found differences have used arguably more sensitive empirical tasks of impulsivity, it is indeed possible that self report measures are not sensitive enough to discriminate between BD patients.

As is clear in the wider suicidal behaviour literature, it is often the interactions between different risk factors that directly precipitate a suicidal act. Some research in BD has attempted to explore the interactions between impulsivity and other risk factors for suicide. Hopelessness has been widely cited as an important risk factor for suicide in general and psychiatric populations (see Beck et al., 1985). Swann et al. (2008) found correlations between measures of impulsivity and hopelessness within their sample of currently depressed bipolar patients, leading the authors to stress the importance of a relationship between impulsivity and hopelessness in promoting suicide in bipolar patients. Similarly, Perroud and colleagues (2011) found strong correlations between measures of impulsivity and aggression in a sample of BD and major depression patients who had attempted suicide which were not present in patients who had not attempted suicide, implying that the interaction between impulsivity and aggression may be important in predicting suicidal behaviour in mood disorder patients. This is supported by Michaelis et al. (2004), who found strong correlations between hostility and impulsivity in BD patients who had attempted suicide but not in patients who had not.

There is also robust evidence to suggest that impulsivity underlies a complex interaction between bipolar disorder, suicide and substance use. Risk of suicide in bipolar disorder is considered to be even higher if the individual misuses substances (Dalton et al., 2003). In a sample of 138 BD patients

measured for aggression, impulsivity and hostility and extent of substance use, Sublette and colleagues (2009) used principal components analysis to develop a theoretical model of the inter-relationships between these factors. The resultant model, reproduced in **Figure Eight** below, shows impulsivity as one of the moderators of the relationship between disorders of drug use and suicide attempt within BD. This model sees drug use as enhancing aggressive, impulsive and hostile traits, which may then themselves lead to suicide attempts.



**FIGURE EIGHT: Interactions Between Substance Misuse, Impulsivity, Aggression, Hostility and Suicide Attempts (Sublette et al., 2009)**

Sher et al. (2001) support Sublette and colleagues' thesis that substance use decreases the ability to control impulses, and may therefore promote the likelihood of suicidal behaviour. It is also pertinent to remember that pre-existing impulsive traits may have a causal role in drug use disorder - as was demonstrated by Swann et al. (2004) and discussed in the previous section - and as such individuals with bipolar disorder and comorbid substance misuse may represent an especially highly impulsive sample (Dalton et al.,

2003). It is certainly clear that wider investigation into the relationships between impulsivity and suicide in bipolar disorder, with particular attention to the potential role of impulse-mediated comorbidities, will provide clinically relevant insights into the high rates of suicidal behaviour within this population.

## **5.4 CONCLUSIONS**

Both bipolar disorder (BD) and borderline personality disorder (BPD) can be seen as disorders characterised by the presence of extreme mood experience and high levels of impulsivity. The literature suggests that these high impulsivity levels are fundamental to the disorders and exist as high trait impulsivity, as well as mood and comorbid-related fluctuating state impulsivity. As such, impulsivity can be considered a trans-diagnostic construct relevant to comorbidity and with the potential to explain clinically-relevant behaviours. This is particularly true when impulsivity is considered in tandem with affect regulation.

## CHAPTER 6: STUDY ONE

### 6.1 INTRODUCTION TO STUDY ONE

The introductory chapters explored the literature relating to impulsivity, and its relationship to both behaviour and bipolar disorder. The literature demonstrates that impulsivity is a multi-faceted construct, comprised of numerous potentially separable variables (see **Chapter 1**). Impulsivity in all its forms has been shown to be an important predictor of a wide variety of behaviour (see **Chapter 2**) and to be elevated in certain psychiatric disorders (see **Chapter 5**). One particularly pertinent pathway to impulsivity is dependent on the experience of extremes of mood (see **Chapter 3**). It is clearly established that high levels of impulsivity are a core feature of bipolar disorder, with these high levels being important in the prediction and explanation of several key behaviours commonly seen in this disorder (see **Chapter 5**). Furthermore, we have also developed an understanding of a potential continuum model of bipolar disorder, which views sub-clinical experiences of mania as being qualitatively similar to the clinical experience of bipolar disorder (see **Chapter 4**).

This study aimed to bring together these various strands of the research literature. Building upon research that has found elevated impulsivity to be a predictor of behaviour within clinically diagnosed bipolar disorder, it was concerned with the replication and extension of these findings within a non-clinical continuum sample.



## 6.2 AIMS AND HYPOTHESES

The study aimed to:

- Explore impulsivity as it manifests in individuals who experience periods of elevated mood/elation over and above what you would expect to see in the general population (probable bipolar spectrum individuals, termed MDQ+), and to determine the possible relevance to bipolar disorder.
- Investigate the relevance of affective impulsivity using the UPPS and Positive Urgency Measure (UPPS-P) to MDQ+ individuals.
- Investigate the links between specific domains of trait impulsivity (i.e. urgency, lack of perseveration) and specific impulsive behaviours seen in bipolar disorder e.g. self harm, eating behaviour, drinking behaviour.
- Explore whether findings regarding the role of impulsivity in suicidal behaviour within bipolar disorder will apply throughout the bipolar spectrum.
- Investigate the impact of various other personality and/or psychopathological measures (e.g. depression, self esteem) on the relationship between impulsivity and behaviour.

It was hypothesised that:

- Impulsivity measured by the UPPS-P would be elevated in individuals classified as hypomanic according to their scores on the Mood Disorder Questionnaire (MDQ+ individuals) compared to MDQ negative individuals.
- High levels of affective impulsivity (as measured by both positive and negative urgency) would be prevalent in bipolar spectrum disorder, as evidenced by increased scores on these facets for MDQ+ compared to MDQ- individuals.
- Increased self-reported impulsivity (particularly affective impulsivity) would be associated with a history of committing or having urges to commit impulsive acts.
- Self-reported impulsivity would be related to suicidal behaviour in individuals with experience of extreme mood.

## **6.3 METHODS**

### **6.3.1 Design**

Study one used a quantitative cross-sectional study design, with a combination of standardised questionnaires and novel questions administered at a single time point. The survey was run online, using the surveymonkey.com software.

### **6.3.2 Ethics**

Ethical approval was obtained from the University of Nottingham Medical School Ethics Committee on the 1<sup>st</sup> May 2009 (see **Appendix 1**), with an extension granted on 15<sup>th</sup> April 2010 (see **Appendix 2**). Participants were required to indicate their consent to take part before they were able to progress with the questionnaire (see **Appendix 3** for the consent form), but were also reminded that they could stop responding at any time should they wish (see **Appendix 4** for the information sheet). Given the sensitive and occasionally emotive nature of the questions, participants were encouraged to contact the investigators or relevant organisations (details of suggested organisations were given within the information sheet) in the event of distress.

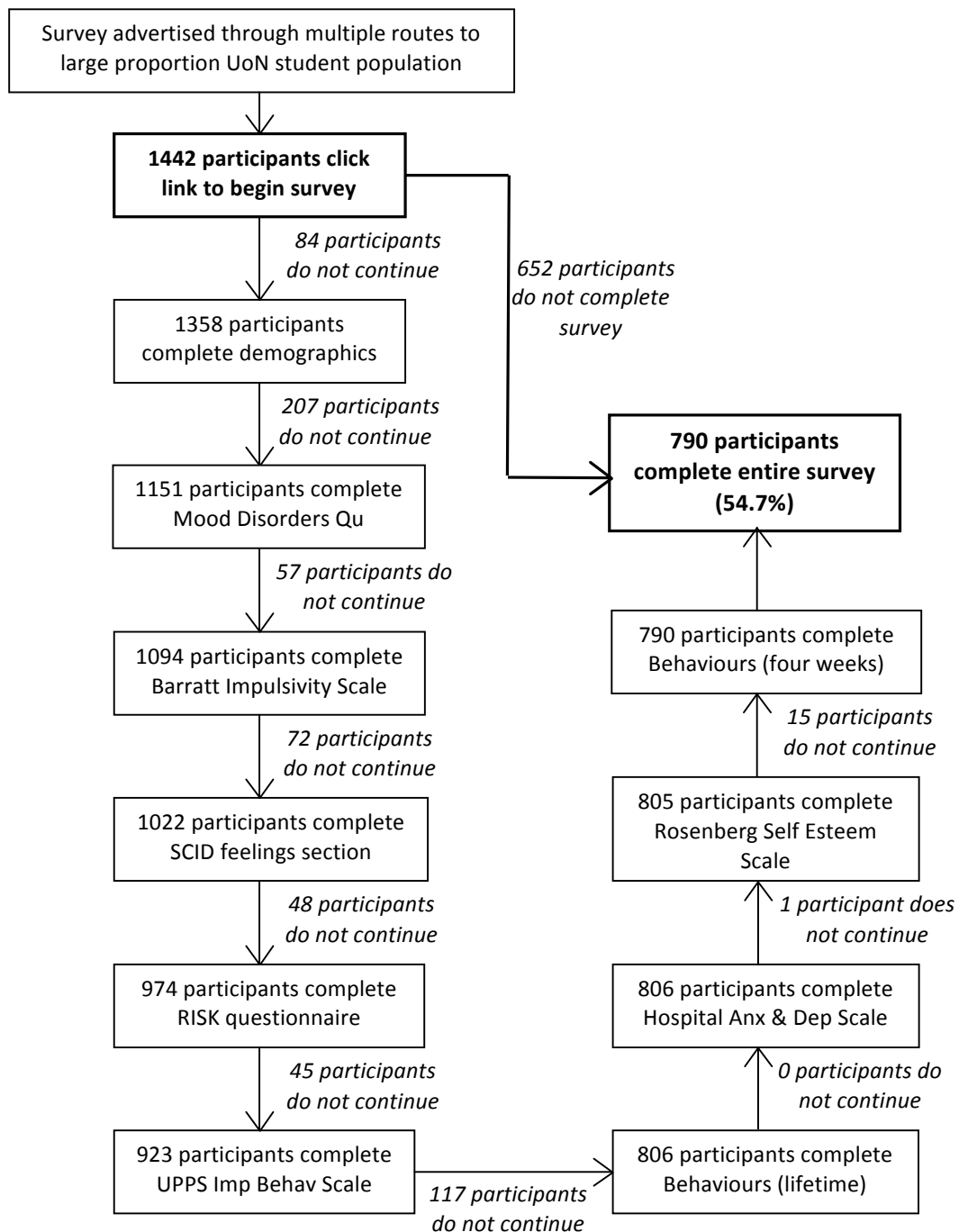
### **6.3.3 Participants**

Invitations to participate in the study were targeted to students of the University of Nottingham, through advertisements on the University's 'Portal' intranet and Networked Learning Environment ('NLE'). Both the Portal and the NLE require the individual to log in before information is provided, and as such are accessible to only staff and students of the University. At the same time, all students are able to access the intranets and the internet in the libraries and departments of the University as well as potentially in their own homes. Students have been identified as an ideal population with whom to use internet-based surveys, given their familiarity

with this form of technology and easy access to the internet (Dillman and Bowker, 2001). The advertisement invited potential participants to participate in a study looking at ‘personality and behaviour’ (see **Appendix 5**). Those interested could click a website link to directly access the study information sheet and progress onwards to the study. They were also encouraged to contact the researchers if they required any further information.

Participants were not excluded on the basis of current or previous mental health or substance related problems, as it was considered that these experiences would be relevant to the research questions and the continuum model underlying the study. The study was however targeted at individuals who were sufficiently proficient in the English language to comprehend the content of the questionnaire. It was assumed that students enrolled at the University would necessarily meet these criteria. Consistent with the higher education context, all participants reported being over 17 years of age. Of 1442 participants who clicked the link to participate in the survey, 1358 proceeded past the information sheet and consent page to begin the survey. 790 participants completed the entire survey (54.7% of those who had clicked the link; 58.1% of those who had begun to answer the survey). The progression of individuals through the survey is represented in **Figure Nine**. Given that all included scales were required for analyses, and that in a remote testing situation, participant drop-out might best be interpreted as withdrawal of consent (responses were automatically stored by the

software as soon as they were clicked, even when participants exited the survey early), the analysis is based on the responses of those individuals who completed the survey. Individuals with greater than 10% missing items on any scale all went on to drop-out of the questionnaire. In cases where individuals had missed three or fewer data points, these missing items were replaced with their own mean score for that scale (Mcdonald et al., 2000).



**FIGURE NINE: Flow Chart of Participant Dropout within the Survey**

#### 6.3.4 Materials and Measures

The questionnaire was run online, using the surveymonkey.com software. Screenshots demonstrating the design of the questionnaire can be seen in **Appendix 6**. Participants could complete the questionnaire remotely on any device with access to the Internet, using the unique website address of the survey. Internet-based research has been shown to provide equivalent results to paper-and-pencil methodology (Riva et al., 2003), and may in fact decrease socially desirable responding and promote greater honesty from participants (Buchanan and Smith, 1999, Buchanan, 2000). Responses to the questionnaire were automatically stored within a password-protected database, and could then be exported using Excel software. From here the results were transferred into SPSS v19 for analysis.

The questionnaire itself was compiled from numerous measures, some standardised, some novel. These measures are described below.

#### **6.3.4.1      *Mood Disorders Questionnaire***

Hirschfeld and colleagues (2000) developed the Mood Disorders Questionnaire (MDQ) as a screening tool for bipolar spectrum disorders. The bulk of the questionnaire is formed from 13 questions, all prefixed with the statement '*Has there ever been a period of time when you were not your usual self and...*' Each of the questions relates to symptomatic experiences relevant to the bipolar spectrum as noted from the DSM-IV (American Psychiatric Association, 1994) or from the authors' clinical experience. They

include, for example, *'Has there ever been a period of time when you were not your usual self and... you had much more energy than usual?'*

Participants indicate their experience by ticking either 'Yes' or 'No' for each of these 13 items. They are then asked whether these experiences happened simultaneously, and the extent of any problems caused by any or all of the experiences (*'No problem'*, *'Minor Problem'*, *'Moderate Problem'* or *'Serious Problem'*). The authors report that an endorsement of seven or more of the thirteen symptoms, occurring together over the same time period and causing a 'moderate' or 'severe' problem, constitutes a positive screen for bipolar spectrum disorder. Given these scoring criteria, the authors report in their original article specificity of 0.90 and sensitivity of 0.73 for psychiatric outpatients. Positive predictive value as been estimated at 29.3%, with negative predictive value at 95.05 (Zimmerman et al., 2009). However, when used in a general population sample, the sensitivity slipped to 0.28 (Hirschfeld et al., 2003). The authors justify this finding, explaining that the 'gold standard' SCID interview for Axis 1 disorders, against which they are comparing the MDQ, has a low reliability in the general population.

Other studies have suggested that the decrease in sensitivity, particularly in regard to difficulties identifying bipolar II disorder (BDII), may be a direct result of the problem severity criterion. Miller and colleagues (2004a) found that half of the false negatives in a psychiatric sample came about as a direct result of their response to this severity criterion question, leading the authors to suggest its removal. Studies using this modified form of the MDQ



(termed the MDQ7 by Benazzi, 2003 when used without the co-occurrence criterion also) have had mixed results, though some studies have reported an increase in sensitivity without too great a drop in specificity – Kim et al (2008) found specificity to be 0.63 and sensitivity to be 0.68, while Benazzi (2003) reports a specificity of 0.46 and a sensitivity of 0.88. Conversely, Isometsä and colleagues (2003) found removing the severity criterion altogether resulted in very low specificity. They instead suggested that a positive screen should result from eight or more co-occurring symptoms with at least a minor impairment. Chung et al. (2009) have also maintained that the inclusion of the co-occurrence criterion is vital to the scale. Other researchers have supported cut offs which occur when participants respond in the affirmative to any 7 from the total 15 questions (the 'MDQa'; see Kim et al., 2008) or simply when nine symptoms are endorsed (Twiss et al., 2008). There is, as yet, no definitive answer as to the most appropriate of these adaptations, with further research clearly needed to better establish a definitive set of marking criteria for a positive screen. This study took the original cut-off criteria (7/13 symptoms, occurring simultaneously and causing a moderate or severe problem) as the boundary for a positive screen (MDQ+). However, bearing in mind the on-going debate within the literature - particularly regarding the relevance of the problem criterion to a non-clinical sample (Udachina and Mansell, 2007) - individuals who endorsed seven or more simultaneous symptoms as causing a mild problem were considered to be 'sub-threshold' cases and were identified as such (MDQsub).

Despite debate surrounding the boundaries, the scale is widely accepted. It has been shown to have solid psychometric properties in the general population (Hirschfeld et al., 2003) and in student samples (Udachina and Mansell, 2007). It is also considered to be an appropriate screening tool for use within psychiatric populations, particularly in terms of identifying undetected bipolarity in patients with a diagnosis of depression (Kim et al., 2008, Miller et al., 2004a, Osvath et al., 2008). In these populations, it has been shown to be unaffected by present episodic state and as having satisfactory reliability ( $\kappa = 0.64$ ; Gervasoni et al., 2009). Scores on the MDQ have been shown to relate well to other relevant measures, such as indices of depression and hypomanic personality (Udachina and Mansell, 2007).

The MDQ was chosen over other continuous measures of hypomania, such as the Hypomania Personality Scale (HPS; Eckblad & Chapman, 1986), due to its focus upon episodic experiences of (hypo)mania in keeping with DSM-IV criteria. Alternative hypomania scales view hypomania as a stable personality trait and, while this has been demonstrated to have predictive validity for bipolar disorder (Kwapil et al., 2000), it was felt by the researchers that episodic hypomanic experiences may be more closely representative of clinically relevant mood experience. It is however noted that using cut-offs in this manner somewhat simplifies that continuum model proposed within **Chapter Four**. It is important to note that as a 15

item measure, the MDQ can be completed very quickly in comparison to the 48 item HPS or comparatively complex HCL-32 (Angst et al., 2005). As the questionnaire was very long, this represented an important consideration for the research.

#### **6.3.4.2        *Barratt Impulsiveness Scale***

The Barratt Impulsiveness Scale (BIS; Barratt, 1959, Barratt, 1972) is a self-report measure of impulsivity, developed by Barratt and colleagues as a tool to aid the understanding of relationships between anxiety, impulsivity and psychomotor efficiency. Its use as a theoretical model to understand impulsivity was evaluated in some detail throughout **Chapter 1**. The BIS-11 is the most recent form of the scale. It consists of 30 items, each rated by the participant on a four-point scale (*'Rarely/Never'* (1), *'Occasionally'* (2), *'Often'* (3), or *'Almost Always/Always'* (4)). These 30 items together cover the three-factor structure of impulsivity, consisting of attentional, motor and non-planning impulsiveness. Attentional impulsiveness is defined as a difficulty in concentrating and remaining focused. It is measured by 8 items, including *'I often have extraneous thoughts when thinking'* and *'I have "racing" thoughts'*. Motor impulsiveness is acting without thought, and is measured by 11 items on the BIS-11. These include *'I do things without thinking'* and *'I act "on impulse"'*. Non-planning impulsiveness refers to the absence of forward planning. It too consists of 11 items, which include *'I am more interested in the present than the future'* and *'I plan tasks carefully'*

(reverse scored). The scores for each facet can be combined to provide a total impulsiveness score. Normal total scores are considered to be in the range of 52-72, with scores of 72 or higher indicating high levels of impulsivity (Stanford et al., 2009).

The BIS-11 is the most commonly used measure of impulsivity. It has a high level of internal consistency (Cronbach's  $\alpha = 0.83$ ) and test-retest reliability (Spearman's  $Rho = 0.83$ ) (Stanford et al., 2009). The three-factor structure of attentional, non-planning and motor impulsiveness has been widely replicated (Patton et al., 1995). The BIS has also been shown to be amendable for computerised administration, with scores equivalent to those found during pencil-and-paper administration (Surís et al., 2007). The interim BIS-11a was used for this study, which has slightly different factor loadings and different wording for six of the questions. As the BIS-11 is the recommended format, the prorating procedure of Dr. Jijffijt was used to update scores from the BIS-11a to represent scores on the BIS-11 (<http://impulsivity.org/BIS-11/bis-10r-bis-11a-issue>, 2011). There are no studies exploring the validity of this pro-rating procedure, though it is considered by the International Society of Research on Impulsivity to represent the most appropriate way to deal with the incorrect use of the BIS-11a.

#### **6.3.4.3 SCID Feelings Questions**

As the study was exploring experiences that had taken place in the past, it was decided that information on lifetime experience of psychiatric symptomology was needed, as opposed to state measures of current mood (e.g. Beck Hopelessness Inventory). In this vein, a questionnaire was developed, using as its basis the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID; First et al., 2002) questions relating to eight key areas of psychiatric experience: depression, hopelessness, phobia, post-traumatic stress, social phobia, panic attack, generalised anxiety and compulsion. For each of these eight areas, participants were initially asked whether they had experienced it. If they endorsed that they had, the questionnaire progressed to ask them how often they experienced it ('Rarely' (1), 'Occasionally' (2), 'Sometimes' (3), or 'Often' (4)) and whether they had experienced it over the past four weeks ('Yes' or 'No'). Answers to this section were used separately as a measure of lifetime experience of any one of the psychiatric experiences, but were also summed to give an indication of total psychopathology (out of 8). This was enhanced by adding together the total frequency score, providing a total psychiatric symptomatology score in which higher scores indicated more frequent and more varied experience of psychopathological experiences (out of 32).

#### **6.3.4.4      *Attitudes Towards Risks Scale***

Franken and colleagues (1992) developed the Attitudes Towards Risks Scale (RISK) as a measure of individuals' beliefs and anticipations regarding risks,

particularly in terms of their willingness to endure the potentially negative consequences of risk-taking. Factor analysis of an original set of 34 risk-related statements resulted in two factors: 'disregard of social approval' and 'disregard of danger'. The final scale included the ten best loading items for each of the two factors, with items such as '*I do not let the fact that something is considered immoral stop me from doing it*' loading upon disregard of social approval, and '*The greater the risk the more fun the activity*' relating to disregard of danger. Each of these items is self-rated on a 1-5 Likert scale, with 5 indicating the statement is '*like me*' and 1 indicating it is '*not like me*'. The maximum total score is 100, with higher scores indicating a greater propensity to take risks. The scale is reported to have high reliability ( $\alpha = 0.91$ ; Franken et al., 1992).

#### **6.3.4.5 UPPS Impulsive Behaviour Questionnaire**

The UPPS Impulsive Behaviour Questionnaire was developed by Whiteside and Lynam (2001) from a factor analysis of numerous scales measuring impulsivity. It was developed within the framework of the Five Factor Model of personality (FFM; McCrae and Costa, 1990). The scale consists of 45 items, rated from 1 to 4 ('*Agree Strongly*' (1), '*Agree Some*' (2), '*Disagree Some*' (3), or '*Disagree Strongly*' (4)). Relevant items are reverse scored, so that higher scores indicate higher impulsivity.

Within the UPPS there are four key pathways to impulsive behaviour:

urgency, (lack of) premeditation, (lack of) perseveration and sensation

seeking. 12 items measure urgency, the tendency to behave impulsively in

conditions of negative affect. These include for example *'When I feel bad, I will often do things I later regret in order to make myself feel better now'*.

(Lack of) premeditation relates to the absence of forward planning. It is

measured by 11 items, including *'I like to stop and think things over before I*

*do them'*. (Lack of) perseverance measures the ability to maintain focus on

boring and/or difficult tasks. It is measured by 10 items, with one example

being *'I tend to give up easily'*. Finally, sensation seeking – defined as the

tendency to enjoy and pursue exciting and potentially dangerous activities -

is measured by 12 items. One example is *'I generally seek new and exciting experiences and sensations'*.

The four-factor structure of the UPPS has been widely replicated (Magid and Colder, 2007, Schmidt et al., 2008, Van der Linden et al., 2006). The average item-total correlation of the scale is 0.58, with internal consistency for each scale found to be greater than or equal to 0.82 (Whiteside and Lynam, 2001).

#### **6.3.4.6      *Positive Urgency Measure***

The Positive Urgency Measure (PUM; Cyders et al., 2007) was created as an addition to the UPPS, so that it might also measure positive urgency (that is,

the tendency to behave impulsively under conditions of positive affect).

Together, the UPPS and the PUM can be referred to as the UPPS-P. The PUM consists of 14 items, all measuring positive urgency. One example item is *'When I am very happy, I tend to do things that may cause problems in my life'*. The potential responses to items are identical to those on the rest of the UPPS (e.g. *'Agree Strongly'* (1), *'Agree Some'* (2), *'Disagree Some'* (3), or *'Disagree Strongly'* (4)), such that, again, higher scores on this facet represent increased levels of impulsivity. While there is some suggestion that positive and negative urgency together load on a wider 'mood-based rash action' facet (Cyders and Smith, 2007), positive urgency is considered to have distinct and incremental predictive value over the other UPPS facets (Cyders and Coskunpinar, 2010). The scale has internal consistency of 0.94 (Cyders et al., 2007).

#### **6.3.4.7      Behaviour Questions**

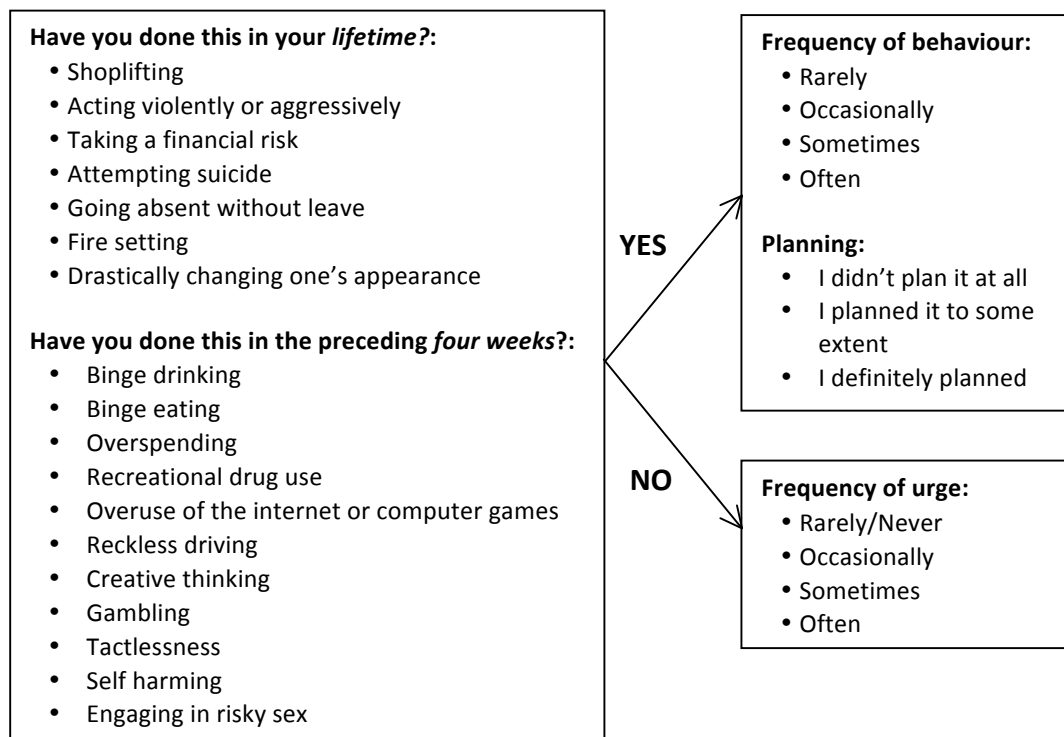
A set of questions were included in the survey to explore the occurrence of a range of behaviours, selected for inclusion on the basis of a proven or theoretical link to impulsivity (see **Chapter 2** for a discussion of the evidence), particularly those behaviours that arise frequently in the context of bipolar disorder (see **Chapter 5** for more discussion of impulsivity and behaviour in bipolar disorder). The range of behaviours was informed by evidence from the literature, as well as the clinical experience of a psychiatrist specialising in the disorder (RM). The first set of questions



explored the occurrence of a set of behaviours within the participant's lifetime. The lifetime behaviours were as follows: shoplifting, acting violently or aggressively, taking a financial risk, attempting suicide, going absent without leave, fire setting and drastically changing one's appearance. The second set of behaviours were thought to be more commonplace or to occur more frequently. Within this section, participants were asked whether they had engaged in any of the following behaviours within the preceding four weeks: binge drinking, binge eating, overspending, recreational drug use, overuse of the internet or computer games, reckless driving, creative thinking, gambling, tactlessness, self harming and engaging in risky sex.

Each behaviour was, where relevant, followed with a short description to ensure participants understood what was meant by the behaviour (e.g. for fire setting: *'set fire to somewhere or something due to the pleasure it gave you'*; see **Appendix 6** for the exact wording for all questions). Given the remote nature of and the type of questions included in this web-based survey, steps were also taken to support participants within the questionnaire set-up. For example, some of the questions contained a note normalising the behaviour (e.g. *'Shoplifting is more common than you might expect, a large study by Blanco et al (2008) found that 11.3% of the American population regularly shoplift.'*) and participants were reminded once more that they could contact support organisations or the researchers if they felt at all distressed by the questions.

Participants who indicated that they had engaged in a behaviour (either within their lifetime or the prior month, depending on the section) progressed to questions regarding the frequency with which they enact this behaviour (*'Rarely'* (1), *'Occasionally'* (2), *'Sometimes'* (3), or *'Often'* (4)), and the degree of planning involved in the most recent occasion (*'I didn't plan it at all'* (1), *'I planned it to some extent'* (2) and *'I definitely planned it'* (3)). Participants who report that they have never done the given behaviour were asked the frequency with which they experienced urges to engage in the behaviour (*'Rarely/Never'* (1), *'Occasionally'* (2), *'Sometimes'* (3), or *'Often'* (4)). This process is summarised within **Figure Ten**.



**FIGURE TEN: Questionnaire Investigating Impulsive Behaviour**

As with the SCID based questions, the behaviour responses were scored as binary variables (i.e. a particular behaviour of interest either was or was not endorsed). Participants were also scored according to the total number of behaviours they reported engaging in, giving a total impulsive behaviours score out of 18. A total behaviour frequency score was calculated, with a maximum possible score of 72, which would be achieved if all of the behaviours were reported as being engaged in 'often'. A similar value was calculated to indicate the extent to which individuals experienced urges (also with a maximum of 72). The planning variable was assessed to provide a modal level of planning across all behaviours for the individual.

#### **6.3.4.8      *Hospital Anxiety and Depression Scale***

The Hospital Anxiety and Depression scale was used to investigate the current experience of anxiety and depression within the sample. The HADS was developed by Zigmond and Snaith (1983) as a brief measure of anxiety and depression, which was not tainted by somatic symptoms. It consists of 14 statements to which the participant indicates the degree to which the statement is representative of their current state. 7 of the statements relate to experience of anxiety (*'I get a sort of frightened feeling like 'butterflies' in the stomach'*), and 7 to depression (*'I look forward with enjoyment to things'*). Each response is scored from 0-3, with higher scores indicating more severe symptomatic experiences. Scores below 8 constitute normal experience, with 8-10 representing borderline difficulties, and scores of

greater than 10 indicating strong experience of negative mood. Research indicates that the HADS has solid psychometric properties, with a literature review indicating a mean Cronbach's alpha for anxiety of .83, and for depression of 0.82 (Bjelland et al., 2002). The HADS appears to be well suited for internet administration, with equivalent results found in this medium as for to pencil-and-paper administration (Andersson et al., 2003).

#### **6.3.4.9          *Rosenberg Self-Esteem Scale***

The Rosenberg Self-Esteem Scale (Rosenberg, 1965, Rosenberg, 1989) is a 10-item measure of global self-esteem. Self-esteem was included as it has been shown to be particularly relevant to bipolar disorder (Jones et al., 2006, Knowles et al., 2007). Items on the Rosenberg Scale include, for example, *'I feel that I have a number of good qualities'*. Respondents indicate to what extent they agree with each of the statements, with *'Strongly Agree'* scored as 3, *'Agree'* scored as 2, *'Disagree'* scored as 1 and *'Strongly disagree'* scored as 0. Relevant items are reverse scored. Responses to each item are totalled, to give a score out of 30, with higher scores indicating higher levels of self-esteem. The scale is widely used and well validated, with Cronbach's alpha ranging between 0.77 and 0.92 (Blascovich and Tomaka, 1993, Heatherton and Wyland, 2003). Though there is some debate as to its factorial structure, many studies have replicated its single factor structure (Shevlin et al., 1995). Finally, the Rosenberg Self Esteem Scale has also been shown to be well suited to

computer administration, with participants preferring this format to typical pencil-and-paper modes of administration (Vispoel et al., 2001).

### 6.3.5 Procedure

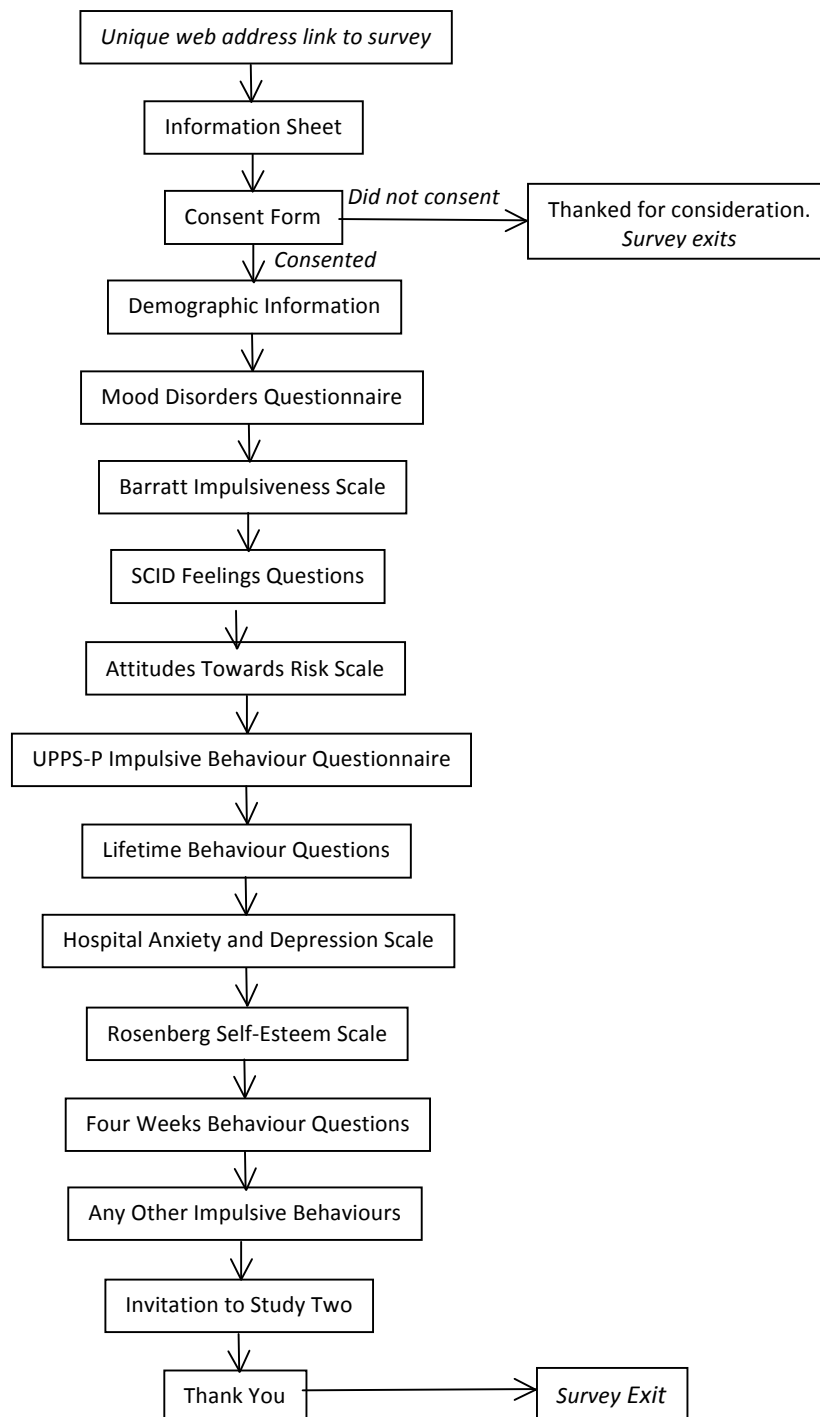
Participants initiated the survey themselves by clicking upon the unique web address at a time to suit them. The web page opened with the information sheet (see **Appendix Four**), which explained that the survey was interested in the relationship between personality traits, feelings and behaviours.

Participants were alerted to the fact that some elements of the survey were personal, and there was the potential for these elements to be distressing.

They were invited to stop the survey if they wanted to (it was possible to exit the survey at any time), or to contact the researchers or a relevant support organisation (details included). When participants clicked 'Next' to continue, they were shown the consent form (see **Appendix 3**). They could tick a box to indicate their consent; if it was given they then progressed through to the questionnaire, whereas if they did not consent they were directed to a page that thanked them for their interest and closed the questionnaire. As many of the questions within the survey were of a personal nature, including some questions regarding illegal behaviour, it was considered most appropriate to keep the survey as anonymous as possible. Participants' demographic information was restricted to their gender, age and years in education. These variables were selected due to their particular relevance to impulsivity. Participants were not asked about their mental

health history, diagnoses or contact with services. In part this was due to a requirement to keep the survey as concise as possible. As a continuum study, it was also felt that the presence or absence of diagnoses was not directly relevant to the research questions.

From this point participants progressed through the relevant scales and sets of questions, as is shown in the flow diagram below (**Figure Eleven**). No questions were compulsory, meaning that participants could progress through the questionnaire when they had neglected to answer a question (Dillman et al., 1999). At the end of the questionnaire individuals were invited to describe any other 'impulsive' behaviours they thought might be relevant. On the penultimate page, there was a short introduction to the second study, described as an interview *'discussing the sort of things you have in this questionnaire'* (see **Appendix 6**). Participants were reassured that there was no pressure to take part in this study, and thanked for their contribution thus far. If they did wish to take part, they were asked to leave a name and telephone number or email address. On the final page of the questionnaire, participants were thanked for their time and contribution. They were reminded of the contact details for the support organisations and the researchers, whom they were invited to contact if they had any questions at all (see **Appendix 6**). The survey was estimated to take around 30-45minutes to complete.



**FIGURE ELEVEN: Survey Procedure**

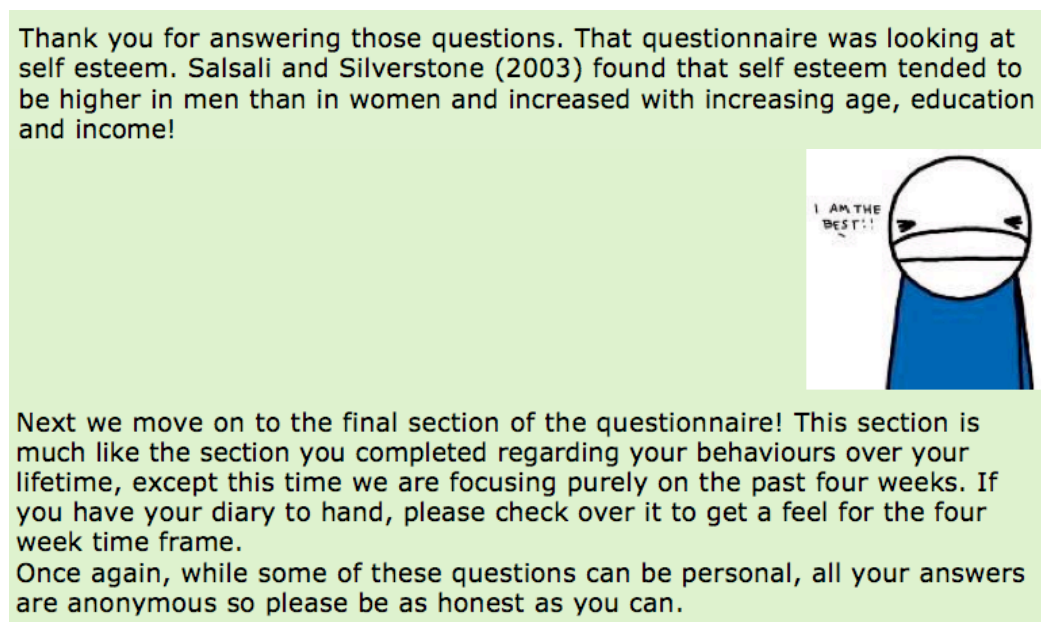
Internet based surveys have been found to be reliable research tools, providing equivalent results to pencil-and-paper surveys, with numerous additional benefits for both researcher and participant (e.g. low cost, results

automatically in electronic format, convenience for participant, increased self-disclosure; Buchanan, 2000, Marquis et al., 1986, Davis, 1999). There are some disadvantages associated with the fact that the participant is remote, giving the researcher little control over the study once it is 'live'. Research nevertheless indicates that small considerations relating to the design of the study can greatly influence the actions of its remote participants (Stern et al., 2007). As such, several steps were taken to modify the survey to enhance its usability.

Following the recommendations of Dillman and colleagues (2005), the design of the survey ensured that page length was limited to the visual field, with a selection of thematically linked questions (e.g. one questionnaire) together on a single page. This ensured that participants were able to focus on the questions in hand without being distracted by later sections, as well as making clear what was necessary to complete before progression (Dowling, 2003). At the same time, participants were kept informed as to their progress through the questionnaire with the use of a progress bar (Dillman et al., 1999). By using the software's 'logic' technique, the survey could be made as concise and relevant as possible to all participants. Logic enables the answer provided by a participant to influence the next question presented to them. For example, if an individual answered that they had not engaged in a given behaviour, they automatically skipped questions regarding the frequency and planning of this behaviour, as these questions would be irrelevant to them. To ensure this worked appropriately, the



questionnaire was thoroughly tested by all researchers before it was used online. Finally, following Dillman et al.'s (1999) advice to ensure a survey is as '*motivating*' as possible, questionnaires were interspersed with basic information regarding the measure used, encouragement regarding progression through the questionnaire, and a small image. These sections provided structure to the questionnaire, engaged participants by highlighting the relevance of their participation and, hopefully, added to the aesthetics of the survey design. An example of one such section is given below in **Figure Twelve**, though the full layout of the questionnaire can be seen in **Appendix 6**.



**FIGURE TWELVE: Example of Motivational Section within Survey**

### 6.3.6 Analysis

Any contact details offered by participants in relation to participation in the second study were removed to anonymise the data. Analysis then took place using SPSS for Mac (version 19.0). The majority of the scales were normally distributed; where scales have been transformed it is noted in analyses below. The Bonferroni correction was used to control for type I error during multiple comparisons; for example when differences were investigated across all behaviours (see **Section 6.4.8**) or all facets of impulsivity (see **Section 6.4.9**).

#### **6.3.6.1      *Basic Demographics***

Results relating to demographic information for the entire sample were elicited using SPSS Descriptive Statistics function. This investigation indicated results were all normally distributed, aside from slight positive skew for HADS depression, both RISK facets and RISK total and age. Procedures undertaken to account for these deviations are described where relevant. Significant results from Kolmogorov-Smirnov tests were considered to be of limited importance in terms of influencing decisions about further analyses, given the large sample size (Field, 2005). Reliability analyses were performed on questionnaire measures using the SPSS reliability analysis function.

The information supplied by Individuals who had dropped out of the study was compared to individuals who persevered using t-tests. Levene's test

indicated variances for age and years in education differed between the two groups, thereby breaking an assumption of the t-test. As such, the appropriate modified (equal variance not assumed) statistic was used. A chi-squared test explored the distribution of gender and experience of hypomania (MDQ status) between the two groups. There were too few individuals who indicated they did not want to disclose their gender to include these individuals within the chi-square. Comparisons between completers and non-completers could only use data that was given by subjects before they exited the study, as such the number of subjects available for analysis varies between these comparisons.

#### **6.3.6.2      *Experience of Hypomania***

Experience of hypomania was investigated using SPSS descriptive statistics function, to provide information regarding the endorsement of items on the Mood Disorders Questionnaire. For further investigation, participants were scored as either MDQ+ (indicating a probable past experience of hypomania; scored when 7 or more symptoms were endorsed, with the participant indicating these symptoms happened simultaneously and caused moderate or severe problems), MDQsubthreshold (indicating possible prior experience of hypomania; scored when the participant endorsed seven or more symptoms, which happened simultaneously and which caused a mild problem) or MDQ- (indicating previous experience of hypomania is unlikely; scored if the individual fits in neither of the above categories i.e. if fewer

than 7 symptoms were experienced, if symptoms of hypomania did not happen simultaneously, or if symptoms caused no problems for the individual). An independent samples t-test was used to investigate whether sub-threshold and MDQ+ individuals significantly differed on the number of symptoms endorsed. This test was chosen to help investigate whether these two groups constituted the same entity.

To investigate whether demographic information differed between the three MDQ groups (MDQ+, MDQ- and MDQsubthreshold), one-way independent ANOVAs were conducted to investigate continuous variables age and years in education. Given a significant result for the ANOVA investigating age, post-hoc tests were completed using Hochberg's GT2. Hochberg's GT2 was chosen given the large difference in sample size for the three groups. The chi-squared test was used to investigate whether proportions of gender differed across the three groups. Given there were so few cases (total: 5) of 'Prefer not to say' these individuals were not included in this analysis, so that the assumptions of the chi-squared test were not violated.

#### **6.3.6.3      *Impulsivity***

Impulsivity scores were investigated across the whole sample using basic descriptive statistic facilities. Questionnaire reliability was also measured using SPSS reliability analyses. Impulsivity scores for each measure were

then compared between males and females using independent samples t-tests.

#### **6.3.6.4      *Behaviour***

The SPSS frequency tool was used to assess percentages of individuals in the whole sample endorsing engagement in behaviour. Frequency of endorsement of each level of planning and behaviour frequency was also noted. Of individuals who did not engage in behaviour, frequency of each level of urge experience was noted. The SPSS descriptives tool was also used to note the mean average number of behaviours engaged in by the full sample.

#### **6.3.6.5      *Mood, Personality and the Experience of Hypomania***

In order to investigate the experience of mood and wider personality as a function of MDQ status, one-way independent ANOVAs were conducted for each of the relevant scales (Rosenberg Self Esteem Scale, Attitudes Towards Risks Scale, Hospital Anxiety and Depression Scale). Preliminary investigations using Levene's test indicated that the variance of both facets of and the total for the Attitudes Towards Risks Scale was not homogenous (all at  $p < .05$ ). As such, these variables were log transformed before proceeding. Total number of SCID questions endorsed also displayed unequal variances across groups, but could not be corrected by log

transformation. As such, Welch's F-test was used when calculating the ANOVA. All ANOVAs were significant, leading to post-hoc tests. Hochberg's GT2 was chosen given the difference in sample size for the three groups.

#### **6.3.6.6      *Impulsivity and the Experience of Hypomania***

Impulsivity scores were normally distributed for each of the facets and for totals in all three groups. One-way independent ANOVAs compared all facets and total scores for both impulsivity scales (UPPS-P and BIS) across the three MDQ groups. As variance was not homogenous across the groups for all facets and totals aside from negative urgency, Welch's F-test was used in these cases. Alpha was adjusted to account for multiple testing, with a p value of <0.005 required to obtain significance. All ANOVAs were significant and were therefore followed up using post-hoc tests (Hochberg GT2). Post-hoc tests were chosen as no specific hypothesis was made regarding the impulsivity levels of MDQsubthreshold individuals.

#### **6.3.6.7      *Impulsivity and Behaviour***

Pearson's product-moment correlation coefficient was used to initially explore the relationship between behaviour (total number of behaviours endorsed) and impulsivity (all facets of both BIS and UPPS-P). Alpha was adjusted using Bonferroni correction to account for multiple testing, with the p level set at <0.005.

As both positive and negative urgency were the facets with the strongest correlations with number of behaviours engaged in, and both were particularly pertinent to hypotheses, urgency was taken forward for further analysis. This involved simple t-tests comparing levels of positive and negative urgency in individuals who had engaged in the behaviour compared to individuals who had not. Alpha was adjusted using Bonferroni correction to 0.002. For eight of the behaviours, the equality of variance for positive urgency could not be assumed. In these cases, the adjusted test statistic was used.

#### **6.3.6.8      *Behaviour and the Experience of Hypomania***

Initial investigation into the relationship between MDQ status and behaviour was conducted using one-way independent ANOVAs. Mean level of planning was not normally distributed and was log transformed for all analyses. Mean frequency of urge experience and the log transformed mean level of planning had unequal variances, and therefore Welch's test statistic was used. Mean frequency of behaviour and total number of behaviours were normally distributed and had homogenous variance across groups. Post-hoc tests for significant results were conducted using Hochberg's GT2.

Chi-squared tests were conducted to explore whether engagement in specific behaviours differed between the three MDQ status groups. No cells

had an expected frequency count of less than 5, as such assumptions for the test were met. Alpha was adjusted, using the Bonferroni correction, to account for multiple tests. P values less than 0.002 were considered statistically significant. Cramer's V was used as a measure of effect size, given that MDQ has three levels. Standardised residuals were also calculated to aid identification of the variable of impact within significant chi-squared results. Residuals of greater than 2.0 indicated the group made a major contribution to the significant result.

Two-by-two frequency tables were constructed within SPSS to produce odds ratios for each behaviour according to each pairing of MDQ statuses (e.g. MDQ- compared with MDQ+). These were noted with their respective 95% confidence intervals (CIs), with CIs that did not cross 1 considered as statistically significant at the .05 level.

#### **6.3.6.9      *Impulsivity, Mood and Suicidal Behaviour***

Independent sample t-tests were used to compare the trait impulsivity scores of MDQ+ and MDQsub individuals who had attempted suicide compared to those who had not. MDQ- individuals were removed from the sample for this analysis, as the area of interest was the occurrence of suicidal behaviour specifically in individuals with experience of extreme mood. The sample size for this analysis was therefore 219 participants. Equal variances could not be assumed for UPPS premeditation, though all



other facets displayed equal variances. The p value for significance was adjusted using the Bonferonni correction to  $<0.006$ .

#### **6.3.6.10                      *Structural Equation Modelling***

Structural Equation Modelling (SEM) is a method of data analysis which allows researchers to simultaneously investigate the complex structural relationships between constructs. The inclusion and analysis of multiple constructs within a single model allows for greater understanding of the impact of variables upon one another, both directly and indirectly (i.e. moderation), as well as providing a clear graphical summary of complex theoretical perspectives. Given the large sample size, along with the variety of measures and constructs investigated, it was considered that SEM would offer an appropriate route for analysis in this study (Martens and Haase, 2006). Furthermore, given the hypothesis-generating nature of the study, SEM provides a framework to confirm (or refute) numerous theoretical concepts, as well as providing the basis for future hypothesis-driven investigation in the area.

Structural equation modelling was conducted using the R programme, v.2.13.1 (R Development Core Team, 2011). This free software is considered a solid tool for SEM analysis. Dr Bert Park, following design of the model by the author, programmed and ran the model using the R software. The model itself was constructed according to the emerging results (i.e. the

apparently strong correlations between constructs) alongside the theoretical underpinnings of the study. Boomsma (2000) emphasises the need for theory to unpin the development of a model, particularly when investigations are in an exploratory stage such as this. Previous research regarding the role of impulsivity in behaviour, particularly within the context of bipolar disorder/experiences of extreme mood, alongside the theory regarding the construct of impulsivity, led to a theorised model in which negative affect influences hypomania experience, which in turn is predictive of both cognitive and affective impulsivity. Despite strong correlations between all facets of impulsivity measured (using the UPPS-P and the BIS), initial results and previous literature indicated that the facets are differentially predictive of behaviour. The decision was therefore taken to investigate cognitive impulsivity (compromising facets relating to attention and cognitive control of behaviour) and affective impulsivity (compromising facets which reference changes in impulsive behaviour due to current or anticipated affective states) separately, i.e. as independent latent variables. Using these separate variables, affective impulsivity was considered to be predictive of impulsive behaviour. The variables described above are latent variables constructed using the measures employed within the study, with number of SCID symptoms, Rosenberg Self Esteem Score and Hospital Anxiety and Depression Scale score contributing to the negative affect latent factor; MDQ number of symptoms endorsed and level of problem constituting the experience of hypomania latent variable. UPPS sensation seeking and total urgency score formed the affective impulsivity factor,

while UPPS premeditation and perseveration and BIS total score contribute to the cognitive impulsivity factor. The latent factor of engagement in impulsive behaviour was formed from the number of behaviours endorsed and the total frequency of engagement in behaviours.

Although SEM is now a widely used technique within psychology research, there exists debate as to how model fit may best be judged. Within this study the guidelines of Hu and Bentler (1999) were broadly used, with the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) used to judge model fit. The Bayesian Information Criterion (BIC2) was also calculated and reported. The RMSEA is widely regarded as the most informative estimate of model fit (Hooper et al., 2008), and is the most commonly reported fit statistic (Kenny, 2011). Guidelines suggest that an RMSEA of 0.05 or less indicates a good fitting model, while any fit statistic of less than 0.1 indicates a model of adequate fit (Nelson Laird et al., 2005, Anderson and Gerbing, 1988). The CFI and the TLI compare the hypothesised structural model to a null model, in which variables are uncorrelated. Both are robust to changes in sample size (Bentall et al., 2009), and both are considered to indicate appropriate model fit at values around 0.95 (Hu and Bentler, 1999). The chi squared statistical test was also conducted, and will be reported, although statistical significance (in this case indicating poor model fit) was likely to be achieved due to the large sample size (Bentall et al., 2009, Hooper et al., 2008, Sugisaki et al., 2005). While measures of model fit are undeniably important

in understanding the success of the model in describing the data, it has been widely argued that they should not be used as a binary outcome, in which model fit is either accepted or rejected (Steiger, 2007). They are instead best understood when used in tandem with one another (Sugisaki et al., 2005, Hooper et al., 2008), and the theory behind the model (Barrett, 2007). Furthermore, Boomsma (2000) asserts that with an exploratory and predictive model such as this, researchers' focus should be upon the sign and size of estimates within the model, not the model fit. As such, measures of model fit will be explored firmly within the context of theory, and be complimented by discussion of the predictive value of estimates contained within the model. It is also understood that any given model which is over-justified (i.e. has a greater number of sample moments than parameters to be estimated), as this model is, can have multiple potential fitting models (MacCallum et al., 1993). The author therefore presents this model as a potential explanation for the data, which is in line with current theoretical perspectives and which is supported by estimates of model fit, but which is only one of the potential explanations for the data used.

## **6.4 RESULTS**

### **6.4.1 Basic Demographics**

The final sample consisted of 790 participants. Participants were aged between 17 and 65 years, with a mean age of 24.25 years (SD 8.19). 23.4%

of the sample was male and 75.9% was female. The remaining 0.6% (n=5) indicated they would prefer not to report their gender. There was some variety in participants' interpretation of the question regarding years in education, with estimates ranging between 0 and 53 years. The mean duration of education was 14.63 years (SD 5.29).

Reliability analyses of questionnaire measures indicated sound psychometric properties. These can be seen summarised in **Table Two** below:

Scale	Cronbach's alpha	Mean inter-item correlation
HADS	.875	.338
Rosenberg	.922	.550
RISK	.942	.452

**TABLE TWO: Psychometric Properties of Questionnaires**

Data indicating full sample scores on these demographic variables, and those questionnaires that will not be investigated independently, are displayed within **Table Three**.

Variable	Mean (SD)
Age (years)	24.25 (8.19)
Years in education	14.63 (5.29)
HADS Anxiety	8.53 (4.15)
HADS Depression	4.23 (3.59)
HADS Total	12.77 (6.91)
Number of SCID feelings	4.09 (2.08)
Rosenberg	18.12 (6.59)
RISK Psychological	19.85 (9.10)
RISK Physical	21.41 (8.92)
RISK Total	41.26 (16.15)

**TABLE THREE: Summary of Full Sample Data Relating to Demographic and Periphery Variables**

T-tests comparing the age and years of education for individuals who completed the survey and those who did not indicated that those individuals who had dropped out of the study before completion were significantly younger than completers ( $t(1344.66) = -4.09, p < .001$ ). Years in education, impulsivity (BIS total score and UPPS total score), mood (HADS) and self esteem did not differ. A chi-squared test to investigate differences in gender showed that the proportions of gender differed between completers and drop-outs, with a higher proportion of men in the sample of participants who chose not to complete the survey ( $\chi^2(1) = 17.92, p < .001$ ).

Experience of hypomania did not differ between completers and non-completers. These analyses can be seen in **Table Four**, below:

Variable	Non-completers	Completers	Difference
Age (non-completer n = 568)	22.60 (6.67)	24.25 (8.19)	t (1344.66) = -4.09, p < .001*
Years in education (non-completer n = 549)	14.90 (4.14)	14.63 (5.29)	t (1308.03) = 1.01, p = 0.313*
Gender (% female) (non-completer n = 567)	65.4	75.9	$\chi^2$ (1) = 17.92, p < .001
MDQ status (% MDQ+) (non-completer n = 360)	12.8	15.3	$\chi^2$ (2) = 4.55, p = .103
BIS Total Score (non-completer n = 305)	63.10 (14.83)	64.89 (11.86)	t (1093) = -1.884, p = .06*
UPPS Total Score (non-completer n = 33)	135.12 (23.51)	131.14 (24.49)	t (821) = .923, p = .356
HADS Anxiety (non-completer n = 19)	8.53 (4.15)	9.84 (4.80)	t (807) = -1.350, p = .177
HADS Depression (non-completer n = 19)	4.23 (3.59)	5.37 (4.57)	t (807) = -1.354, p = .176
Rosenberg Self Esteem (non-completer n = 15)	18.12 (6.59)	18.07 (7.40)	t (803) = 0.029, p = .977

\* Levene's test indicated variances not equal, appropriate statistic used

**TABLE FOUR: Comparison of Non-Completers and Completers**

#### 6.4.2 Experience of Hypomania

Participants in the full sample endorsed the full range of hypomania symptoms, with number endorsed ranging from 0 to 13. The mean average number of endorsed symptoms was 6.32 (SD 3.42), with the modal average of endorsed symptoms falling at 4 (endorsed by 10.9% of the sample). 63.2% of the sample indicated that their symptoms of hypomania had occurred simultaneously. 44.1% of the sample said their symptoms had given them 'No problem', 38.6% indicated problems caused were 'Minor', while 13% said symptoms had caused 'Moderate' problems. 4.3% of the sample indicated problems caused had been 'Serious'.

Results from the MDQ are summarised in **Table Five**. For the majority of the sample (72.2%) there was no evidence of previous elevated mood and so were scored as MDQ-. These individuals endorsed a mean average of 4.96 (SD 2.87) symptoms, though endorsement ranged from 0 to 12 symptoms. 16.8% of the sample were found to have sub-threshold experience of hypomania (MDQsub; seven or more simultaneous symptoms causing only a minor problem). MDQsub individuals endorsed an average of 9.62 symptoms (SD 1.82; range of 7 to 13 symptoms). 11.0% of the sample met full MDQ criteria for previous experience of hypomania and were scored MDQ+. These individuals endorsed between 7 and 13 symptoms, with a mean average of 10.17 (SD 1.92). 75.9% of MDQ+ individuals had described their symptoms as causing moderate problems, with the remaining 24.1% indicating the symptoms had caused severe problems for them. An independent samples t-test indicated that MDQsub and MDQ+ individuals



differed significantly as to the number of symptoms endorsed, with MDQ+ individuals endorsing a greater number.

		MDQ-	MDQsub	MDQ+	Difference
<b>Number (% of sample)</b>		570 (72.2)	133 (16.8)	87 (11.0)	-
<b>Number of symptoms</b>	<b>Mean</b>	4.96 (2.87)	9.62 (1.82)	10.17 (1.92)	MDQ+ vs. MDQsub: t (218) = -2.156, p = .032
	<b>Range</b>	0-12	7-13	7-13	-
<b>Problems caused (%)</b>	<b>None</b>	61.1	-	-	-
	<b>Mild</b>	30.2	100	-	-
	<b>Moderate</b>	6.5	-	75.9	-
	<b>Severe</b>	2.3	-	24.1	-

**TABLE FIVE: MDQ Responses Stratified According to Group**

One-way independent ANOVAs were conducted to explore the differences in age and years in education between the three MDQ groups. These can be found in **Table Six** below. Years in education did not differ between the three groups. Age was however found to differ, with the MDQsub individuals significantly younger than MDQ- individuals ( $F(2, 786) = 4.481$ ,  $p = .012$ ). The chi-squared test indicated gender did not differ across the three groups.

Variable	MDQ-	MDQsub	MDQ+	Difference
Years in education	14.53 (5.55)	14.89 (4.59)	14.91 (4.53)	$F(2, 771) = .380, p = .684$
Age	24.74 (8.77)	22.42 (5.86)	23.86 (6.83)	$F(2, 786) = 4.481, p = .012$
	24.74 (8.77)	22.42 (5.86)	-	2.322, $p < .05$
	24.74 (8.77)	-	23.86 (6.83)	0.881
	-	22.42 (5.86)	23.86 (6.83)	-1.441
Gender (% female)	77.4	70.7	74.7	$\chi^2(2) = 2.09, p = .352$ , phi = .05

**TABLE SIX: Years in Education, Age and Gender Stratified by MDQ**

### Grouping

#### 6.4.3 Impulsivity

Basic descriptive information regarding impulsivity scores for the whole sample is displayed within **Table Seven**.

Scale		Range	Mean (SD)
BIS	Attentional	8-30	18.54 (4.36)
	Motor	11-39	22.43 (4.95)
	Non-Planning	12-42	24.17 (5.13)
	Total	38-109	64.89 (11.86)
UPPS-P	Urgency	12-48	29.48 (7.14)
	(lack of) Premeditation	11-42	22.51 (5.68)
	(lack of) Perseveration	10-39	20.99 (5.68)
	Sensation Seeking	12-48	31.28 (8.14)
	Positive Urgency	14-56	26.88 (8.75)
	Total	65-217	131.14 (24.49)

**TABLE SEVEN: Impulsivity Scores for Total Group**

Reliability analyses for the two impulsivity questionnaires can be found in **Table Eight** below. These analyses suggest the impulsivity scales are reliable quantifiers of trait impulsivity.

Scale		Cronbach's alpha	Mean inter-item correlation
BIS	Attentional	.649	.271
	Motor	.719	.230
	Non-planning	.738	.222
	Total	.849	.195
UPPS-P	Negative Urgency	.875	.368
	(lack of) Premeditation	.878	.412
	(lack of) Perseveration	.872	.412
	Sensation Seeking	.887	.401
	Positive Urgency	.937	.522
	Total	.939	.218

**TABLE EIGHT: Psychometric Properties of Impulsivity Questionnaires**

Independent-samples t-tests demonstrated that males and females did not differ in scores for attentional, motor, non-planning, total BIS, premeditation, perseveration or total UPPS-P impulsivity (**Table Nine**). Males had higher positive urgency and sensation seeking scores than females. Females had higher negative urgency than males.

Variable	Males	Females	Difference
<b>Attentional</b>	18.85 (4.28)	18.42 (4.38)	t (783) = 1.182, p = .238
<b>Motor</b>	22.25 (4.95)	22.49 (4.95)	t (783) = -0.572, p = .567
<b>Non-Planning</b>	23.95 (5.07)	24.19 (5.12)	t (783) = -0.554, p = .580
<b>BIS Total</b>	64.70 (11.71)	64.87 (11.88)	t (783) = -0.177, p = .860
<b>Urgency</b>	27.56 (6.93)	30.06 (7.12)	t (783) = -4.194, p < .001
<b>(lack of) Premeditation</b>	21.82 (5.49)	22.68 (5.69)	t (783) = -1.800, p = .072
<b>(lack of) Perseveration</b>	21.09 (5.68)	20.94 (5.68)	t (783) = 0.314, p = .754
<b>Sensation Seeking</b>	33.91 (7.55)	30.47 (8.16)	t (327.248) = 5.299, p < .001 *
<b>Positive Urgency</b>	28.05 (8.72)	26.49 (8.70)	t (783) = 2.127, p = .034
<b>UPPS-P Total</b>	132.43 (23.14)	130.64 (24.84)	t (783) = 0.870, p = .385

\* Equal variances could not be assumed, appropriate test statistic used

**TABLE NINE: Impulsivity Scores Stratified by Gender**

#### 6.4.4 Behaviour

Results, displayed in **Table Ten** below, show the percentage of individuals who endorse engaging in impulsive behaviours, and the level of planning

and frequency associated with the behaviour. Percentages are also displayed for those individuals who did not engage in the behaviours. These percentages relate to the frequency of their urges to engage in behaviour. In total, participants in the study endorsed engaging in a mean average of 6.18 (SD 2.70) of the 18 behaviours.

Behaviour	Ever		Frequency				Planning			Urge			
	Yes	No	Rarely	Occasionally	Sometimes	Often	None	Some	Definitely	Rarely/Never	Occasionally	Sometimes	Often
Shoplifting	28.7	71.3	89.5	7.9	1.8	0.9	65.9	26.6	7.4	89.0	8.9	1.6	0.5
Violence/aggression	65.3	34.7	70.7	20.6	7.9	0.8	88.5	10.6	1.0	70.2	20.4	8.4	1.1
Financial risk taking	13.8	86.2	46.8	37.6	11.0	4.6	11.0	28.4	60.6	76.6	15.6	6.9	0.9
Suicide attempt	17.7	82.2	59.2	24.6	7.0	9.2	32.4	51.4	16.2	80.2	13.0	5.1	1.7
Going AWOL	27.2	72.8	50.0	36.1	10.2	3.7	39.3	4.1	12.6	55.8	24.4	13.7	6.1
Fire setting	14.9	85.1	73.4	16.9	8.9	0.8	53.7	30.6	15.7	92.5	6.2	0.8	0.6
Drastic appearance change	37.0	63.0	36.4	37.8	15.1	10.7	16.5	44.7	38.8	64.6	26.4	6.4	2.6
	Past month												
Binge drinking	47.7	52.3	19.0	31.9	27.2	21.9	26.5	59.2	14.3	68.1	23.3	7.6	1.0
Binge eating	50.9	49.1	18.2	40.9	24.9	16.0	59.6	33.7	6.7	58.8	33.9	6.5	0.8
Overspending	56.3	43.7	22.1	41.4	25.7	10.7	47.4	46.1	6.5	51.6	37.0	7.6	3.8
Recreational drug taking	16.6	83.4	44.4	30.1	15.0	10.5	36.1	41.4	22.6	84.7	11.0	3.4	0.9
Overusing the internet	52.8	47.2	5.1	27.8	29.0	38.2	47.6	38.4	14.0	66.7	26.9	5.4	1.1
Risky driving	23.4	76.6	26.9	39.2	24.2	9.7	67.7	25.3	7.0	80.9	15.4	2.8	0.8
Creative thought	72.2	27.8	5.8	37.2	33.2	23.8	30.5	56.7	12.9	-	-	-	-
Gambling	12.5	87.5	43.9	29.6	15.3	11.2	32.3	29.3	38.4	87.9	10.1	1.6	0.4
Tactlessness	53.4	46.6	23.0	45.1	19.5	12.4	86.2	12.9	1.0	58.5	30.9	7.7	3.0
Self harming	10.5	89.5	48.9	22.7	13.6	14.8	50.0	45.3	4.7	83.0	11.0	4.4	1.6
Risky sexual behaviour	17.2	82.8	36.8	35.3	22.1	5.9	57.8	32.6	9.6	75.8	18.1	4.3	1.8

TABLE TEN: Percentages (%) of Participants Engaging or Having Urges to Engage in Behaviour, the Frequency of Engagement and the

## Associated Level of Planning

NB/ Percentages for planning and frequency relate to individuals who endorsed the behaviour, urges relate to those who did not (see Figure Ten)

#### 6.4.5 Mood, Personality and the Experience of Hypomania

Analyses for mood and personality variables across MDQ grouping can be found in **Table Eleven**. HADS Anxiety was shown to differ significantly across the three groups ( $F(2, 787) = 34.67, p < .001$ ), with further analysis indicating that anxiety was lowest in MDQ- individuals, significantly increased in MDQsub individuals ( $-1.43, p = .001$ ) and significantly increased again in MDQ+ individuals ( $-2.22, p < .001$ ). The same pattern was found for HADS Depression, with a significant ANOVA ( $F(2, 787) = 26.54, p < .001$ ) highlighting a difference across the three groups. Depression was lowest in MDQ- individuals, increased in MDQ sub ( $-1.11, p = .003$ ) and increased further in MDQ+ ( $-1.66, p = .002$ ). Total HADS scores were found to differ significantly across the three groups ( $F(2, 787) = 39.33, p < .001$ ), with lowest total scores in MDQ-, higher scores in MDQsub ( $-2.54, p < .001$ ) and highest in MDQ+ ( $-3.88, p < .001$ ).

There was a linear trend in self esteem across the three groups ( $F(2, 787) = 37.27, p < .001$ ), with self esteem highest in MDQ- individuals, significantly decreased in MDQsub individuals ( $1.85, p = .007$ ) and lowest in MDQ+ individuals ( $4.29, p < .001$ ).

Log-transformed Attitudes to RISK scores also resulted in significant ANOVAs. Propensity towards psychological risk-taking was highly significant ( $F(2, 786) = 54.21, p < .001$ ), with psychological risk-taking lowest in MDQ-

individuals compared to both MDQsub ( $-0.15, p < .001$ ) and MDQ+ individuals ( $-0.14, p < .001$ ). MDQsub and MDQ+ individuals did not differ in their scores on this subscale ( $0.01, p = .986$ ). Results were identical for physical risk taking, which gave a significant result on the ANOVA ( $F(2, 786) = 39.54, p < .001$ ). Physical risk-taking was lowest in MDQ- individuals when contrasted with MDQ sub ( $-0.13, p < .001$ ) and MDQ+ individuals ( $-0.10, p < .001$ ). MDQsub and MDQ+ did not differ. Total Attitudes Towards Risk Scale scores differed significantly across the groups ( $F(2, 786) = 57.05, p < .001$ ), with lowest risk scores in MDQ- compared to MDQsub ( $-0.14, p < .001$ ) and MDQ+ ( $-0.12, p < .001$ ) individuals. MDQ+ and MDQsub individuals did not differ ( $0.02, p = .788$ ).

Endorsement of psychopathological experience ('SCID questions') differed across the three groups ( $F(2, 201.28) = 62.96, p < .001$ ). There was a trend toward significance between MDQ- and MDQsub individuals, with MDQ- individuals endorsing fewer mood experiences ( $-0.45, p = .053$ ). A greater number of mood experiences were endorsed by MDQ+ individuals as compared to both MDQsub ( $-1.64, p < .001$ ) and MDQ- individuals ( $-2.09, p < .001$ ).



Variable	MDQ-	MDQsub	MDQ+	Difference
HADS Anxiety	7.89 (3.90)	9.32 (3.99)	11.54 (4.51)	F (2, 787) = 34.67, p < .001
	7.89 (3.90)	9.32 (3.99)	-	-1.43, p = .001
	7.89 (3.90)	-	11.54 (4.51)	-3.65, p < .001
	-	9.32 (3.99)	11.54 (4.51)	-2.22, p < .001
HADS Depression	3.74 (3.31)	4.85 (3.50)	6.51 (4.39)	F (2, 787) = 26.54, p < .001
	3.74 (3.31)	4.85 (3.50)	-	-1.11, p = .003
	3.74 (3.31)	-	6.51 (4.39)	-2.77, p < .001
	-	4.85 (3.50)	6.51 (4.39)	-1.66, p = .002
HADS Total	11.63 (6.37)	14.18 (6.53)	18.05 (8.07)	F (2, 787) = 39.33, p < .001
	11.63 (6.37)	14.18 (6.53)	-	-2.54, p < .001
	11.63 (6.37)	-	18.05 (8.07)	-6.42, p < .001
	-	14.18 (6.53)	18.05 (8.07)	-3.88, p < .001
Rosenberg	19.10 (6.18)	17.25 (6.33)	12.97 (7.03)	F (2, 787) = 37.27, p < .001
	19.10 (6.18)	17.25 (6.33)	-	1.85, p = .007
	19.10 (6.18)	-	12.97 (7.03)	6.14, p < .001
	-	17.25 (6.33)	12.97 (7.03)	4.29, p < .001
RISK Psychological*	1.21 (0.18)	1.37 (0.18)	1.36 (0.18)	F (2, 786) = 54.21, p < .001
	1.21 (0.18)	1.37 (0.18)	-	-0.15, p < .001
	1.21 (0.18)	-	1.36 (0.18)	-0.14, p < .001
	-	1.37 (0.18)	1.36 (0.18)	0.01, p = .986
RISK Physical*	1.26 (0.18)	1.39 (0.16)	1.36 (0.17)	F (2, 786) = 39.54, p < .001
	1.26 (0.18)	1.39 (0.16)	-	-0.13, p < .001
	1.26 (0.18)	-	1.36 (0.17)	-0.10, p < .001
	-	1.39 (0.16)	1.36 (0.17)	0.03, p = .537
RISK Total*	1.55 (0.16)	1.69 (0.15)	1.67 (0.16)	F (2, 786) = 57.05, p < .001
	1.55 (0.16)	1.69 (0.15)	-	-0.14, p < .001
	1.55 (0.16)	-	1.67 (0.16)	-0.12, p < .001
	-	1.69 (0.15)	1.67 (0.16)	0.02, p = .788
Total Number SCID	3.80 (2.05)	4.25 (1.89)	5.89 (1.54)	F (2, 201.28) = 62.96, p < .001**
	3.80 (2.05)	4.25 (1.89)	-	-0.45, p = .053
	3.80 (2.05)	-	5.89 (1.54)	-2.09, p < .001
	-	4.25 (1.89)	5.89 (1.54)	-1.64, p < .001

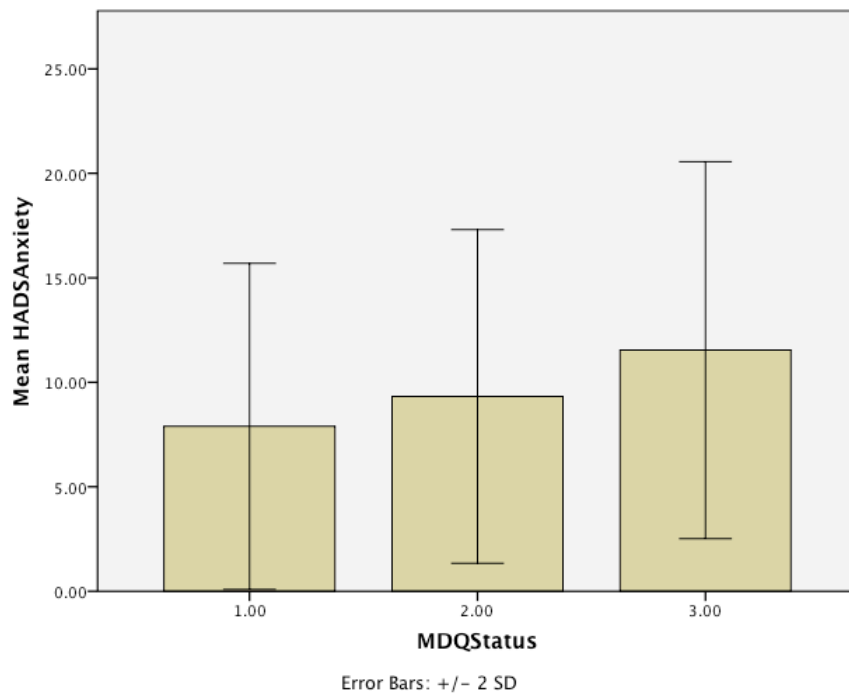
\* Log corrected

\*\* Welch's F-test

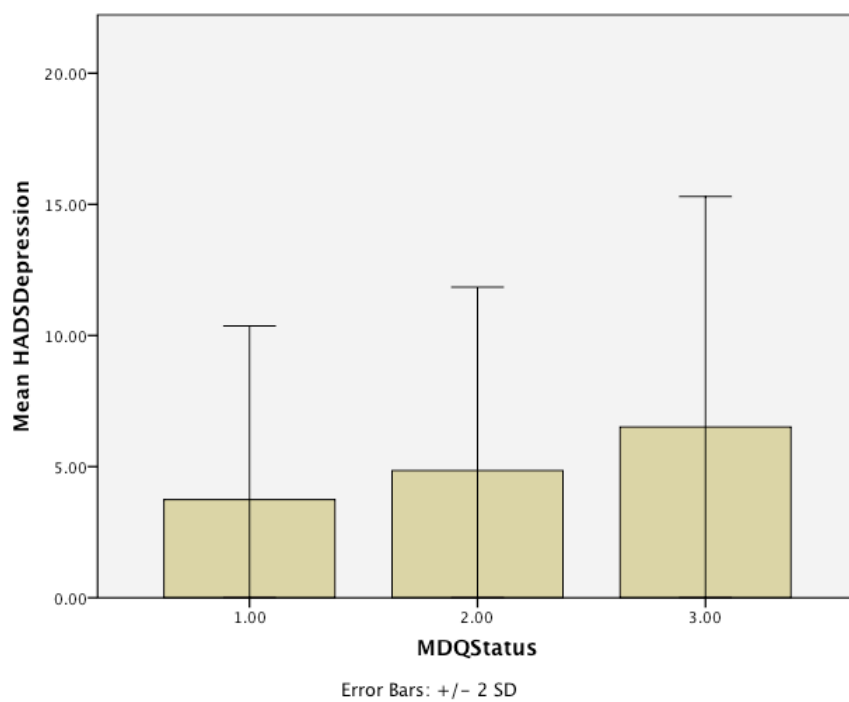
**TABLE ELEVEN: Difference in Mood and Personality Measures Across the Three MDQ Status Groups**

Graphical representations of these relationships can be found in **Figures**

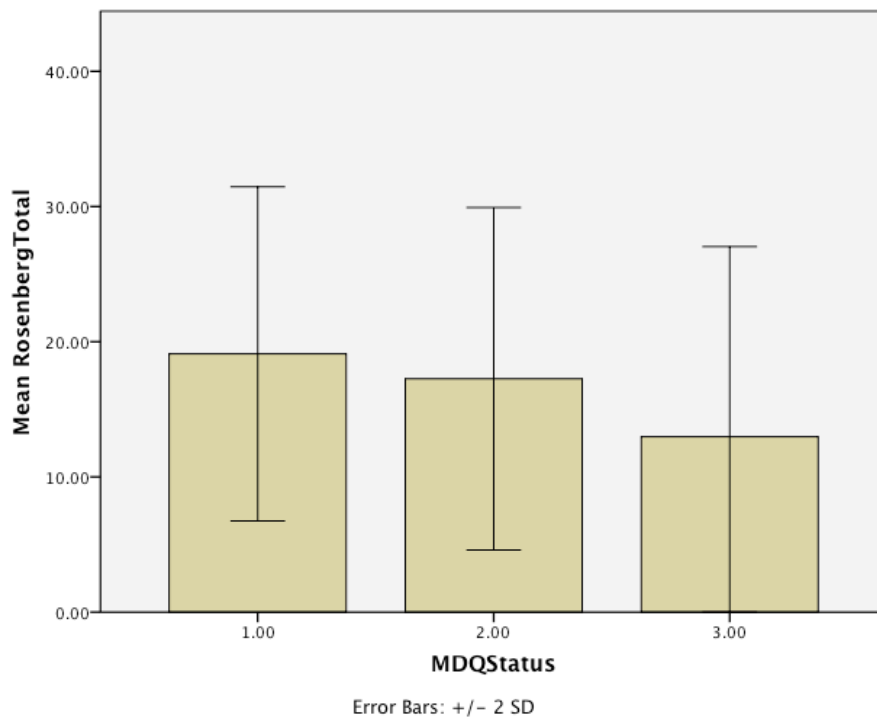
**Thirteen, Fourteen and Fifteen** below:



**FIGURE THIRTEEN: Histogram - HADS Anxiety Stratified by MDQ Status**



**FIGURE FOURTEEN: Histogram - HADS Depression Stratified by MDQ Status**



**FIGURE FIFTEEN: Histogram – Rosenberg Self-Esteem Stratified by MDQ Status**

#### 6.4.6 Impulsivity and the Experience of Hypomania

One-way independent ANOVAs, summarised in **Table Twelve**, indicated that all impulsivity facets and both scale totals differed between the three groups. Post-hoc tests showed that BIS attentional impulsivity increased in a linear fashion across the three groups, with lowest levels of attentional impulsivity in MDQ- individuals, higher in MDQsub individuals and highest in MDQ+ individuals ( $F(2, 176.508) = 63.978, p < .001$ ). This pattern was repeated for BIS total scores ( $F(2, 168.649) = 47.546, p < .001$ ), although the difference between MDQsub and MDQ+ individuals only approached significance (mean difference 4.657,  $p = .007$ ). Both BIS motor ( $F(2,$

169.036) = 36.246,  $p < .001$ ) and BIS non-planning impulsivity ( $F(2, 172.16) = 18.633$ ,  $p < .001$ ) were elevated in both MDQ+ and MDQsub individuals as compared to MDQ- individuals, but did not differ between the two elevated mood groups.

Impulsivity measured using the UPPS-P was lowest in MDQ- individuals compared to MDQsub and MDQ+ individuals across all UPPS facets aside from sensation seeking and total UPPS-P score. Sensation seeking was lower in MDQ- individuals compared to MDQsub individuals ( $-3.801$ ,  $p < .001$ ) but not to MDQ+ individuals ( $-1.737$ ,  $p = .170$ ). All facets and total UPPS-P score did not differ between MDQsub and MDQ+ individuals.

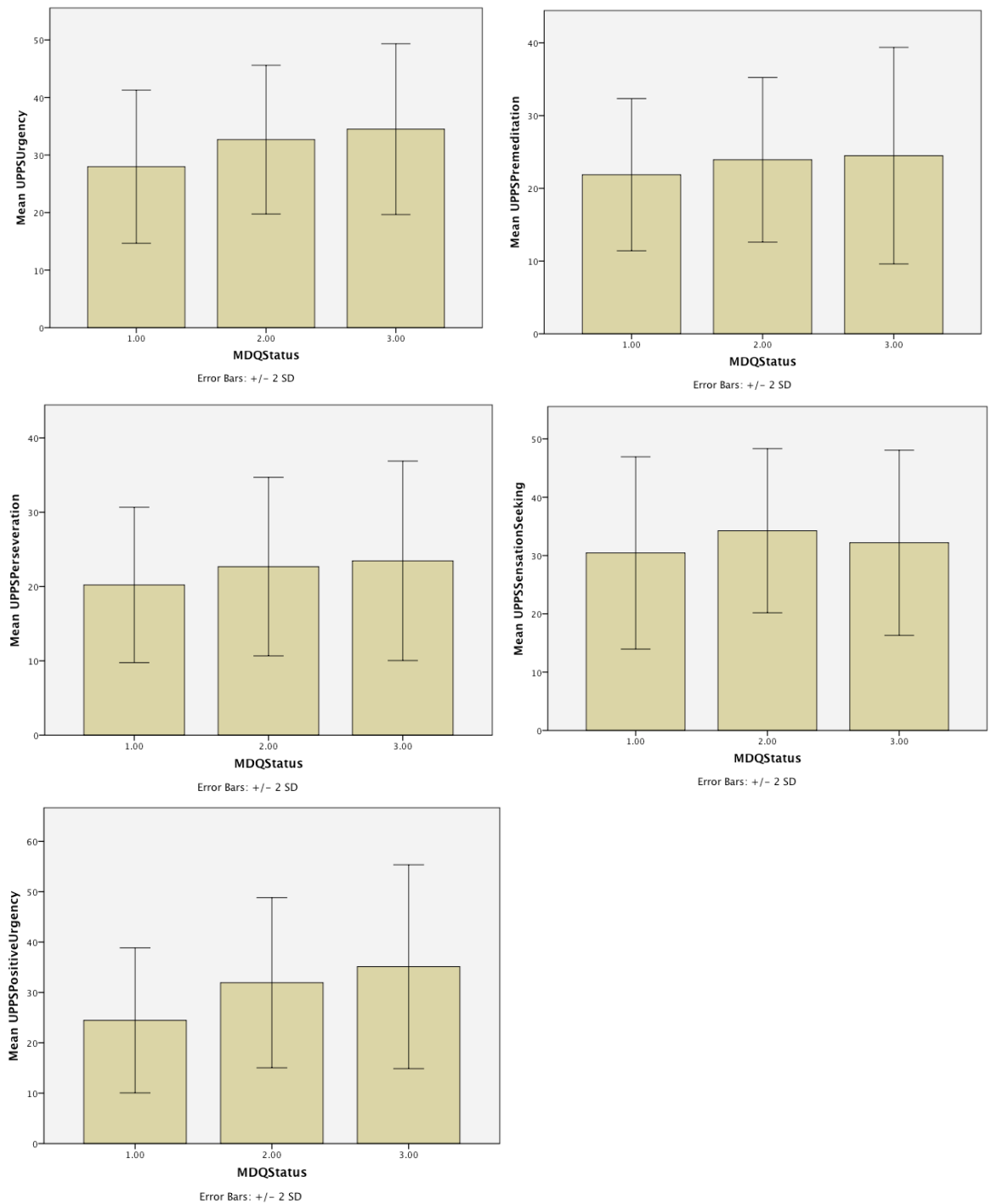
Variable	MDQ-	MDQsub	MDQ+	Difference
BIS Attentional	17.51 (3.92)	20.41 (3.83)	22.42 (4.76)	F (2, 176.508) = 63.978, p < .001*
	17.51 (3.92)	20.41 (3.83)	-	-2.905, p < .001
	17.51 (3.92)	-	22.42 (4.76)	-4.913, p < .001
	-	20.41 (3.83)	22.42 (4.76)	-2.009, p = .001
BIS Motor	21.48 (4.39)	24.33 (5.34)	25.78 (5.55)	F (2, 169.036) = 36.246, p < .001*
	21.48 (4.39)	24.33 (5.34)	-	-2.849, p < .001
	21.48 (4.39)	-	25.78 (5.55)	-4.305, p < .001
	-	24.33 (5.34)	25.78 (5.55)	-1.456 p = .073
BIS Non-planning	23.46 (4.77)	25.45 (5.18)	26.86 (6.01)	F (2, 172.16) = 18.633, p < .001*
	23.46 (4.77)	25.45 (5.18)	-	-1.991, p < .001
	23.46 (4.77)	-	26.86 (6.01)	-3.398, p < .001
	-	25.45 (5.18)	26.86 (6.01)	-1.406, p = .119
BIS Total	62.30 (10.34)	69.75 (12.10)	74.40 (13.69)	F (2, 168.649) = 47.546, p < .001*
	62.30 (10.34)	69.75 (12.10)	-	-7.446, p < .001
	62.30 (10.34)	-	74.40 (13.69)	-12.102, p < .001
	-	69.75 (12.10)	74.40 (13.69)	-4.657, p = .007
UPPS-P Negative Urgency	27.98 (6.65)	32.67 (6.46)	34.50 (7.42)	F (2, 787) = 53.680, p < .001
	27.98 (6.65)	32.67 (6.46)	-	-4.698, p < .001
	27.98 (6.65)	-	34.50 (7.42)	-6.519, p < .001
	-	32.67 (6.46)	34.50 (7.42)	-1.822, p = .141
UPPS-P (lack of) Premeditation	21.87 (5.23)	23.92 (5.66)	24.49 (7.45)	F (2, 169.124) = 11.057, p < .001*
	21.87 (5.23)	23.92 (5.66)	-	-2.049, p < .001
	21.87 (5.23)	-	24.49 (7.45)	-2.620, p < .001
	-	23.92 (5.66)	24.49 (7.45)	-0.572, p = .841
UPPS -P (lack of) Perseveration	20.22 (5.23)	22.68 (6.01)	23.46 (6.71)	F (2, 170.024) = 16.835, p < .001*
	20.22 (5.23)	22.68 (6.01)	-	-2.463, p < .001
	20.22 (5.23)	-	23.46 (6.71)	-3.245, p < .001
	-	22.68 (6.01)	23.46 (6.71)	-0.782, p = .666
UPPS-P Sensation Seeking	30.45 (8.24)	34.25 (7.04)	32.18 (7.94)	F (2, 189.922) = 15.050, p < .001*
	30.45 (8.24)	34.25 (7.04)	-	-3.801, p < .001
	30.45 (8.24)	-	32.18 (7.94)	-1.737, p = .170
	-	34.25 (7.04)	32.18 (7.94)	2.064, p = .176
UPPS-P Positive Urgency	24.45 (7.20)	31.93 (8.45)	35.11 (10.12)	F (2, 167.152) = 80.854, p < .001*
	24.45 (7.20)	31.93 (8.45)	-	-7.482, p < .001
	24.45 (7.20)	-	35.11 (10.12)	-10.663, p < .001
	-	31.93 (8.45)	35.11 (10.12)	-3.181, p = .009
UPPS-P Total	124.96 (20.93)	145.45 (23.69)	149.75 (28.67)	F (2, 168.732) = 64.981, p < .001*
	124.96 (20.93)	145.45 (23.69)	-	-20.492, p < .001
	124.96 (20.93)	-	149.75 (28.67)	-24.786, p < .001
	-	145.45 (23.69)	149.75 (28.67)	-4.293, p = .417

\* Welch's F-test

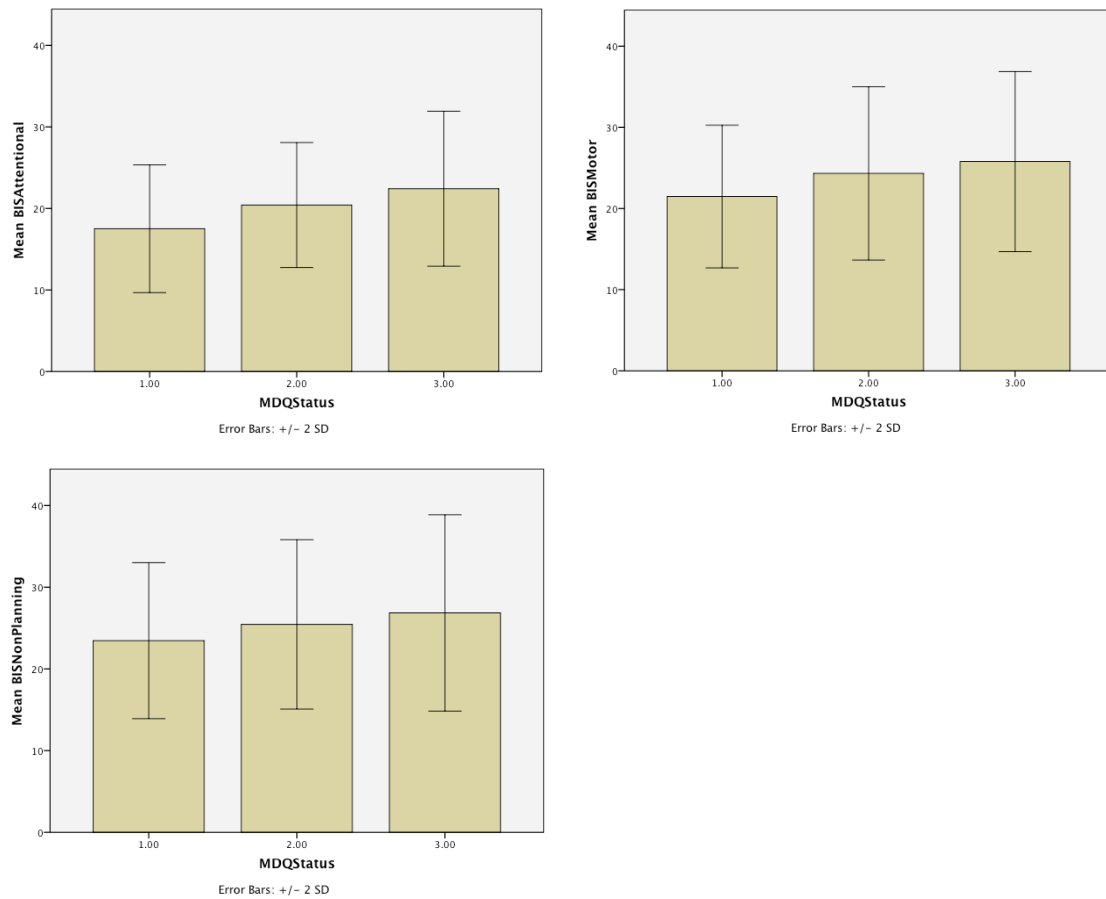
NB: p value .005

**TABLE TWELVE: Difference in Impulsivity Across the Three MDQ Status****Groups**

These findings are summarised graphically in **Figures Sixteen and Seventeen** below:



**FIGURE SIXTEEN: Histogram – UPPS Facets Stratified by MDQ Status**



**FIGURE SEVENTEEN: Histogram – BIS Facets Stratified by MDQ Status**

#### 6.4.7 Impulsivity and Behaviour

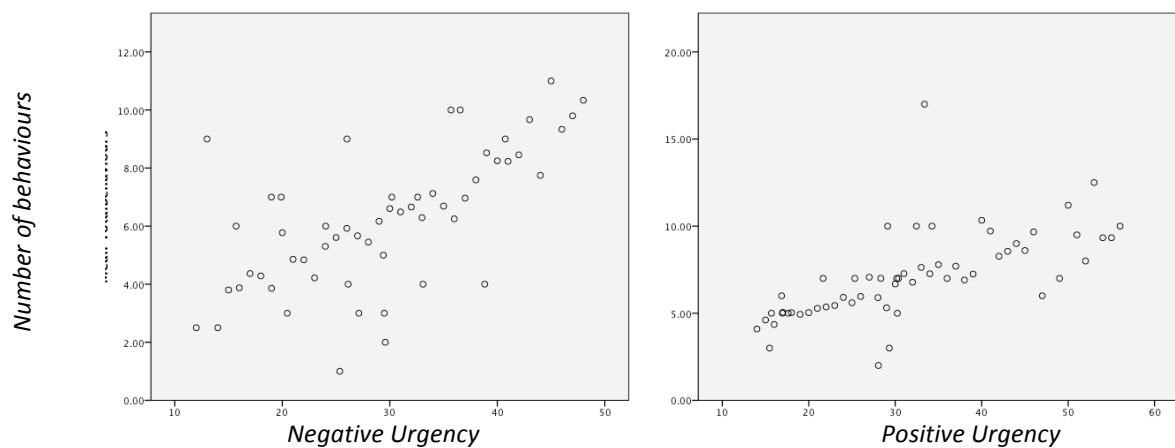
Pearson's product-moment correlation coefficient indicated that as levels of impulsivity increased the number of behaviours endorsed increased.

Correlations ranged from moderate to strong, and were significant for each facet. Coefficients are summarised in **Table Thirteen**. The data are summarised graphically in **Figure Eighteen** following this.

Impulsivity Measure	Correlation with Total Number of Behaviours	P value
Attentional	.350	< .001
Motor	.409	< .001
Non-Planning	.334	< .001
BIS Total	.439	< .001
Negative Urgency	.451	< .001
Perseveration	.344	< .001
Premeditation	.314	< .001
Sensation Seeking	.316	< .001
Positive Urgency	.490	< .001
UPPS-P Total	.564	< .001

*NB: p value .005*

**TABLE THIRTEEN: Correlations Between Impulsivity and Number of Behaviours**



**FIGURE EIGHTEEN: Scatter Plots – Urgency Facets and Number of Behaviours**



T-tests comparing the urgency levels of individuals who had and had not engaged in behaviours indicated that with the majority of behaviours (including shoplifting, being violent or aggressive, attempting suicide, going AWOL, fire setting, drastic appearance change, binge drinking, binge eating, overspending, drug taking, tactlessness, self harm and risky sex) both negative and positive urgency were significantly higher in those individuals who had engaged in the behaviour. Exceptions to this were financial risk taking, risky driving and gambling. Individuals who endorsed engaging in these behaviours had similar levels of negative and positive urgency as those who did not. Individuals who endorsed an overuse of computers in the past month had higher levels of positive urgency than individuals who believed they had not overused the internet ( $t(788) = -3.287, p = .001$ ), but similar levels of negative urgency ( $t(788) = -1.965, p = .05$ ). Negative urgency was lower in individuals who endorsed having a creative thought in the previous month when compared to individuals who did not ( $t(788) = 3.949, p < .001$ ). See data summarised within **Table Fourteen**.

Behaviour		Negative Urgency	Difference	Positive Urgency	Difference
Shoplifting	No	28.67 (6.96)	t (788) = -	25.78 (8.17)	t (366.85) = -
	Yes	31.51 (7.20)	5.136, p < .001	29.62 (9.53)	5.327, p < .001*
Violence/ Aggression	No	26.99 (6.95)	t (788) = -	24.87 (8.00)	t (788) = -
	Yes	30.82 (6.89)	7.405, p < .001	27.95 (8.95)	4.781, p < .001
Financial Risk	No	29.54 (7.04)	t (788) =	26.70 (8.16)	t (788) = -
	Yes	29.12 (7.81)	0.572, p = .567	28.05 (9.51)	1.504, p = .133
Suicide Attempt	No	28.71 (6.88)	t (787) = -	26.08 (8.19)	t (179.347) = -
	Yes	33.11 (7.26)	6.552, p < .001	30.65 (10.23)	5.709, p < .001*
Going AWOL	No	28.61 (6.90)	t (788) = -	25.34 (7.80)	t (321.549) = -
	Yes	31.81 (7.29)	5.714, p < .001	31.01 (9.77)	7.642, p < .001*
Fire Setting	No	29.11 (7.08)	t (788) = -	26.10 (8.53)	t (788) = -
	Yes	31.64 (7.15)	3.585, p < .001	31.32 (8.67)	6.110, p < .001
Appearance Change	No	28.31 (6.87)	t (788) = -	25.53 (7.94)	t (523.527) = -
	Yes	31.49 (7.17)	6.176, p < .001	29.18 (9.57)	5.506, p < .001*
Binge Drinking	No	27.96 (6.99)	t (788) = -	25.18 (8.33)	t (788) = -
	Yes	31.15 (6.94)	6.418, p < .001	28.75 (8.83)	5.849, p < .001
Binge Eating	No	27.77 (6.79)	t (788) = -	25.02 (7.79)	t (773.948) = -
	Yes	31.14 (7.10)	6.800, p < .001	28.68 (9.25)	6.031, p < .001*
Overspending	No	27.93 (6.91)	t (788) = -	24.79 (8.00)	t (788) = -
	Yes	30.69 (7.10)	5.478, p < .001	28.50 (8.97)	6.045, p < .001
Drug Taking	No	29.06 (7.04)	t (788) = -	26.17 (8.43)	t 173.665) = -
	Yes	31.60 (7.33)	3.742, p < .001	30.49 (9.44)	4.868, p < .001*
Internet Overuse	No	28.96 (7.14)	t (788) = -	25.81 (8.73)	t (788) = -
	Yes	29.96 (7.12)	1.965, p = .05	27.84 (8.67)	3.287, p = .001
Risky Driving	No	29.28 (7.11)	t (788) = -	26.52 (8.68)	t (788) = -
	Yes	30.16 (7.25)	1.474, p = .141	28.07 (8.91)	2.113, p = .035
Creative Thought	No	31.09 (7.483)	t (788) =	27.31 (9.06)	t (788) =
	Yes	28.87 (6.918)	3.949, p < .001	26.72 (8.63)	0.843, p = .399
Gambling	No	29.35 (7.10)	t (788) = -	26.59 (8.57)	t (788) = -
	Yes	30.44 (7.44)	1.419, p = .156	28.92 (9.74)	2.481, p = .013
Tactlessness	No	26.81 (6.41)	t (788) = -	24.43 (7.63)	t (786.828) = -
	Yes	31.82 (6.94)	10.486, p < .001	29.02 (9.10)	7.708, p < .001*
Self Harm	No	28.96 (7.00)	t (788) = -	26.36 (8.47)	t (788) = -
	Yes	33.92 (8.87)	6.109, p < .001	31.30 (9.87)	4.938, p < .001
Risky Sex	No	28.87 (6.90)	t (788) = -	25.93 (8.15)	t (173.947) = -
	Yes	32.46 (7.56)	5.430, p < .001	31.44 (10.03)	6.006, p < .001*

\* Equal variances not assumed

**TABLE FOURTEEN: Relationship Between Urgency and Behaviour**

#### 6.4.8 Behaviour and the Experience of Hypomania

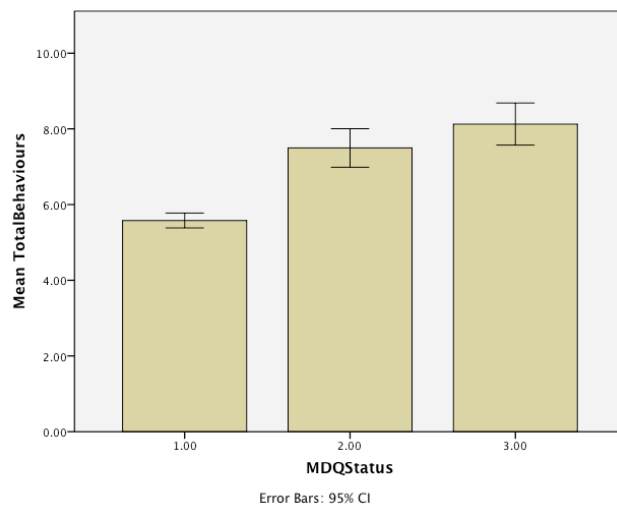
Independent one-way ANOVAs for MDQ status were significant for total number of behaviours, frequency of urge experience and frequency of behaviour. Level of planning did not differ significantly between the three MDQ status groups ( $F(2, 198.986) = 0.894, p = .411$ ). Post-hoc tests indicated that MDQsub (mean difference 1.91729,  $p < .001$ ) and MDQ+ individuals (mean difference -2.54749,  $p < .001$ ) both engaged in more behaviours than MDQ- individuals, but did not significantly differ from one another in terms of number of behaviours endorsed (mean difference -0.63020,  $p = .196$ ). Mean frequency of behaviour differed between MDQ- and MDQ+ individuals, with MDQ+ individuals engaging in behaviour more frequently (mean difference -0.18176,  $p = .004$ ). Frequency of engagement in behaviour did not differ between MDQ- and MDQsub (-0.10269,  $p = .09$ ) individuals or between MDQsub and MDQ+ individuals (mean difference -0.07907,  $p = .572$ ). Mean frequency of urges to engage in behaviour differed between the three groups ( $F(2, 155.171) = 24.029, p < .001$ ), with MDQsub (mean difference -0.15962,  $p < .001$ ) and MDQ+ (mean difference -0.28486,  $p < .001$ ) individuals experiencing urges to act more frequently than MDQ- individuals. MDQ+ individuals also experienced urges significantly more frequently than MDQsub individuals (mean difference -0.12524,  $p = .008$ ). These findings are summarised in **Table Fifteen** and **Figures Nineteen, Twenty** and **Twenty-One** below.

	MDQ-	MDQsub	MDQ+	Difference
Total number of behaviours	5.57 (2.39)	7.50 (2.97)	8.13 (2.61)	F (2, 787) = 60.307, p < .001
	5.57 (2.39)	7.50 (2.97)	-	-1.91729, p < .001
	5.57 (2.39)	-	8.13 (2.61)	-2.54749, p < .001
	-	7.50 (2.97)	8.13 (2.61)	-0.63020, p = .196
Mean frequency of urge experience	1.29 (0.24)	1.45 (0.37)	1.57 (0.49)	F (2, 155.171) = 24.029, p < .001*
	1.29 (0.24)	1.45 (0.37)	-	-0.15962, p < .001
	1.29 (0.24)	-	1.57 (0.49)	-0.28486, p < .001
	-	1.45 (0.37)	1.57 (0.49)	-0.12524, p = .008
Mean frequency of behaviour	2.09 (0.51)	2.19 (0.45)	2.27 (0.45)	F (2, 784) = 6.487, p = .002
	2.09 (0.51)	2.19 (0.45)	-	-0.10269, p = .09
	2.09 (0.51)	-	2.27 (0.45)	-0.18176, p = .004
	-	2.19 (0.45)	2.27 (0.45)	--0.07907, p = .572
Mean level of planning (log transformed)	0.20 (0.10)	0.20 (0.09)	0.19 (0.08)	F (2, 198.986) = 0.894, p = .411*

\* Welch's test statistic used

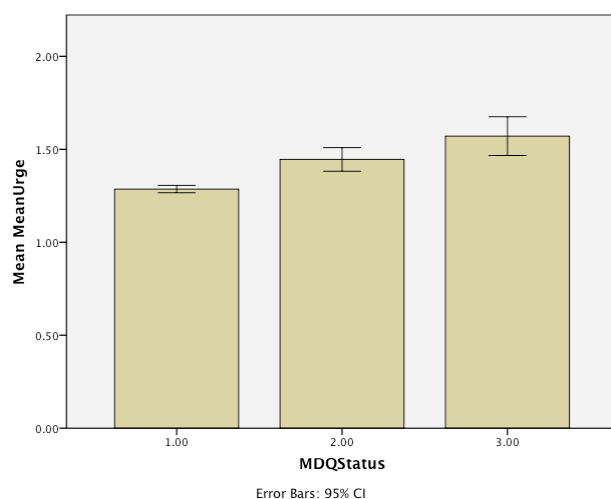
**TABLE FIFTEEN: Impulsive-Type Behaviour Variables Stratified by MDQ**

### Status

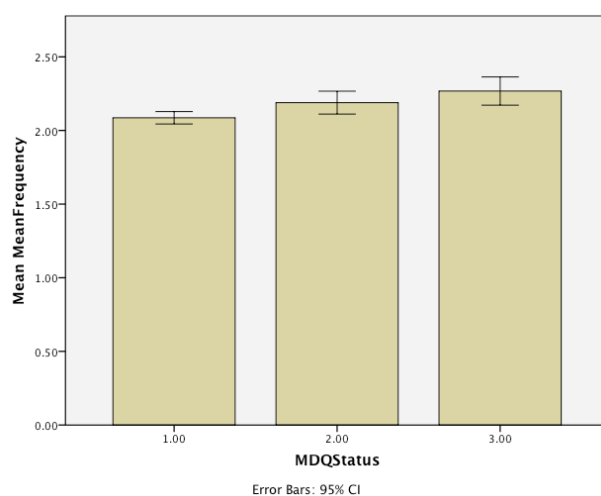


**FIGURE NINETEEN: Mean Number of Behaviours Across MDQ Status**

### Groups



**FIGURE TWENTY: Mean Level of Urge Across MDQ Status Groups**



**FIGURE TWENTY-ONE: Mean Frequency of Behaviour Across MDQ Status Groups**

Chi squared tests, seen in **Table Sixteen** below, were conducted for each behaviour. These indicated that, aside from financial risk taking, risky driving, gambling, drug taking and creative thinking, behaviour engagement differed between the three groups. Exploration of the standardised residuals showed that MDQ- and MDQsub individuals made particularly

strong contributions to the significant results for shoplifting and fire setting. In both these cases fewer MDQ- individuals and more MDQsub individuals reported engagement in the behaviour. All three groups contributed to significant differences in engagement in risky sex and going AWOL. In these cases, MDQ- individuals were less likely and MDQ+ and MDQsub individuals were more likely to endorse engaging in the behaviours. MDQ- individuals were less likely to have attempted suicide than the other groups, while MDQ+ individuals were far more likely. For appearance change, overspending and self harm, the MDQ+ group made a major positive contribution to the significant result, with individuals in this group much more likely than expected to have engaged in any of these behaviours. It was not clear which group influenced the significant finding for acting violently or aggressively, binge drinking, binge eating, excessive Internet use or tactlessness (all standardised residuals less than 2).

Behaviour		MDQ-	MDQsub	MDQ+	Difference
Shoplifting	Yes (%)	24.2	42.1	37.9	$\chi^2 (2) = 20.901, p < .001$ ; Cramer's V = .163
	Residuals	-2.0	2.9	1.6	
Violence/ Aggression	Yes (%)	60.5	75.9	80.5	$\chi^2 (2) = 21.206, p < .001$ ; Cramer's V = .164
	Residuals	-1.4	1.5	1.7	
Financial Risk	Yes (%)	13.2	15.0	16.1	$\chi^2 (2) = 0.753, p = .686$ ; Cramer's V = .031
Suicide	Yes (%)	13.7	17.4	44.8	$\chi^2 (2) = 50.169, p < .001$ ; Cramer's V = .252
	Residuals	-2.3	-0.1	6.0	
AWOL	Yes (%)	20.0	42.9	50.6	$\chi^2 (2) = 55.374, p < .001$ ; Cramer's V = .265
	Residuals	-3.3	3.5	4.2	
Fire Setting	Yes (%)	11.2	25.6	23.0	$\chi^2 (2) = 22.432, p < .001$ ; Cramer's V = .169
	Residuals	-2.3	3.2	1.9	
Appearance Change	Yes (%)	33.0	45.1	50.6	$\chi^2 (2) = 14.586, p = .001$ ; Cramer's V = .136
	Residuals	-1.6	1.5	2.1	
Binge Drinking	Yes (%)	43.9	59.4	55.2	$\chi^2 (2) = 12.612, p = .002$ ; Cramer's V = .126
	Residuals	-1.3	1.9	1.0	
Binge Eating	Yes (%)	46.5	60.9	64.4	$\chi^2 (2) = 16.071, p < .001$ ; Cramer's V = .143
	Residuals	-1.5	1.6	1.8	
Overspending	Yes (%)	52.5	62.4	72.4	$\chi^2 (2) = 14.622, p = .001$ ; Cramer's V = .136
	Residuals	-1.2	0.9	2.0	
Drug Taking	Yes (%)	14.4	24.1	19.5	$\chi^2 (2) = 7.915, p = .019$ ; Cramer's V = .100
Internet Use	Yes (%)	49.3	60.9	63.2	$\chi^2 (2) = 10.097, p = .006$ ; Cramer's V = .113
	Residuals	-1.1	1.3	1.3	
Risky Driving	Yes (%)	21.9	29.3	24.1	$\chi^2 (2) = 3.315, p = .191$ ; Cramer's V = .065
Creative Thought	Yes (%)	72.1	72.2	72.4	$\chi^2 (2) = 0.004, p = .998$ ; Cramer's V = .002
Gambling	Yes (%)	11.6	12.8	18.4	$\chi^2 (2) = 3.204, p = .201$ ; Cramer's V = .064
Tactlessness	Yes (%)	48.8	63.9	67.8	$\chi^2 (2) = 18.076, p < .001$ ; Cramer's V = .151
	Residuals	-1.5	1.7	1.8	
Self Harm	Yes (%)	8.1	11.3	25.3	$\chi^2 (2) = 23.898, p < .001$ ; Cramer's V = .174
	Residuals	-1.8	0.3	4.3	
Risky Sex	Yes (%)	13.2	28.6	26.4	$\chi^2 (2) = 23.810, p < .001$ ; Cramer's V = .174
	Residuals	-2.3	3.2	2.1	

NB:  $p$  at .002

**TABLE SIXTEEN: Chi-squared of Behaviours Stratified by MDQ Status**

Odds ratios were calculated for each of the behaviours. These can be found in **Table Seventeen**. Nearly all behaviours were equally as likely in MDQsub and MDQ+ individuals, as demonstrated by confidence intervals that crossed 1. The exceptions were suicide, which was 3.85 (95% CI 2.08 to 7.14) times as likely in MDQ+ compared to MDQsub individuals, and self harm,

which was 2.66 (95% CI 1.29 to 5.49) times more likely in MDQ+ compared to MDQsub individuals. According to the odds ratios, shoplifting, violence, going AWOL, fire setting, appearance change, binge drinking, binge eating, overspending, internet use, risky driving, tactlessness and risky sex were all more likely in MDQ+ and MDQsub individuals compared to MDQ- individuals. Drug taking was found to be more likely in MDQsub individuals compared to MDQ- (OR 1.89, 95% CI 1.29-2.99), but was not more likely in MDQ+ compared to MDQ- or MDQsub.

	MDQ- vs MDQsub	MDQ- vs. MDQ+	MDQsub vs. MDQ+
Shoplifting	2.27 (1.54 – 3.38)	1.91 (1.19 – 3.07)	0.84 (0.48 – 1.46)
Violence	2.05 (1.34 – 3.17)	2.69 (1.54 – 4.68)	1.31 (0.67 – 2.53)
Financial Risk	1.16 (0.69 – 1.99)	1.26 (0.68 – 2.36)	1.08 (0.52 – 2.28)
Suicide	1.33 (0.80 – 2.12)	5.16 (3.15 – 8.33)	3.85 (2.08 – 7.14)
AWOL	3.00 (2.01 – 4.48)	4.09 (2.56 – 6.53)	1.36 (0.79 – 2.35)
Pyromania	2.72 (1.70 – 4.34)	2.36 (1.34 – 4.14)	0.87 (0.46 – 1.64)
Appearance Change	1.67 (1.14 – 2.45)	2.08 (1.32 – 3.28)	1.25 (0.72 – 2.14)
Binge Drinking	1.87 (1.28 – 2.75)	1.58 (1.00 – 2.48)	0.84 (0.49 – 1.45)
Binge Eating	1.79 (1.22 – 2.64)	2.08 (1.30 – 3.32)	1.16 (0.66 – 2.03)
Overspending	1.50 (1.02 – 2.22)	2.38 (1.45 – 3.92)	1.58 (0.88 – 2.84)
Drug Taking	1.89 (1.29 – 2.99)	1.45 (0.81 – 2.58)	0.77 (0.40 – 1.49)
Internet Use	1.60 (1.09 – 2.35)	1.77 (1.11 – 2.82)	1.10 (0.63 – 1.93)
Risky Driving	1.48 (0.97 – 2.25)	1.13 (0.67 – 1.92)	0.77 (0.41 – 1.42)
Creative Thought	1.00 (0.66 – 1.53)	1.01 (0.61 – 1.68)	1.01 (0.55 – 1.85)
Gambling	1.12 (0.63 – 1.98)	1.72 (0.94 – 3.14)	1.53 (0.73 – 3.24)
Tactlessness	1.86 (1.26 – 2.75)	2.21 (1.37 – 3.57)	1.19 (0.67 – 2.11)
Self Harm	1.45 (0.79 – 2.68)	3.86 (2.18 – 6.82)	2.66 (1.29 – 5.49)
Risky Sex	2.64 (1.69 – 4.13)	2.37 (1.39 – 4.05)	0.90 (0.49 – 1.65)

**TABLE SEVENTEEN: Odds Ratios (and Confidence Intervals) for Behaviours in the Three MDQ Groups**

#### **6.4.9 Impulsivity, Mood and Suicidal Behaviour**



Of the sample of 219 participants (all MDQ+ and MDQsub individuals), 62 had attempted suicide (28.31%) and 157 had not. Independent sample t-tests showed that BIS non-planning and UPPS-P negative urgency, premeditation, perseveration and positive urgency were significantly higher in MDQ+/sub individuals who had attempted suicide as compared to those who had not. This is summarised in **Table Eighteen** below:

Impulsivity Facet	Attempted Suicide	Not Attempted Suicide	Difference
BIS Attentional	22.24	20.74	t (217) = 2.351, p = .02
BIS Motor	26.33	24.34	t (217) = 2.461, p = .015
BIS Non-planning	27.81	25.26	t (217) = 3.125, p = .002
UPPS-P Urgency	36.19	32.35	t (217) = 3.830, p < .001
UPPS-P Premeditation	26.30	23.25	t (87.641) = 2.835, p = .006*
UPPS-P Perseveration	25.15	22.06	t (217) = 3.369, p = .001
UPPS-P Sensation Seeking	32.10	34.01	t (217) = -1.716, p = .088
UPPS-P Positive Urgency	36.15	32.10	t (217) = 2.979, p = .003

\* Equal variances not assumed

p < 0.006

**TABLE EIGHTEEN: Impulsivity Levels in MDQ+/sub Individuals Stratified by Suicidal Behaviour**

#### 6.4.10 Structural Equation Modelling

All factor indicators loaded significantly upon latent variables at  $p < .001$ . The proportion of variance explained by each indicator is summarised within

**Table Nineteen** below.

Latent Variable	Indicator	R <sup>2</sup>
Negative Affect	Number of SCID Symptoms	0.34
	Rosenberg Self Esteem	0.60
	Hospital Anxiety and Depression	0.75
Experience of Extreme Mood	Number of MDQ Symptoms	0.43
	Severity of Symptom Experience	0.26
Affective Impulsivity	UPPS Sensation Seeking	0.43
	UPPS Positive and Negative Urgency	0.66
Cognitive Impulsivity	UPPS (lack of) Premeditation	0.80
	UPPS (lack of) Perseveration	0.43
	BIS Total	0.79
Impulsive Behaviour	Number of Behaviours	0.84
	Frequency of Behaviours	0.94

**TABLE NINETEEN: Proportion of Variance in Latent Variables as Explained by Indicators**

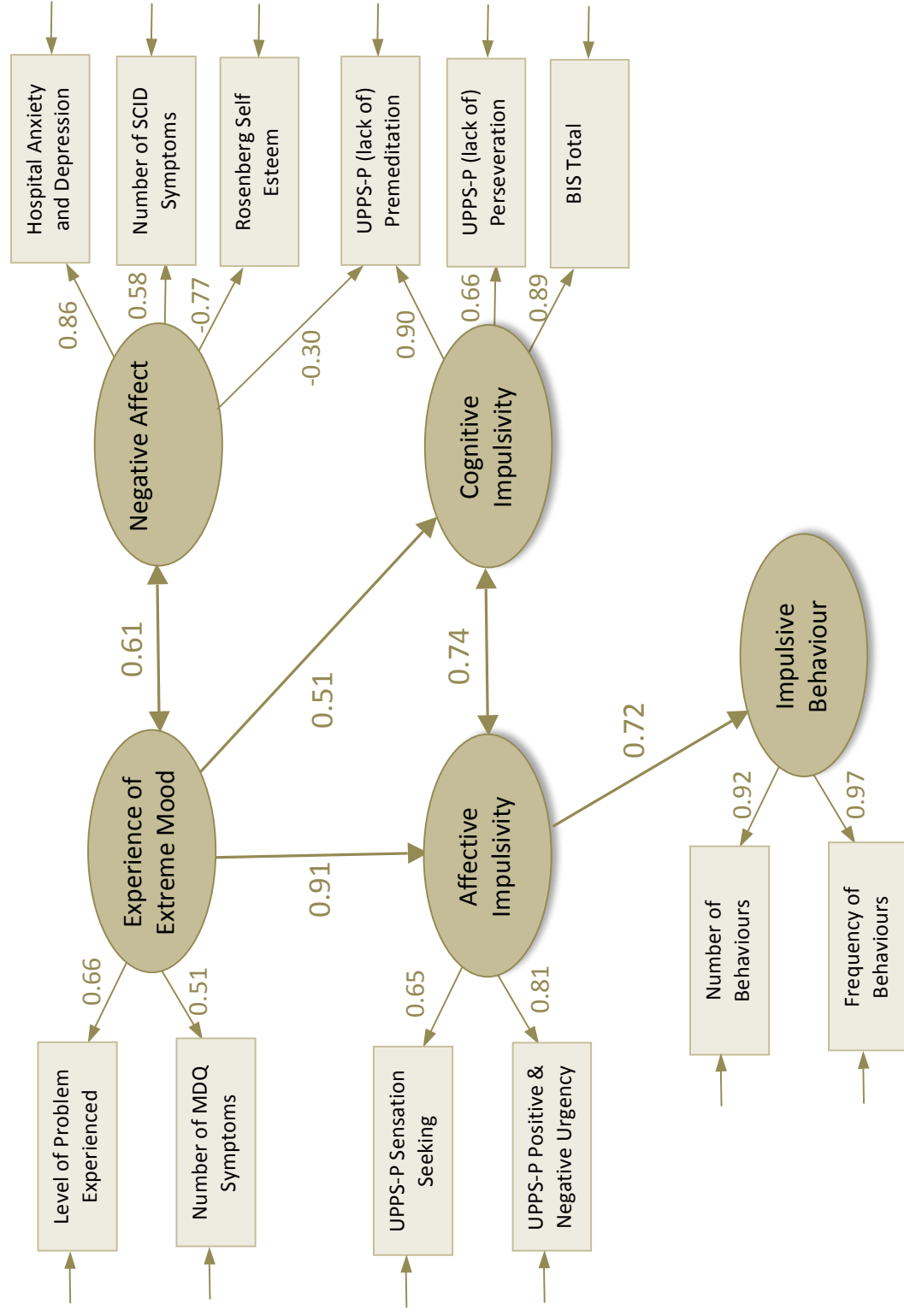
The chi-squared test result rejected model fit ( $\chi^2 (45) = 277.118$ ,  $p = < .001$ ).

However, it is common for chi-square to reject models at this sample size, and model fit indicators suggested that, overall, the model was an adequate representation of the data, with all model fit indices within suggested guidelines. These measures of the model fit are summarised in **Table Twenty** below.

$\chi^2$	RMSEA (90% CIs)	CFI	TLI	BIC
$\chi^2 (45) = 277.118, p = <.001$	0.08 (0.072-0.090)	0.952	0.942	22745.125

**TABLE TWENTY: Measures of Model Fit**

The theorised model can therefore be accepted as a potential explanation for the data. The model is represented graphically in **Figure Twenty-Two** below:



*Numbers indicate standardised regression weights*

**FIGURE TWENTY-TWO: Structural Equation Model for the Relationship between Impulsivity, Negative Affect, Experience of Hypomania and Mood**

The SEM summarised in the above figure suggests that there is a strong relationship between the experience of negative affect and a history of experiencing extremes of mood ('hypomania'). Experience of extreme mood was seen to be highly predictive of two forms of impulsivity: cognitive impulsivity and particularly affective impulsivity. These two forms of impulsivity were also strongly related to one another, but had different predictive pathways with impulsive behaviour, with affective impulsivity explaining 52% of the variance in impulsive behaviour. Cognitive impulsivity was not related to impulsive behaviour.

## 6.5 DISCUSSION

### 6.5.1 Summary of Findings

Study One was developed with the intention of further elucidating the relationships between trait impulsivity, experience of extreme mood and impulsive behaviour. Through analysis of the literature, hypotheses were developed that predicted elevated levels of trait impulsivity in individuals who experience extreme mood, and a relationship between high levels of impulsivity and a greater frequency of engagement in impulsive behaviour (see **Section 6.2**). Results, described within **Section 6.4**, were found to both support these hypotheses and to advance our understanding of the nature of these relationships.

Individuals who had some experience of extreme mood (both MDQ+ and MDQsub individuals) had significantly higher scores on all facets of both the Barratt Impulsiveness Scale (BIS) and the UPPS Impulsive Behaviour Scale with Positive Urgency Measure (UPPS-P) when compared to individuals who did not (MDQ- individuals). Furthermore, BIS attentional impulsivity was also elevated in MDQ+ as compared to MDQsub individuals. Although attentional impulsivity was the only facet in which the difference in scores between MDQ+ and MDQsub individuals reached statistical significance, graphical representations of the data (histograms) indicated a linear trend for all facets, with MDQ+ individuals displaying the highest trait impulsivity scores and MDQ- individuals the lowest, with MDQsub individuals generally falling in-between. The exception to this was UPPS-P sensation seeking, for which MDQsub individuals had statistically higher scores than both MDQ+ and MDQ- individuals.

These findings extend the work of researchers such as Swann and colleagues (Swann et al., 2003, Swann et al., 2007, Swann et al., 2005), who have demonstrated increased trait impulsivity in individuals with, compared to individuals without, bipolar disorder (BD). This has led researchers to suggest that impulsivity is a key process within the disorder, and may be fundamentally linked to the presentation and aetiology of BD. Finding that trait impulsivity is also increased in a (broadly speaking) non-clinical continuum sample of individuals who have experienced extreme mood – to the extent they may tentatively be considered as occupying a position

somewhere within the bipolar spectrum (Hirschfeld et al., 2000) – indicates that impulsivity is likely to be a fundamental process throughout the bipolar spectrum.

Results confirmed the hypothesis that both positive and negative urgency would be elevated in individuals who experienced extreme mood (MDQ+ and MDQsub) as compared to those who do not (MDQ-). These findings suggest that MDQ+/sub individuals have difficulty exerting control over their behaviour when experiencing elevated mood states, and as such, once more indicates the important relationship between mood and impulsivity.

It is important to note that urgency does not measure the frequency or extent of extreme emotion experience, but is instead a measure of *response* to mood state. For example, Cyders (2008) found that a music-based mood induction elevated impulsive responses on the Balloon Analogue Risk Task and increased the volume of alcohol drunk more notably in individuals with high positive urgency, as compared to individuals with low positive urgency. In other words, given similar emotional experiences, it was only individuals with high levels of urgency who responded to the affective state with an increase in impulsive behaviour. Therefore, the finding that individuals who experience extreme mood also have a tendency to behave impulsively when in elevated mood states is not tautologous.

It was also hypothesised that increased trait impulsivity would be related to more frequent impulsive behaviour. This hypothesis is also supported by the data. Strong correlations were found between the number of behaviours engaged in and all facets of the trait impulsivity measures. Correlations were highest for both positive and negative urgency, resulting in these two facets being taken forward into further analysis. These analyses found that for 13 of the 18 behaviours reported, both positive and negative urgency were significantly higher in individuals who had, compared to individuals who had not engaged in the behaviour. For a further two behaviours, the relationship was more closely linked to either positive or negative urgency.

There is a wide range of literature supporting the relationship between trait impulsivity and real-world behaviour, as was described in **Chapter 2**. The findings of this study add to this literature, and emphasise the importance of impulsivity as a predictor of a wide range of behaviours. The emergence of both positive and negative urgency as the strongest predictors of behaviour further emphasises the particular value of affective impulsivity as a facet of measurement. However, it should also be noted that urgency was not able to discriminate between all behaviours (notably financial risk taking, driving in a risky manner and gambling). Whiteside and Lynam (2001) have argued that different facets of impulsivity are predictive of different forms of impulsive behaviour. It is not clear whether these behaviours, unexplained by affective impulsivity, might be better explained by alternative impulsivity



facets (e.g. cognitive impulsivity), or whether they might be predicted by situational factors (cf. **Study Two**).

Findings also supported a link between a history of extreme mood experience and impulsive behaviour. It was found that MDQ+ and MDQsub individuals engaged in more impulsive behaviours than MDQ- participants, and that MDQ+ individuals engaged in impulsive behaviours more frequently than MDQ- individuals. Engagement in 13 of the 18 behaviours differed according to MDQ status, with certain behaviours (notably suicide) strikingly more common in MDQ+ or MDQsub than MDQ- participants. As well as behaviour, (resisted) urges to engage in risky behaviour were more common in individuals with experience of extreme mood, with these urges being experienced most frequently in MDQ+ participants, less in MDQsub participants and less still in MDQ- participants. The common occurrence of impulsive behaviour in individuals who have experienced extreme mood replicates findings within bipolar disorder, in which the high rate of impulsive behaviours is suggested to be a direct result of the high levels of trait impulsivity found in this population (e.g. Najt et al., 2007).

Reports of elevated trait impulsivity in individuals with bipolar disorder (BD) who have attempted suicide as compared to those who have not (Swann et al., 2005), led to the hypothesis that trait impulsivity would be related to suicidal behaviour in individuals with mood experience (i.e. MDQsub and MDQ+ individuals). This hypothesis was also confirmed, with BIS non-

planning impulsivity and UPPS-P urgency, premeditation, perseveration and positive urgency all significantly higher in MDQ+/sub individuals who had attempted suicide, as compared to MDQ+/sub individuals who had not. This finding underscores the broad range of literature that relates impulsivity to suicidal behaviour, as is evidenced by the inclusion of impulsivity as a key predictor within several models of suicide (Bender et al., 2011). It also adds to an emerging collection of evidence that suggests that impulsivity may be of particular relevance to suicidal behaviour in mood disorder (Swann et al., 2005). Together, the findings suggest that the overlap between mood experience and impulsivity may be relevant in better understanding the causes of suicidal behaviour.

The study hypotheses were focused on the relationship between trait impulsivity and experiences of extreme mood, and how this relationship might be relevant to the prediction of behaviour. To better understand this, a structural equation model (SEM) was developed. The model included all relevant variables measured within the study, with a particular interest in how these variables would interact with one another structurally. The SEM indicated that the latent variable affective impulsivity (made up of positive and negative urgency and sensation seeking) was the primary correlate of impulsive behaviour. The relationship between this latent variable and impulsive behaviour was very strong (0.72, see **Figure Twenty-Two**). The latent variable of cognitive impulsivity (formed of total BIS scores alongside UPPS-P premeditation and perseveration) was conversely not related to

impulsive behaviour. The latent variable experience of extreme mood (formed by the indicators 'number of MDQ symptoms' and 'severity of the symptom experience'), had strong relationships to both impulsivity factors, but was not directly related to impulsive behaviour. Negative affect and experience of extreme positive mood were correlated. The influence of negative affect on affective impulsivity was moderated by the experience of extreme mood.

The SEM provides a strong case for the separation of impulsivity in to discrete facets, which – while they may have strong relationships with one another (the correlation between affective and cognitive impulsivity as found in the SEM was 0.74) – have differential relationships with outcomes, such as behaviour. Within this study, impulsivity was separated according to those facets of impulsivity which appeared to place an emphasis upon mood experience as a promoter of behaviour and those which highlighted the role of cognitive processes, or lack thereof, in the lead up to impulsivity. While this distinction appeared a good fit with various models of impulsivity often discussed within the literature (see, for example, Cyders and Smith, 2007), it is a novel way to conceptualise the construct and other structural divisions may prove to fit better with future findings.

Also contained within the SEM is a proposed pathway between the experience of negative affect and the enacting of impulsive behaviour, with negative affect (a latent variable encompassing the Hospital Anxiety and

Depression Scale, the SCID questions scores and the Rosenberg Self Esteem Scale) correlated with experience of extreme positive mood (a latent variable constructed from responses to the Mood Disorders Questionnaire). Extreme mood experience then leads in to high levels of affective impulsivity, which in turn predicts involvement in impulsive behaviour, in terms of both range of behaviours and the frequency of engagement in these behaviours. This pathway demonstrates the degree to which impulsivity and affect are enmeshed, and the relevance of both constructs to the prediction of a wide range of dysfunctional, impulsive behaviour.

Alongside the hypothesis-driven findings described above, the study also generated some interesting, less-expected findings. First, there was some evidence of gender differences in impulsivity. Male participants were seen to report higher levels of positive urgency and sensation seeking than female participants, while the female participants reported higher levels of negative urgency than males. Previous studies have found UPPS-P sensation seeking to be elevated in males when compared to females (Van der Linden et al., 2006), though there is little other data to support sex differences in positive or negative urgency. In many studies, including this one, the high proportion of female participants compared to male participants precludes any definitive conclusions about the relationship between gender and impulsivity, though it is important to be aware of the impact any potential differences may have.

The study also raised interesting questions about the use of the Mood Disorders Questionnaire (MDQ). While the MDQ is widely regarded as a relevant and useful screening measure for bipolar spectrum disorders (Hirschfeld et al., 2000), there exists some debate as to where cut-off points for a positive screen (MDQ+) should lie (Miller et al., 2004a). It was therefore appropriate to maintain some degree of flexibility in MDQ scoring. The decision was taken to include a 'sub-threshold' group (MDQsub) in the study, containing individuals who met all criteria for a positive screen, but who felt their symptoms constituted only a minor problem. This is in line with the recommendations of authors such as Benazzi (2003), who suggest that issues with the MDQ are as a direct result of the 'problem question'.

The findings resulting from this modified scoring strategy provide an interesting contribution to the debate. While MDQ+ and MDQsub participants had broadly similar profiles, there were some important differences. MDQ+ individuals had significantly higher scores for anxiety and depression, lower self-esteem, increased experience of lifetime psychiatric symptomology, decreased levels of sensation seeking and increased engagement in some of the more serious impulsive behaviours (suicide, self harm, over-spending). This profile suggests that MDQ+ individuals demonstrate greater psychopathology across the board than MDQsub participants, a finding that is relevant to the use of the MDQ as a screening tool. It indicates that the MDQ, and particularly the problem criterion, in

reality taps in to a wider range of psychological experience than hypomanic symptomatology alone.

### **6.5.2 Strengths and Limitations**

There is growing use of the internet as a tool to aid research, and while it is widely considered to be a valuable method of data collection (Buchanan and Smith, 1999) internet-based surveys have some notable limitations. The link for the survey was placed on intranet sites for the university, and therefore access was limited to University students and staff. However, the reality is that once the survey is live, the researchers have little control over its access. It is therefore possible that the results included data from non-targeted participants or multiple responses from some individuals, or that incorrect responses were given due to a misunderstanding of questions. Attempts were made, using the structure of the study, to tackle these limitations. For example, it was requested that individuals complete the survey only once, and participants were invited to contact the researchers with any questions or queries.

The researchers were also unable to control a relatively high rate of drop out within the survey (45.3%). As a long survey (it is estimated that it took around 30minutes to complete), this high rate of drop out was anticipated, and steps were taken to make the survey as engaging as possible. It is possible that a shorter survey may have led to a decreased dropout rate, but

this would have restricted the range of data collected. As a key strength of this study is the broad range of measures included, it is considered that the dropout is an unfortunate, but potentially unavoidable limitation. Analysis of data from individuals who dropped out of the study suggested that they do not constitute a distinct population, and as such their absence from the final data set is unlikely to have influenced the findings.

While access to the survey was open to the wider university population, it is possible that some aspect of the presentation of the study may have biased the sample. The study advertisement gave away little detail as to the exact content of the survey, stating instead that it was interested in 'personality and behaviour'. However, it is likely that a proportion of respondents progressed to entering the study due to a personal interest in the area, triggered by their beliefs, thoughts and concerns about their own personality and behaviour. There is a potential that this could create a sample that is not representative of the population (students at the University of Nottingham). This may to some degree explain the relatively high rates of psychopathology and impulsive behaviour found within the study, though it should be noted that student samples often present with high levels of clinically interesting variables (Vredenburg et al., 1993).

Even if the sample were representative of the wider university population, it would be difficult to generalise from it. Student samples, while widely used in psychology research, are not themselves representative of the general

population. The sample within this study is young (mean average age: 24.25years) and well educated (mean average years in education: 14.63years), as well as predominantly female (75.9% of the sample). As age (Steinberg et al., 2008), gender (Van der Linden et al., 2006) and education (Granö et al., 2004) have been shown to hold independent relationships with impulsivity, it is possible that these sample characteristics will impact upon the findings. Replication of the study findings in a general population sample is needed to ensure that this is not the case.

Comparison of the findings of this study with normative samples can give some indication as to the extent to which this sample is representative. For the UPPS-P, average scores and standardised deviations are similar for the sample and a control sample used by Whiteside and colleagues (2005) for all subscales aside from sensation seeking (SS). The average score for SS was 31.28 (SD 8.14) in this sample, while it was lower at 26.11 (SD 6.76) for Whiteside et al.'s participants. Mean average scores (and standard deviation of these scores) on the Barratt Impulsiveness Scale were similar within this sample and a control sample collated by Stanford et al. (2009). It is therefore likely the sample described holds impulsivity levels representative of the general population. BIS impulsivity scores can also be compared for this sample and samples of individuals with bipolar diagnosis, as collated by Swann and colleagues (2005). While scores for the MDQ- participants are notably lower than the clinical participants seen in Swann et al.'s study, both MDQsub and MDQ+ participants have levels of BIS impulsivity approaching



these levels (e.g. mean average of 25.78 on the BIS motor impulsivity sub-scale for MDQ+ participants in this study, compared to 27.1 in Swann et al., 2005). This reinforces the assertion that impulsivity levels are elevated in MDQsub and MDQ+ individuals as compared to the general population, and may give some support to the proposition that MDQ+ individuals occupy a position at some point along the bipolar spectrum.

Measures were carefully chosen for inclusion within the survey. The research is nonetheless limited by the ability of these measures to accurately assess the relevant variables, and therefore the absence of validation for some of the scales can be considered a limitation. As has been discussed, it was felt that modifications to MDQ scoring were necessary in light of the debates in the current literature surrounding the scale. These modifications, while suggested in the literature, have not been validated and represent only one possibility for the most effective use of the MDQ. Similarly, both the 'SCID Feelings Questions' and 'Impulsive Behaviour Questions' included within the survey were developed expressly for the survey and had not undergone a validation process. While their psychometric properties were unknown, the scales formed meaningful variables within the analysis. On-going research using the scales will inform their use. It should also be noted that reliability analyses conducted on existing scales used within the study supported their reliability.

Regarding the MDQ, it is relevant to consider the extent to which the categorical scoring of the scale, which uses cut-offs to dichotomise the sample into individuals who are MDQ positive or negative, represents a study limitation. While the importance of continuum models of psychiatric disorder - particularly in relation to the bipolar spectrum - was discussed in depth within **Chapter Four**, it could be argued that published MDQ scoring criteria mean the scale more closely adheres to a categorical perspective. The inclusion of the MDQ subthreshold group demonstrates the need to understand more subtle variations in mood experience, with this group occupying a position between MDQ- and MDQ+ groups for several of the variables. It would be interesting for future studies to use continuum measures of bipolar spectrum experience, such as the Hypomania Check List (Angst et al., 2005) or the Hypomania Personality Scale (Eckblad & Chapman, 1986), to explore the potential existence of continuous relationships between the bipolar spectrum and impulsivity.

As the survey has a cross-sectional design, it is limited in its ability to describe the temporal ordering or causal pathways linking the variables together. While the study has indicated that there do appear to be relationships between the variables studied, and that these relationships are strong, it is harder to indicate in what direction they operate and in what order. The study suggests that mood is highly relevant to impulsive behaviour, but we cannot from these results identify the specific time frame in which this may occur, or how impulsive behaviour might be seen to

feedback to influence affective state. To identify answers to these questions requires further study, using designs which are longitudinal in structure or which employ qualitative methodology. Some of these issues are addressed within Study Two (**Chapter 7**).

Alongside these limitations, the study also had certain important strengths. While heavily informed by findings from the literature (as described in **Chapters 1** through **5**), the study was highly original, representing a novel direction for the research area. In taking findings confirmed within a clinical sample, and extending them into a continuum group, the study was able to build upon the existing research; both in confirming the clinical findings in a (broadly) non-clinical group and in testing out novel ideas (such as the use of an index of impulsive behaviour). These new findings can now feedback into research within clinical populations.

The large sample size ensured a wide range of data could be collected, including information provided on a wide variety of behaviours and experiences, including those that are rare or infrequently reported. It is likely that this was aided by the anonymity of the survey, which supported participants to answer the questions with some degree of honesty. The sample size also enabled the use of complex statistical techniques, namely structural equation modelling (SEM), which typically requires a sample size upwards of 200 participants (Kenny, 2011). The use of SEM within this study is particularly important given the developing understanding that impulsivity

does not and cannot exist in a vacuum. SEM provides the structure to explore the role that other variables - such as the experience of extreme mood states, or fluctuations in self-esteem – may have in influencing impulsivity. It must be noted that there was a limit to the number of separate variables that could be measured within the survey, and therefore some potentially relevant variables were not included (e.g. measures of compulsivity). Further work can progress to tease out more specifically the exact constructs that work together to promote impulsive behaviour.

### **6.5.3 Implications**

The findings discussed in **Section 6.5.1** have some important implications. As has been suggested throughout this chapter, the results imply that mood is highly relevant to impulsivity and impulsive behaviour, both in terms of affective states and in history of extreme mood states (MDQ+/sub). This is in direct contrast to the arguments of authors such as Barratt (Barratt and Patton, 1983) who have suggested that impulsivity is a cognitive construct which operates separately from mood. Results from Structural Equation Modelling in fact appear to suggest the converse – that affect is central to at least one form of impulsivity and is an important predictor of impulsive acts. Researchers and clinicians need to be aware of the interaction between these variables to best understand dysfunctional impulsive behaviour, and where possible, to prevent it.

The study demonstrates that similar processes to those found in samples of bipolar disorder patients can be identified in a non-clinical sample of individuals with experience of extreme mood. This is in line with theories which emphasise mental health and well-being as existing along a continuum, such that the experiences of individuals who have clinically relevant symptomatology are qualitatively similar to those individuals whose experiences do not meet clinical cut-offs (see **Section 4.1**; Regier, 2007). The study is particularly relevant to the bipolar spectrum, the boundaries of which are the subject of debate within the literature (Pies, 2007). The data from this study supports the assertion of numerous researchers, who see the bipolar spectrum as stretching throughout the general population into non-clinical samples. This has in itself a wide range of clinical and theoretical implications, as described in **Section 4.2.3**.

As well as being relevant to bipolar spectrum disorder itself, findings of increased impulsivity, psychopathology and impulsive behaviour in a non-clinical sample have important implications in their own right. If individuals with even mild to moderate experience of extreme mood have an elevated propensity to engage in high-risk impulsive behaviour such as suicide attempts, it stands to reason that there is both the need and the potential for intervention within this group. Results described within this chapter indicate that impulsivity is not only present within a non-clinical sample, but that it also has an important influence on the behaviour of people without diagnosable psychiatric disorder.

#### 6.5.4 Next Steps

The study was designed to be exploratory in nature, and has opened up many avenues for further research. It is important, first of all, to investigate whether the model developed regarding the relationship between impulsivity, mood and behaviour can be replicated in a clinical sample of individuals with bipolar disorder (BD). The results of this experiment will add to the debate regarding the validity of the bipolar spectrum, and contribute to an understanding of the interaction between mood and impulsivity, and the impact of this interaction on behaviour in BD. In future, it would also be of interest to see how models such as this apply to different psychiatric disorders. Mood and impulsivity are both important constructs in many psychiatric disorders (e.g. borderline personality disorder), and it is not clear how the relationship between impulsivity and mood state may manifest trans-diagnostically.

The model developed in this study investigated the relationship between extreme positive mood, impulsivity and impulsive acts. As well as these core variables, the role of 'negative' psychological experience (i.e. anxiety, depression, self esteem) was also measured and taken in to account. This latent variable had an indirect but important impact upon impulsivity and impulsive behaviour. It is important that future studies are able to look more broadly at a range of psychological variables that might influence the

experience of impulsivity. The identification of these extraneous variables will aid the prediction of impulsive behaviour, as well as contributing to our understanding of impulsivity as a construct in context.

As the recognition of a relationship between affect and impulsivity is in many ways a recent phenomenon, there is still a great deal of research needed to identify the explicit mechanisms at play. The study described within this chapter is unable to inform our understanding of the functional role of affect as a promoter of impulsive behaviour. Further experimental research is badly needed to identify what urgency represents; whether it constitutes an inability to effectively cope with emotional states, a measure of propensity to experience strong emotional states or something different altogether. This research could take many forms, including experimental studies using mood induction (cf Cyders, 2008), naturalistic experience sampling or qualitative methodologies.

As has been discussed, impulsivity is a construct that evades agreed definition. This study was able to contribute to the debate through the dissociation of impulsivity into cognitive and affective factors. This separation appeared to increase the predictive capabilities of the construct. However, defining impulsivity is a thorny issue and far more work is needed to assess whether the dichotomising of impulsivity into these categories – or others – is the most appropriate way forward for the field. It is clear that

coming to some consensus as to what impulsivity is and how it might best be measured is still an urgent priority for the area.

Finally, the study raised some interesting questions about the ways in which impulsivity might be resisted. Finding that urges to engage in impulsive behaviour are common, both in individuals who have and who have not experienced extreme mood, suggests that 'impulses' are commonly experienced within the population. Furthermore, they are frequently resisted. Research exploring how, when and why this resistance occurs may become a focus of therapeutic approaches aimed at preventing high-risk impulsive behaviour.



## CHAPTER 7: STUDY TWO

### 7.1 INTRODUCTION TO STUDY TWO

Study One explored the relationships between impulsivity, behaviour and experiences of hypomania, finding that the three are closely interlinked (see **Chapter 6**). These findings add to the large volume of quantitative data supporting the importance of impulsivity as both a trans-diagnostic concept and as an important predictor of behaviour. The value of this data is clear, particularly for the prediction and prevention of harmful and risky behaviour. However, as a field that has been investigated almost exclusively using quantitative methodology, it is likely that elements relevant to these relationships have been overlooked. Furthermore, the temporal ordering of these processes and the context in which the harmful and risky behaviour developed and continues to occur cannot be readily explored in a cross-sectional survey. Qualitative methodology provides a research tool to consider the individuals' personal experience in a scientific, controlled manner, allowing researchers to better understand inter-relations between previously researched elements as well as potentially generating novel avenues for investigation (Hjelmeland and Knizek, 2010). Since our understanding of impulsive processes is fairly limited, inductive methods are particularly suitable for investigating their temporal order, as no assumptions regarding the processes have to be made in order to measure them. At the same time, using both quantitative and qualitative methods

allows for triangulation, in which the findings from quantitative and qualitative studies inform one another and, importantly, can together contribute to a deeper theoretical understanding (Östlund et al., 2011).

## **7.2 AIMS**

This qualitative study had the following aims:

- To better understand the individual's experience of impulsivity and impulsive type behaviours
- To remain open to the identification of any novel processes within impulsivity, which may have been missed during quantitative investigation
- To identify external and internal factors which may act as triggers to impulsive behaviour
- To investigate the temporal relationship between internal and external factors and impulsive behaviour
- To explore the role of historic and present experience of mood as a precursor to impulsive behaviour

As an inductive and qualitative study, this study had no explicit hypotheses to test. Instead, the focus was upon collecting appropriate data that would allow themes and relationships to emerge independently.

## **7.3 METHODS**

### 7.3.1 Design

The study consisted of a single semi-structured interview of around an hour's duration.

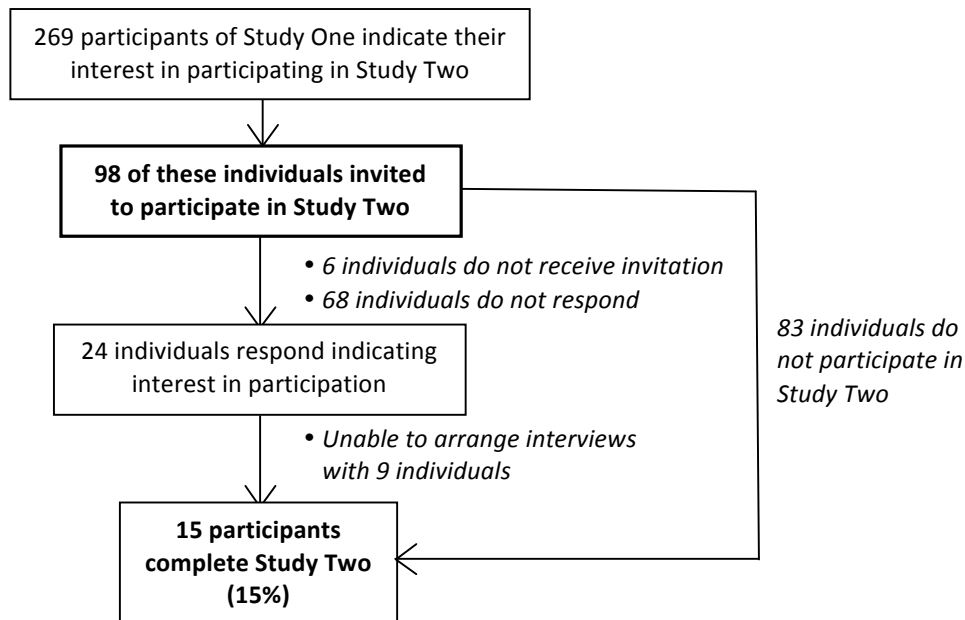
### 7.3.2 Ethics

Ethical approval was obtained from the University of Nottingham Medical School Ethics Committee (see **Appendix 7**). Participants were required to indicate their consent to take part before the interview commenced (see **Appendix 8** for the consent form). Given the potentially sensitive nature of the topics discussed, great care was taken to ensure that the participant felt supported within the research process. The interview was structured with an awareness of enhancing therapeutic aspects (see **Section 7.2.5**). Debrief was considered important, with the researcher providing a face-to-face debrief with the participant immediately after the interview, as well as providing them with a debrief document to take away. This document contained contact details for the researchers and support organisations, alongside encouragement to contact them if at all needed (see **Appendix 9**). In considering the wellbeing of the participant and those around them, the researcher also has a duty to identify any potentially serious risky behaviour. Participants were informed before beginning the interview (as part of the information sheet, see **Appendix 10**) that despite strict anonymity and confidentiality for the most part, any disclosure that caused the researcher

to fear risk of serious harm to the participant or someone else would result in the relevant emergency service(s) being informed. The researcher was supported by the research team in these decisions.

### 7.3.3 Participants

Participants were sampled from individuals who had left their contact details during **Study One**. The sampling intended to ensure the participants of Study Two would vary in terms of age, gender, experience of elevated mood, impulsivity level and type and number of behaviours endorsed. As the study progressed, sampling also sought those individuals who had the potential to disconfirm developing hypotheses (e.g. If a theme was forming based upon female self-harmers alone, male self-harmers would be sought in an attempt to extend the theme). Sampling continued until there was a sense of saturation of themes. However, given restrictions of time and funding, alongside the complexities of this novel subject, full saturation was neither expected nor achieved. 269 individuals left their contact details as part of Study One, indicating they would be interested in being contacted about a subsequent study. Of these individuals, 98 were invited to participate (see **Appendix 11** for the invitation email, which was accompanied by the information sheet, found in **Appendix 10**). The final study consisted of 15 participants. See **Figure Twenty-Three** for a diagram demonstrating flow through the study.



**FIGURE TWENTY-THREE: Flow Chart of Participation in Study Two**

The final sample included a range of individuals in terms of age, gender, experience of hypomania, behaviours endorsed and trait impulsivity. The exact characteristics of the sample will be described in more detail in the results (**Section 7.4**).

### **7.3.4 Materials and Measures**

#### **7.3.4.1 Semi-Structured Interview**

The majority of the study was based around a semi-structured interview, during which the participants described discrete occasions of their own potentially impulse-mediated behaviour. Participants were reminded of the behaviours the research was particularly interested in (the eighteen

behaviours included in **Study One**, see the list in **Figure Ten**) but were also invited to talk about any incident of their own behaviour they considered to be impulsive. Interviews were recorded using an Olympus WS-331M Digital Voice Recorder and transcribed into a Microsoft Word Document.

The interview schedule (see **Appendix 12**) was developed with particular reference to the Timeline Followback Method (TLFB; Sobell and Sobell, 1992), Life Charts (Sharpe, 1992) and the Suicide Attempt Self-Injury Interview (SASII; Linehan et al., 2006). The TLFB method, originally used to accurately portray a history of alcohol use (although it has been adapted for use with various other behaviours, see Weinhardt et al (2008) for an analysis of its use in measuring risky sexual behaviour), emphasises the use of '*recall aids*' to support individuals' accurate reporting of events that have taken place in the past. Such aids include the identification of '*discrete events and anchor points*' and '*key dates*', in which other events in the individuals' life as well as common external events (e.g. 'Christmas') are recalled and noted as a mechanism to enhance their recollection of the event(s) under scrutiny. Within the interview schedule of this study, this mechanism was employed through the use of an open question at the beginning of the interview, once the event in question was identified: '*What was going on generally in your life at the time?*'. This encouraged participants to identify wider events in their life, with the intention that this would improve the depth and quality of their memory of the event.

A similar technique is used with life charts (Sharpe, 1992), whereby the flow of events and experiences in numerous domains (e.g. relationships, contact with services) is charted across a life span to explore their impact upon a specific event (e.g. suicide, Fortune et al., 2007). Although the interview in this setting was not long enough to explore an individuals' narrative experience across such a wide time period, the participant was prompted to discuss their experience in these areas if they felt it had an impact upon the behaviour in question. This data could then be used to construct timelines, which highlighted the impact of various life domains at various time points on the behaviour in question (see **Section 7.2.6.2**).

The SASII was developed as a tool to obtain in-depth and accurate information about individuals' histories of self-injury and suicidal behaviour. Although it differs from the TLFB method in the information it attempts to gather, the two schedules are both concerned with maximising the accuracy and specificity of information obtained from the memory of participants. It is these aspects that the interview schedule used here attempted to mirror, as the depth and quality of information we could hope to obtain from participants was necessarily restricted by their ability to provide an accurate rendering of their experience, sometimes many years after the event had taken place. The SASII asks specific yet open questions about the individual's intentions and experiences at different time points throughout a given incident of self harm or suicide attempt (e.g. *'At the time of your self-injury/suicide attempt/overdose, what final outcome did you most intend*

*and expect?’; ‘Did any of the events or experiences on this list happen immediately following your self-harming/suicidal incident?’). This time-linked questioning was mimicked within the structure of the interview schedule for this study. Participants were first asked to describe events leading up to the behaviour, including their intentions and expectations of the behaviour at that point in time, ideally without recourse to hindsight. The interview then moved on to discuss the behaviour itself, including emotional experiences at the time of the behaviour. Finally, the interview discussed the consequences of the behaviour, both immediate and long term. As well as being of interest to the research, this final aspect of the study also functioned as a mechanism to check the current wellbeing of the participant and to gauge the likelihood of their repeating the behaviour (e.g. ‘Could you imagine doing x again?’). It also added a sense of closure to the interview and, hopefully, if the memory was a painful one, to the event itself.*

Separating the interview in this manner allowed research questions to be targeted towards specific time-points in the behaviour, for example to explore the ways in which the individual experienced and processed triggers to their behaviour.

As well as the interview, participants also repeated a selection of the questionnaires found in **Study One**. This was to ensure any large changes in any of these important measures could be noted. The measures included are noted below, though the reader is referred to **Section 6.2.4** for further details about them.



#### **7.3.4.2      *Mood Disorders Questionnaire***

The Mood Disorders Questionnaire (Hirschfeld et al., 2000) is a 15 item scale used as a screening measure for bipolarity. It assesses prior experience of likely (hypo)mania through the reporting of symptoms, their potential concurrence and the impact of these symptoms. The original study reported specificity of 0.90 and sensitivity of 0.73 within a psychiatric sample.

#### **7.3.4.3      *UPPS-P Impulsive Behaviour Questionnaire***

The UPPS-P Impulsive Behaviour Questionnaire includes the original UPPS items devised by Whiteside and Lynam (2001) alongside the novel Positive Urgency measure of Cyders and colleagues (Cyders et al., 2007). The full 59-item questionnaire measures five key pathways to impulsivity: positive urgency, negative urgency, (lack of) premeditation, (lack of) perseveration and sensation seeking. The factor structure of the scale has been reliably replicated (Magid and Colder, 2007) and the internal consistency found to be good (0.82; Whiteside and Lynam, 2001).

#### **7.3.4.4      *Barratt Impulsiveness Scale***

The Barratt Impulsiveness Scale (BIS; Barratt, 1959) is the most widely used self-report measure of impulsivity. It consists of 30 items measuring three second-order facets of impulsivity: attentional, motor and non-planning impulsiveness. The factor structure has been replicated (Patton et al., 1995) and the internal consistency is also good (0.83; Stanford et al., 2009).

#### **7.3.4.5      *Hospital Anxiety and Depression Scale***

The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) measures current experience of anxiety and depression. Of the 14 items included in the scale, 7 relate to experiences of anxiety and 7 to experiences of depression. The scale is very widely used, and has been shown to have good psychometric properties (Bjelland et al., 2002).

#### **7.3.5    Procedure**

Participants who expressed an interest in participating in the study were contacted via email to arrange a convenient time for them to come in for the study. On the day of the interview, participants were usually met by the researcher at a central location. This allowed the researcher to bring the participant to the interview location, which was difficult to find unaccompanied, and also enabled a distinct period of time in which the researcher and participant were able to build rapport. Rapport is an essential feature of the qualitative research process, and is fundamental in

ensuring the participant is comfortable, and therefore feels able to speak openly (Dicicco-Bloom and Crabtree, 2006). The interview location was a small and quiet room within an academic Division of Psychiatry. On arrival at the interview room, the researcher explained the interview in general terms and checked the understanding of the participant. The participant was then invited to re-read the information sheet (**Appendix 10**) and fill in the consent form (**Appendix 8**). The participant then spent 15-20 minutes completing the four standardised questionnaires described in **Section 7.3.4**.

When the participant indicated they had finished the questionnaire measures, they were asked if they felt ready to begin with the interview. At this point the researcher described a little more about the study, ensuring the participant was aware that they did not need to discuss anything they were not comfortable with, and that the interview could be stopped or paused at any point. The researcher also described the format of the interview, in terms of following each behaviour in turn through antecedents, to the behaviour itself, to the consequences. Participants had time at this point to consider the list of behaviours the research was particularly interested in. They were asked to think about a particular incident of the behaviour that they felt comfortable talking about and that they could remember well. The list of suggested behaviours (as found in **Study One**) can be found in **Figure Twenty-Four** below, although participants were advised that they could talk about anything they thought was relevant:

• Shoplifting	• Overspending
• Being violent or aggressive	• Drug taking
• Taking financial risks	• Excessive internet use
• Attempting suicide	• Risky driving
• Going AWOL	• Gambling
• Fire setting	• Being tactless
• Drastic appearance change	• Self harming
• Binge drinking or eating	• Engaging in risky sex

**FIGURE TWENTY-FOUR: Behaviours Suggested for Discussion within Study**

## Two

Once the participant had an idea of what they would like to talk about, their consent to the interview being recorded was checked verbally and the interview was begun. The full interview schedule can be found in **Appendix 12**. The interview was semi-structured, with open questions or statements (e.g. *'Could you please describe the last time you x?'*) followed up with prompting or clarifying questions (e.g. *'Who were you with?'*) only if needed. The interview was constructed to allow the participant to speak uninterrupted as much as possible. Once the researcher was satisfied that all the questions had been answered the participant was invited to add anything they thought relevant or simply that they wanted to say. The interview lasted for approximately one hour, with one to three separate behaviours (dependent on the time taken to discuss each) covered in this time.

When the interview finished, the researcher checked the wellbeing of the participant. If they were feeling in any way distressed, or simply wanted to talk some more, they were offered a hot drink and an extended debrief. Otherwise, the participant was given the debrief sheet (see **Appendix 9**) and reassured that they should feel able to contact the researchers at any point if they had any questions or feelings arising regarding the topics discussed. They were thanked for their time, and reimbursed accordingly (£10).

It is important to illustrate how the ethical considerations inherent within a study of this kind influenced the procedure. It was very important to the researchers that a study into such potentially sensitive and emotive experiences should prioritise the wellbeing of its participants. Key aspects of the study procedure, such as the building of rapport, the structure of the interview and the presence of debrief, were carefully considered with this in mind. There is evidence in the literature that participants can find taking part in a qualitative study with an engaged and non-judgemental listener a therapeutic experience (Murray, 2003), and descriptions of experiences such as this were fundamental to the study design. Several of the participants did remark that the study was '*therapeutic*' or in some way helped them process the events they were talking about. While the wellbeing of the participant is paramount, it is also important to consider the wellbeing of the researcher. Various studies have indicated that research into sensitive topics can have a negative impact on the researcher

(Dickson-Swift et al., 2008). The researcher in this study was able to make use of supervision, support and debrief from the supervisors.

### **7.3.6 Analysis**

#### **7.3.6.1 Quantitative Data**

A small amount of quantitative data were collected to describe the sample (see **Sections 7.3.4.2 to 7.3.4.5**). While the sample (n=15) is too small to provide any meaningful results from statistical analysis, the results of these measures will be reported in the results (**Section 7.4**) for the reader's information.

#### **7.3.6.2 Qualitative Data: Thematic Analysis**

The qualitative data was analysed using thematic analysis (TA), a qualitative methodology that focuses upon the identification and elucidation of themes within data. These themes, and the relationships between them, can then be reported and explored. TA is widely regarded as one of the more atheoretical qualitative methods (e.g. in comparison to Interpretive Phenomenological Analysis or Grounded Theory; Braun and Clarke, 2006) as it does not subscribe to a particular epistemological position, and instead relies on the data to direct findings. It was therefore considered to be an appropriate method to use in this study, which, as the first qualitative study

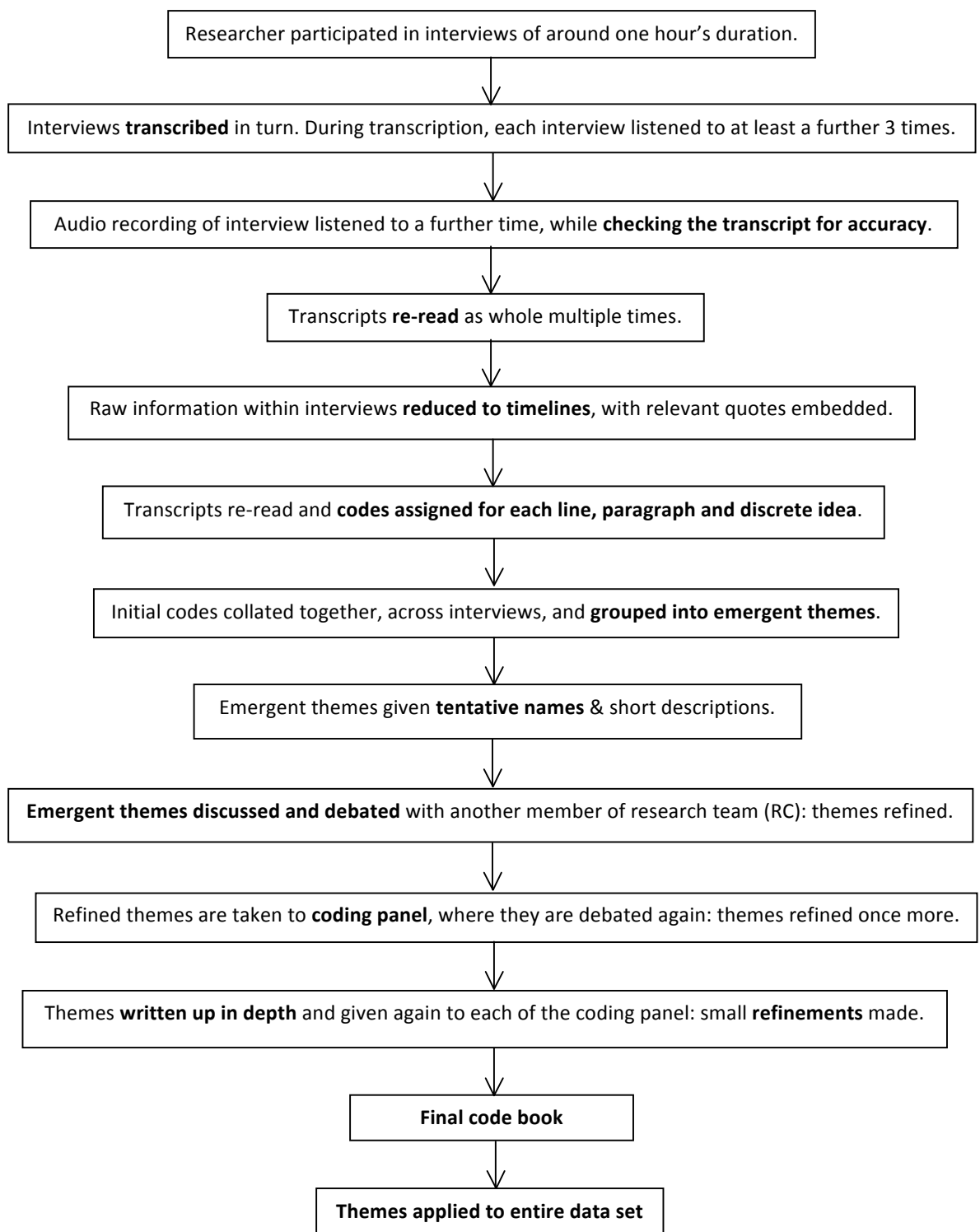
in the research area, was necessarily entirely inductive. As an initial study in the area, it was important for the data to be analysed using a methodology which maintained the richness of the data (as befits qualitative analysis) as well as giving some indication of concrete elements of common or differing ground which would, at some point in the future, prove amenable to more positivist hypothesis testing. Thematic analysis is well placed in this regard, as it is able to identify similarities and differences between groups and individuals (Braun & Clarke, 2006).

It is important to note in any discussion regarding analysis of qualitative data the difference between the positivist ontology that underscores much quantitative research and the social-constructionist or realist ontology within which qualitative research functions. In essence this difference means that qualitative research is not concerned with the identification of a single, objective truth but instead attempts to capture in depth the experience of the individual. As such, there is little focus upon the generalisability of findings. It also means that the process of analysis functions outside of delineated processes, and much of the weight of the analysis is placed upon the shoulders of the researcher. While this process enables the data to direct the research process, it also calls for greater honesty on the part of the researcher as to their role within the analytic process (Elliott et al., 1999). The researcher is the tool with which the data are mined, and therefore their own personal ontology, epistemology and experiences influence the way in which they interact with the data. The

impact of the researcher can be charted through the maintenance of a research journal, or set of memos, in which the researcher commits to writing their feelings and ideas about the research as it progresses. Excerpts from the research journal collated for this study can be seen, for reference, in **Appendix 13**. In the interests of reflexivity, it is also vital to note that the primary researcher for this study did not have personal experience of hypomania, or many of the behaviours discussed with participants, and as such existed in a position as an '*outsider*'. Finally, selected qualitative methodologies, particularly grounded theory, call for the researcher's blinding to the research field prior to qualitative investigation, in order to allow the data to have its own independent voice. It is therefore also important to note that while the researcher attempted to maintain neutrality on the subject, she was well acquainted with literature surrounding the area at the time of investigation.

In part due to the intentionally adaptable nature of qualitative research, and also to the particular flexibility of TA as a methodology, there is some confusion in the literature as to the specific process that should be taken to use TA in the analysis of qualitative material. For clarity the exact steps involved in the analysis of this data are reported here, though the reader is advised that the work of both Boyatzis (1998) and Braun and Clark (2006) was fundamental in guiding this process. The analysis is summarised in **Figure Twenty-Five**, with a textual account following.



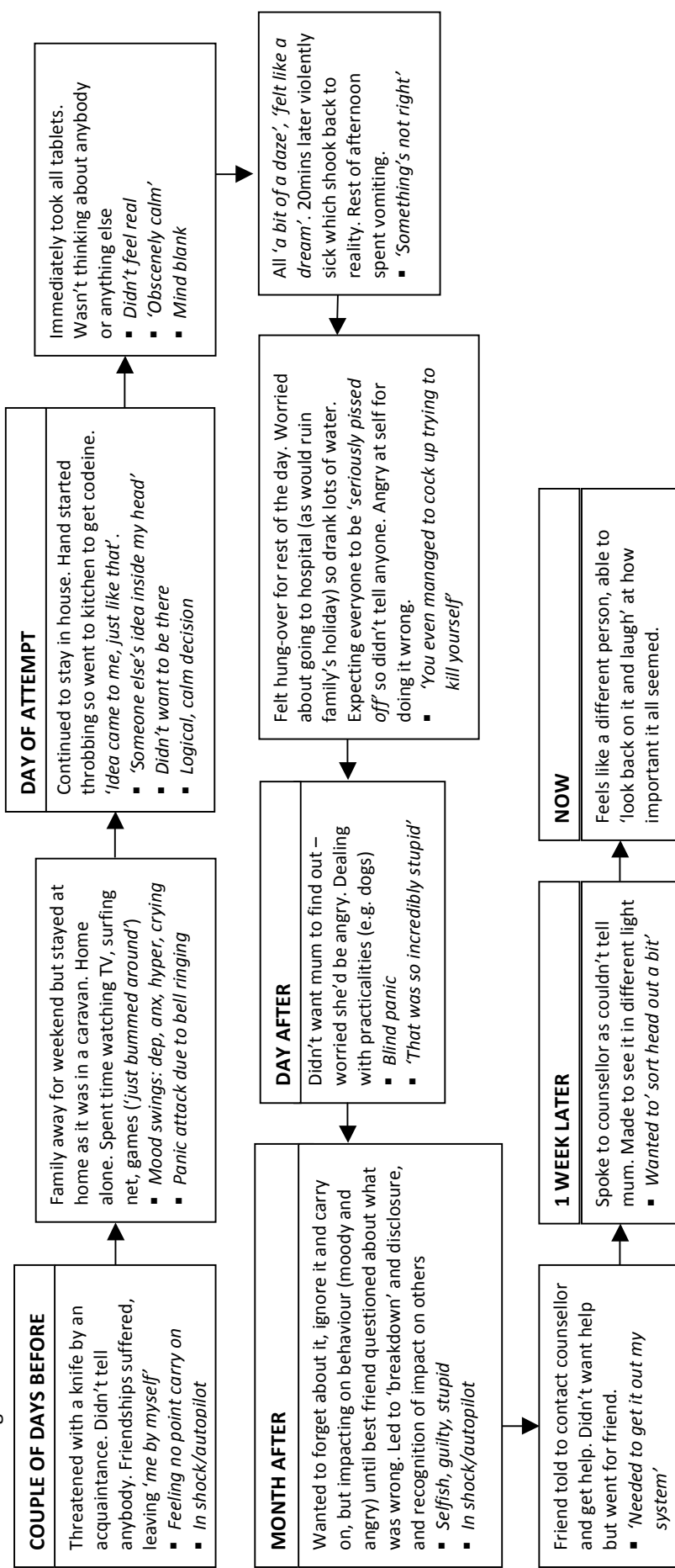


**FIGURE TWENTY-FIVE: Thematic Analysis of Interview Data**

Once interviews had taken place, the researcher transcribed each in turn from the recording. During this process, and continuing throughout analysis, the researcher kept a 'memo' book in which to record her responses to the data, both personal and theoretical (see **Appendix 13**). Throughout transcription, each recording was listened to multiple times and transcribed in a way that preserved accuracy and meaning. Once the entire recording had been transcribed, it was checked through for accuracy while listening to the audio recording. From this point, the transcribed interview was the primary source of analysis. As recommended by Boyatzis (1998), the data were then summarised to '*reduce the raw information*'. This process is designed to aid both the conscious and unconscious processing of the data. At the same time, it also provides a tool to help co-researchers engage with the data, as they are able to succinctly understand the context of the interview as a whole, without the need to necessarily read it line-by-line. The decision was taken to summarise the data in the form of timelines, which preserved the time-locked structure of the interviews and the behaviours individuals discussed. An example of a completed timeline can be seen below in **Figure Twenty-Six**. Timelines for the remainder of the participants and behaviours can be found in **Appendix 14**.

**Participant 885139251: Suicide Attempt**

- Hanging around with 'bad crowd'
- Mum and step-dad arguing, threat of divorce
- Brother recently diagnosed with chronic illness
- Not attending school regularly
- Never thought about suicide



**FIGURE TWENTY-SIX: Example Timeline**

Once the timelines were completed, and the researcher had had the opportunity to engage multiple times with the transcribed data, codes were assigned individually to each line, paragraph and independent section within each of the transcripts. Codes were used to summarise and elucidate underlying ideas within the interviews. An excerpt from one of the interviews, showing codes assigned can be found in **Appendix 15**. Once codes had been assigned for each of the participants, the codes were brought together in attempts to identify those themes that stretched, to a greater or lesser degree, across the interviews or which appeared to indicate a relevant insight in regard to the research questions. While some thematic analysis emphasises the need for a theme to be represented in each and every transcript (see Hopson, 1993), this study was interested in tensions and differences between individuals' experiences of behaviour and as such, any emergent theme which was considered relevant was taken forward at this point. This synthesis resulted in the identification of 44 emergent themes, which were divided to indicate their relevance at specific time points (e.g. antecedents, behaviour and consequences; see **Appendix 16**). These themes were then assigned identifying names and short descriptions. These emergent themes were then discussed at length with one of the supervisors (RC), with discussions exploring the evidence for a given theme (i.e. was the theme substantiated by the data?), the relevance of the theme to the research questions and the relationships between themes. At this point the emergent themes were refined to form 22 themes, which can be found in **Appendix 17**.

As a qualitative method, thematic analysis (TA) is primarily dependent on the insights of that researcher or researchers who have collected the data and driven the analysis. However, to ensure that themes are grounded within the data and are therefore representative of the statements of participants, and that all avenues of investigation have been followed, it can be helpful to discuss the analytic process within a wider group. Numerous published studies of TA have made use of this 'coding panel' (Hopson, 1993, Sinclair and Green, 2005). A coding panel was formed for this study, consisting of individuals who had the potential for different perspectives and insights into the data. The panel consisted of a cognitive psychologist (RC), a consultant psychiatrist (RM), an experienced qualitative researcher (VT), a service user with an interest in research participation (CG) and an English department academic and service-user with an interest in narrative (BS). Both RM and RC were supervisors of the primary researcher – and as such were familiar with the research area and the aims of the study - while CG, VT and BS were unfamiliar with the research area and remained naïve to the research questions and background to the study. The coding panel convened in one face-to-face meeting, during which the research and the refined themes were introduced for discussion. This meeting was followed up over email to ensure the panel agreed any changes made. The panel felt the majority of refined themes were representative of the data, and supported steps to integrate the themes more closely, resulting in seven key themes, with 22 sub-themes spread between them. This constituted the

final set of themes, which were compiled into a code book. A code book is formed to supply the information Boyatkis (1998) states is necessary for a ‘*good code*’: a label, a definition of the theme, a description of how to identify the theme, a description of any qualifiers to the theme (e.g. anything which negates coding of the theme) and positive and negative examples in the form of quotes. This final code book can be found in its entirety in **Appendix 18**, but will be explored in depth in **Section 6.3**. The code book was used to re-comb the original data to ensure all relevant quotes were appropriately coded, and that no important themes or codes had been neglected.

## 7.4 RESULTS

### 7.4.1 Quantitative Data

#### 7.4.1.1 *Participants*

The final sample consisted of 15 individuals. The scores of these individuals on the scales used in Study One are summarised below in **Table Twenty-One**. Five of the fifteen participants were male, the rest were female. Five participants were categorised as being MDQ+, three as being MDQsubthreshold and the remaining seven as MDQ- (according to their original questionnaire responses). Total BIS impulsivity scores ranged between 46 and 108 (mean average 67), while total UPPS-P impulsivity scores ranged between 106 and 217 (mean average 143). Participants

selected for interview endorsed engaging in a wide range of behaviours, with all participants for Study Two endorsing between 6 and 10 of the 18 behaviours (mean average for the sample was 8 behaviours). A range of these behaviours were discussed within the interviews, including suicide attempts (with six participants), self harm (with five participants), overspending (with four participants), binge eating (with three participants), binge drinking (with three participants), financial risk taking (with two participants), career change (with two participants), appearance change (with two participants), physical risk taking (with one participant) and engaging in risky sex (with one participant).

Participant		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Age		22	21	19	19	19	19	20	29	53	53	18	18	19	19	28
Gender		M	F	M	F	F	F	F	F	M	F	M	F	F	F	M
Years in Education		15	17	14	15	13	14	16	22	18	30	14	13	14	15	23
MDQ Status		MDQ-	MDQ+	MDQs ub	MDQ+	MDQs ub	MDQ+	MDQ+	MDQs ub	MDQ-	MDQ-	MDQ-	MDQ-	MDQ-	MDQ+	MDQ-
BIS	Attentional	18	29	29	30	21	22	24	22	16	13	16	16	13	16	11
	Motor	27	28	37	28	13	31	21	28	17	18	17	24	17	18	20
	Non-Planning	19	29	42	36	14	28	24	26	20	18	24	25	19	22	19
	Total	63	84	108	94	46	80	68	76	53	49	58	66	49	56	50
RISK	Psychological	22	35	33	36	22	28	24	22	25	26	17	20	15	28	23
	Physical	38	20	41	25	27	24	17	40	22	23	10	23	19	23	22
UPPS-P	Neg Urgency	28	46	46	43	31	41	37	33	24	26	31	41	26	35	20
	Premeditation	23	30	40	31	15	34	17	30	15	19	19	17	22	16	18
	Perseveration	18	32	35	29	13	31	17	19	26	20	23	14	13	23	17
	Sen Seeking	44	20	45	27	30	35	22	34	30	18	13	20	38	31	32
	Pos Urgency	31	49	51	51	17	50	36	34	25	25	26	42	30	26	26
HADS	Total	144	177	217	181	106	191	129	150	120	108	112	134	129	131	113
	Anxiety	5	19	15	15	20	11	21	15	2	7	15	12	5	14	5
	Depression	3	11	7	17	3	5	16	11	3	10	7	6	1	6	1
Rosenberg		25	3	11	8	23	15	1	4	25	17	15	13	25	11	24
Total Number of SCID Experiences		0	7	4	7	7	6	8	5	4	5	5	7	0	7	4
Total Number Behaviours Engaged in		10	9	9	10	7	8	10	7	6	9	7	9	7	8	9
Main Behaviours Discussed		Financial risk, binge drinking	Self harm, suicide attempt	Binge drinking, overspending, physical risk	Suicide attempt, binge eating	Suicide attempt, self harm	Financial risk, binge drinking	Self harm, internet use	Suicide attempt	Overspending, career change	Suicide attempt	Overspending, binge eating	Overspending, appearance change	Self harm, appearance change	Suicide attempt, self harm	Risky sex, binge eating

TABLE TWENTY-ONE: Characteristics of Study Two Participants



#### 7.4.1.2 *Changes in Measures between Study 1 and Study 2*

Several of the measures collected within the initial study were also collected as part of this second study. They included the Mood Disorders Questionnaire (MDQ), Barratt Impulsiveness Scale (BIS), UPPS Impulsive Behaviour Questionnaire and Positive Urgency Measure (UPPS-P) and the Hospital Anxiety and Depression Scale (HADS). These measures were collected to ensure participants' scores from the first study remained valid. The comparison of scores on the MDQ from Study One (S1) and Study Two (S2) can be seen in **Table Twenty-Two** below:

Participant Number	Number of symptoms		Simultaneous (Y/N)		Problem		Status	
	S1	S2	S1	S2	S1	S2	S1	S2
1	8	9	Y	Y	0	0	1	1
2	11	11	Y	Y	2	2	3	3
3	9	9	Y	Y	1	0	2	1
4	11	11	Y	Y	2	2	3	3
5	12	9	Y	Y	1	1	2	2
6	9	9	Y	Y	2	1	3	2
7	9	10	Y	Y	2	2	3	3
8	10	12	Y	Y	1	2	2	3
9	8	7	Y	Y	0	0	1	1
10	9	7	Y	Y	0	0	1	1
11	6	3	N	N	0	1	1	1
12	10	9	N	N	1	1	1	1
13	8	2	Y	Y	0	0	1	1
14	8	6	Y	Y	3	1	3	1
15	5	4	N	N	0	1	1	1

**TABLE TWENTY-TWO: Changes in MDQ Responses Between Study One and Study Two**

Eleven individuals maintained their MDQ status from Study One in Study

Two. One individual changed from MDQsub in Study One to MDQ- in Study Two, one from MDQsub to MDQ+, one from MDQ+ to MDQsub and one from MDQ+ to MDQ-. Three of the four changed status as a result of their response to the problem question (i.e. responded that the symptoms experienced caused more or less of a problem than originally stated). The fourth individual, who changed from MDQ+ to MDQ-, changed as a result of endorsing fewer symptoms and indicating the symptoms were less of a problem than originally stated.

Changes in the impulsivity scales can be seen in **Tables Twenty-Three** and **Twenty-Four** below:

Participant Number	<i>Attentional</i>		<i>Motor</i>		<i>Non-Planning</i>		<i>Total</i>	
	<i>S1</i>	<i>S2</i>	<i>S1</i>	<i>S2</i>	<i>S1</i>	<i>S2</i>	<i>S1</i>	<i>S2</i>
<b>1</b>	18	14	27	18	19	17	63	49
<b>2</b>	29	24	28	24	29	24	84	71
<b>3</b>	29	27	37	42	42	44	108	114
<b>4</b>	30	29	28	32	36	32	94	91
<b>5</b>	21	16	13	12	14	17	46	44
<b>6</b>	22	19	31	21	28	22	80	61
<b>7</b>	24	22	21	26	24	24	68	71
<b>8</b>	22	24	28	24	26	29	76	76
<b>9</b>	16	16	17	18	20	20	53	54
<b>10</b>	13	16	18	16	18	20	49	51
<b>11</b>	16	19	17	21	24	23	58	63
<b>12</b>	16	18	24	21	25	24	66	63
<b>13</b>	13	13	17	16	19	15	49	44
<b>14</b>	16	16	18	20	22	21	56	56
<b>15</b>	11	11	20	21	19	22	50	55

**TABLE TWENTY-THREE: Changes in BIS Impulsivity Scores Between Study One and Study Two**

Participant Number	Urgency		Premeditation		Perseveration		Sensation Seeking		Positive Urgency		Total	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1	28	33	23	19	18	16	44	45	31	30	144	143
2	46	40	30	24	32	29	20	30	49	52	177	175
3	46	37	40	36	35	39	45	48	51	49	217	209
4	43	46	31	20	29	28	27	23	51	53	181	170
5	31	21	15	11	13	13	30	19	17	21	106	85
6	41	31	34	31	31	22	35	47	50	41	191	172
7	37	35	17	21	17	19	22	21	36	35	129	131
8	33	37	30	28	19	22	34	36	34	43	150	166
9	24	22	15	18	26	25	30	31	25	27	120	123
10	26	25	19	17	20	16	18	15	25	28	108	101
11	31	26	19	21	23	21	13	12	26	16	112	96
12	41	31	17	16	14	19	20	18	42	40	134	124
13	26	13	22	15	13	14	38	39	30	22	129	103
14	35	32	16	18	23	18	31	30	26	30	131	128
15	20	17	18	17	17	19	32	32	26	15	113	100

**TABLE TWENTY-FOUR: Changes in UPPS-P Impulsivity Scores Between**

**Study One and Study Two**

BIS total scores ranged from being identical at re-test up to 19 points different. UPPS-P total scores were between 1 and 26 points different at Study Two when compared to Study One.

The HADS was primarily used in Study Two as a measure to check participants' current mood state. However, as it was also used in Study One, its re-test values can be summarised in **Table Twenty-Five** below:

Participant Number	Anxiety		Depression	
	<i>S1</i>	<i>S2</i>	<i>S1</i>	<i>S2</i>
1	5	5	3	2
2	19	20	11	6
3	15	7	7	3
4	15	17	17	11
5	20	18	3	8
6	11	3	5	4
7	21	12	16	10
8	15	14	11	8
9	2	1	3	4
10	7	12	10	7
11	15	10	7	10
12	12	12	6	6
13	5	3	1	0
14	14	11	6	2
15	5	8	1	1

**TABLE TWENTY-FIVE: Changes in HADS Scores Between Study One and Study Two**

#### **7.4.2 Qualitative Data: Thematic Analysis**

The thematic analysis process described within **Section 7.3.6.2** resulted in the emergence of seven key themes from the data, with twenty-two sub themes spread between them. The themes and sub-themes are summarised within **Figure Twenty-Seven**, and can be seen in greater detail in the codebook found in **Appendix 18**.

Theme	Sub-themes
• Preparatory Set	<ul style="list-style-type: none"> <li>• <i>Engineering the Environment</i></li> <li>• <i>Consideration of Behaviour</i></li> <li>• <i>Anticipating Outcomes</i></li> </ul>
• Influence of the Environment and Others	<ul style="list-style-type: none"> <li>• <i>Ability to Access Help</i></li> <li>• <i>Immediate Physical Trigger</i></li> <li>• <i>Seeking Out External Sources of Information</i></li> <li>• <i>Life Events</i></li> </ul>
• Intense Emotional State	<ul style="list-style-type: none"> <li>• <i>Altered State of Consciousness</i></li> <li>• <i>Extreme Internal Focus</i></li> <li>• <i>High Arousal/Cognitive Load</i></li> <li>• <i>Moderating Affective State</i></li> </ul>
• Agency (lack of)	<ul style="list-style-type: none"> <li>• <i>Intrusive Thought</i></li> <li>• <i>Sense of Self</i></li> <li>• <i>(Lack of) Volition</i></li> <li>• <i>Absence of Choice</i></li> </ul>
• Premonitory Urge	<ul style="list-style-type: none"> <li>• <i>Distracting/Resisting</i></li> <li>• <i>Intense Drive to Complete Act</i></li> </ul>
• Reflexive Action	<ul style="list-style-type: none"> <li>• <i>Impulsive Thought</i></li> <li>• <i>Consideration of Alternatives/Risk</i></li> <li>• <i>Reinforced and Habitual Behaviour</i></li> </ul>
• Sensation Seeking	<ul style="list-style-type: none"> <li>• <i>Anticipation of Sensation</i></li> <li>• <i>Singular Focus</i></li> </ul>

**FIGURE TWENTY-SEVEN: Themes and Sub-Themes**

The themes and sub-themes listed in **Figure Twenty-Seven** will be described in turn throughout the remainder of this chapter.

#### **7.4.2.1      *Preparatory Set***

The theme 'Preparatory Set' emerged from participants' descriptions of preparing for behaviour over an extended time period. Decisions to engage in behaviour were described in a way that emphasised the drawn out process of decision-making, in which individuals mulled over their options across a period of days, weeks or months. It is important to note that this does not necessarily negate the 'impulsive' nature of these behaviours, as the final decision as to the when and where of behaviour engagement was frequently made rapidly, and with a lesser degree of planning. A quote from Participant 13, describing her decision to have a drastic haircut, highlights this distinction:

*'Over Christmas I think I'd been having a thought, thinking about it. And then it would have been then yeah a week into exams and um yes, it was gone!'*

Participant 13 (MDQ-; UPPS-P total score 129), describing drastic appearance change

This individual had considered the haircut over a period of weeks, and had at that point made the decision to have it done '*within... six weeks*'. However, passing by the hairdressers after a long day revising, she made the final and instant decision to engage in the behaviour. Her previous consideration of the topic allowed her the freedom to make this choice, and to engage in the behaviour somewhat 'impulsively'.

The three sub-themes contained within the theme describe key aspects of this preparatory planning. The first sub-theme, 'Engineering the Environment', summarises participants' need to modify their external environment and obtain tools that enable them to engage in behaviour. These preparatory activities are often completed ahead of the occurrence of behaviour, and form a part of the planning for a given behaviour. The clearest examples of this sub-theme come from individuals describing occasions of self-harm or attempting suicide, in which they require external objects to complete the behaviour. Talking about her suicide attempt, Participant 14 described collecting tablets in preparation:

*'I had prepared for it. Um I did, I hadn't decided to do it on that particular day but I had bought things leading up to whenever I'd felt or feel like doing it.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing a suicide attempt

Here Participant 14 describes making practical preparations for a suicide attempt ahead of deciding when or where this attempt may take place. A similar experience is described by Participant 10, who had kept tablets in preparation for her attempt over a period of years:

*'I had a little bottle of antidepressants that I'd had in my keeping since, uh, since I'd started to get really ill with cystitis... and I'd decided rather than take antidepressants*

*I'd change career, but I'd kept these pills... It was quite exciting to, to know that I had this bottle of pills.'*

Participant 10 (MDQ-; UPPS-P total score 108), describing a suicide attempt

These examples summarise the idea that some degree of organisation may be required on a practical level to enable individuals to engage in a future impulsive behaviour.

The second sub-theme within Preparatory Set is 'Consideration of Behaviour'. This sub-theme contains references made by participants to considering for and planning their behaviour – to a greater or lesser degree – over an extended time period. As was described above, this planning process usually occurs ahead of the final decision to engage in the behaviour. This is described by Participant 9, in the context of a sudden career change:

*'I sometimes make quick decisions but they're based on something that's been simmering away, or thoughts about what might be a good idea, even though it doesn't present itself. And then when it presents itself, I am able to make a quick decision.'*

Participant 9 (MDQ-; UPPS-P total score 120), describing a career change



This quote is taken from Participant 9's description of an impulsive decision to leave his current work and take up another post in a very different field. This final decision, prompted by the advertisement of an appropriate position, was made quickly and somewhat impulsively. However Participant 9 was clear that this quick decision could only be made as he had mulled over a career change in theory over a period of years. Occasionally this consideration process and eventual decision appears more overtly impulsive, such as in the case of Participant 6:

*'It wasn't like completely spur of the moment, it is something that like I've always wanted to travel as a general, general idea of things that I want to do in my life, but I got bored essentially and was like "Ah, A levels coming to the end", um had a particularly boring day at college, went home and decided to book flights to Thailand.'*

Participant 6 (MDQ+; UPPS-P total score 191), describing an impulsive decision to travel

Here, the individual's consideration of the behaviour contains less concrete planning, and is instead concerned with imagining the behaviour and hoping that it might one day occur. However, as with other occurrences of this sub-theme, it is this prior consideration that paves the way for the behaviour at later points.

The final Preparatory Set sub-theme, 'Anticipating Outcomes', is concerned with participants' descriptions of predicting and planning for the outcomes of their intended actions. Frequently, identification of potential outcomes led to participants deciding against the behaviour. Participant 11, talking about overspending, described his experiences of the urge to buy subsiding once the financial consequences of his actions were considered:

*'Eventually I'll get round to thinking "Can I afford this?"  
[laughs] It really depends on how long it takes me to buy  
something, on whether I end up getting it or not. 'Cause if  
I'm there for a while it gives um my mind time to kind of  
overcome the initial desire and start thinking about it. '*

Participant 11 (MDQ-; UPPS-P total score 112), describing over-spending

Here the participant's understanding of the consequences overrides his powerful desire to buy. If, in preparing for the behaviour, he has time to consider these outcomes, he finds himself unable to continue with the planned behaviour. It is when the consequences are not considered, or are brushed aside, that impulsive behaviour can take place. Participant 15 talked about his experiences of over-eating, which he usually counters by identifying the negative consequences of his actions:

*'I know now that although they do taste nice, there's too  
many drawbacks. And I'm too acutely aware of them... You*

*can always shake your moobs if you're feeling, if you need  
a kick to "No, don't eat that." '*

Participant 15 (MDQ-; UPPS-P total score 113), describing over-eating

However, when he encounters more powerful urges to overeat:

*'Those sort of long-term consequences don't crop up at  
all... It's just this once. You're in a shit mood, you're having  
a bad day. It's just this once. Just let yourself off.'*

Participant 15 (MDQ-; UPPS-P total score 113), describing over-eating

In this example, the urge to eat is seen as being so powerful and necessary that there is no space to consider the consequences. They are not noted, and the behaviour is able to continue unimpeded. As such, an ability to appropriately consider potential outcomes of behaviour is an important factor during preparation for a potentially risky and impulsive behaviour.

#### **7.4.2.2      *Influence of the Environment and Others***

The theme 'Influence of the Environment and Others' demonstrates that impulsive behaviour is firmly grounded within an environmental and social context. This context influences the decision making process as well as the behaviour itself. Participant 2 talked about an occasion of self-harm, emphasising how big a role the context – her new home, coupled with an

aggressive and intimidating neighbour – played in her desire to engage in the behaviour.

*'I knew that I had to get out of that situation, and I just, I didn't feel safe in the house, um, and I felt very alone and I thought "Well, I really need to be around people because things are just going to get worse if I stay here"... I knew I had to remove myself from that situation.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self-harm

Participant 2 here demonstrates how extricating herself from the situation removed, or in the very least decreased, the likelihood of engaging in the behaviour. As such, the context can be considered a key factor in both prompting and maintaining the behaviour.

The sub-themes included within this theme specify particular aspects of the environment that participants identified as being relevant to their impulsive behaviour. The first is 'Ability to Access Help'. This sub-theme is concerned with the degree to which the individual has help and support available to them, and to which they feel able to access and use this support. This was a common theme, with nine of the fifteen participants making strong reference to the social context in which their behaviour occurred. Some individuals, such as Participant 13, indicated that simply being separated

from a social context enhanced the likelihood of impulsive or out-of-the-ordinary behaviour:

*'The prompt? Um, being in the isolated environment. That inevitably, I think that would always drive me to do something spontaneous.'*

Participant 13 (MDQ-; UPPS-P total score 129), describing appearance change

However, other individuals described the social context as being most relevant at the point when high-risk impulsive behaviour (notably suicide attempts and self-injury) became likely. In these situations both social and clinical support is necessary to stop the behaviour occurring. When these support mechanisms are not accessible, the participant alone is seen as unable to stop the behaviour (cf. **Section 7.4.2.4: Agency (lack of)**).

Participant 8 experienced a prolonged period of suicidal ideation and intent. In attempting to control her urges to act, she sought help from numerous sources, as is described below:

*'It was just like "I have done everything I can think of." I'd rung a couple of friends going "I'm not coping, please someone give me a call." I'd tried getting some help from the [therapeutic] group I'm in but the group I'm in doesn't actually give you any... I might have tried ringing [the crisis team] and not been able to get through or something.'*

*Everything I'd tried had backfired um and so I was like actually I can't, I've tried everything so it doesn't work. I may as well just go ahead.'*

Participant 8 (MDQsub; UPPS-P total score 150), describing a suicide attempt

As the sources of support sought were not or did not feel available, the participant saw an attempt as an inevitability. In the interview, she went on to describe how '*not being listened to*' was for her a key trigger in this suicide attempt. While in this case support was sought and denied to the participant, other participants described multiple reasons why even seeking support was not possible (e.g. Participant 5: parents away on holiday; Participant 2: partner having exams).

Participants also described their own difficulties in finding and engaging with support in a way which was helpful to them, particularly in situations where their emotional state was already highly charged (see **Section 7.4.2.3: Intense Emotional State**). Seeking help is therefore seen as a struggle in its own right, as is demonstrated by Participant 7:

*'I know I shouldn't do it and people say "Oh yeah, talk to people before you get to that point" and things, but yeah, it's not that easy.'*

Participant 7 (MDQ+; UPPS-P total score 129), describing self-harm

Even if the individual is able to access support, their ability to engage with it was described as being compromised. Participants talked about being too focused on their own perspective to understand the perspectives or advice of others:

*'I think even then on the occasions that I did talk to someone I would disagree with what they were telling me... I think that might have been partially because I was too wrapped up in how I was feeling and not willing to kind of see how someone else actually saw it, in a kind of more rational way.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing a suicide attempt

Participant 14's description of needing to adapt to the perspectives of others was reflected in interviews with other participants. In these interviews, the support of others was constructed primarily as a tool to enable the individual to step away from their own focused intentions and understand their behaviour more widely. Social support was described as important to *'dilute the intensity of the feelings'* (Participant 10) and *'bring it all into perspective'* (Participant 5). Without this support the individual remained isolated and unable to comprehend their own decision making process (cf. the sub-theme **'Extreme Internal Focus'**), they were left *'stewing on my own'* (Participant 2).

A further influence of the social environment comes from 'Seeking external sources of information'. This sub-theme arose from individuals' descriptions of seeking advice or information from external sources, including friends, family and the media. The theme arose primarily from the descriptions of less impulsive individuals, for whom seeking out information about others' experiences formed a major step in a structured decision making process. For these individuals, any large decision was preceded by the collation of relevant information. For example, when discussing spending large amounts of money, Participant 9 said:

*'I always look at review sites. I've never booked a holiday, or a hotel or a B & B or anything without trying to find some reviews on the Internet... It's not a person's advice, it's a, anonymous advice but yes, I do tend to, I tend to ask around if it's a big decision'*

Participant 9 (MDQ-; UPPS-P total score 120), describing spending

For this individual, the experiences of others are important in guiding his choices. A similar experience was reported by Participant 1, who used both the media and family experience to inform his choices during a high-risk financial investment:

*'When I asked my dad he said "Obviously you take one risk," and erm, he, er, that was probably, probably about a*



*month later I sort of started going into the stock market. And then probably I was researching companies for another three, four weeks or something before I found a company... Finding all the best places where you can like look up the history of the share price.'*

Participant 1 (MDQ-; UPPS-P total score 144), describing a financial risk

Again we see that the search for information from others precedes the decision to engage in the behaviour.

Although the majority of overt descriptions of advice seeking came from individuals and behaviours lower down the impulsivity scale, there was evidence of a reference to external sources of information during riskier and more impulsive behaviours. In these cases, the social information frequently came in the form of social norms. Individuals made reference to the wider societal context in which their behaviour occurred, imbuing information through the accepted actions of others instead of through a direct process of advice seeking. Participant 3 described the peer pressures underlying his binge drinking:

*'It's just sort of more a "I don't want to be seen as not being able to take as much as someone else, so we've got to carry on." It's all like trying to keep up with other people like, sort of drink, drink the same amount. That way none*

*of us is like lesser than the others, so we're all egging each other on and by the time, by the time we get to that stage we're being sick on the floor of hostels.'*

Participant 3 (MDQ+; UPPS-P total score 217), describing binge drinking

Although this individual was not asking for the opinions of his peers directly, he was able to ascertain their feelings indirectly, through their own actions. His behaviour was then guided by this information.

The third aspect of the environment that participants saw as being relevant to occurrences of their impulsive behaviour was more tangible: 'Physical Triggers' in the immediate environment. The sub-theme consists of participant's references to physical objects as being key triggers in their impulsive actions. Physical triggers appeared to be an important part of a wide range of impulsive behaviours, with participants referring to physical triggers in the context of overspending, binge drinking, binge eating, self harm and suicide attempts. Participant 6, talking about an occasion of unplanned excess drinking, described how her intentions to stop drinking dissipated when she was offered another drink:

*'I do remember being like "I'm not gonna drink any more."  
And then sitting down and talking to someone, and then  
somebody else came over who'd already bought drinks and  
I was like "It's rude not to!"'*

Participant 6 (MDQ+; UPPS-P total score 191), describing binge drinking

Here the physical trigger of the alcoholic drink was a key factor in changing the participant's mind, and encouraging her to continue drinking. Similarly, the availability of tools to engage in the behaviour is an important factor. Participant 3, describing his experiences of over-spending, explained how access to money was an important predictor of his engagement in this behaviour:

*'And you think "Oh, if there's left over, I just won't spend it,  
will I. I'll just keep it in my wallet and spend it next time."  
But if there's money you just buy more... It's just like "Oh!  
I've still got some more left – I'll go get more drinks!"'*

Participant 3 (MDQsub; UPPS-P total score 217), describing over-spending

For this individual, when physical access to money was restricted (e.g. by lack of availability of cash machines), his desire or need to engage in the behaviour was also lessened. For him, the physical cues brought about by possessing cash triggered the occasions of overspending.

Several participants followed this strategy through into their own actions, restricting the availability of physical triggers as a tool to manage unwanted impulsive behaviour. Participant 15 used this technique to manage his tendency to overeat, saying:

*'I don't buy biscuits or crisps when we do the big shop, cause I just eat them.'*

Participant 15 (MDQ-; UPPS-P total score 113), describing a binge eating

While taking action to restrict behaviour can be effective in this way, other individuals described these processes as ineffective, as other items then act as triggers. Participant 2 had got rid the tools she commonly used to self-harm, but was prompted to begin self-harming by the presence of a cigarette lighter.

*'Before I'd moved I'd thrown out the tools that I'd had, um, to try and remove temptation, but then seeing the lighter there and sort of, so it, the lighter being there did have an effect.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self-harm

This sub-theme is therefore important in demonstrating how the physical environment interacts with the feelings and cognitions of the individual to result in impulsive behaviour.

A final important environmental aspect was the presence of major life events. Events occurring in the individual's life impacted their feelings and decision-making processes in such a way that particular impulsive behaviours were made more likely. The majority of behaviours discussed, including both high- and low-risk behaviours, were described as being firmly linked to events occurring in the individual's life at that time. Some participants directly linked external events to their behaviours, such as Participant 10:

*'Attempting suicide... That was a complete reaction to a situation that I'd consciously got myself into but it turned out to be something else.'*

Participant 10 (MDQ-; UPPS-P total score 108), describing a suicide attempt

The situation the participant is referring to here (an unplanned pregnancy in the context of an abusive relationship, which resulted in moving cities and jobs) was deeply unsettling, and caused her to feel as though she could not cope. Her behaviour came, in her eyes, as a reflexive action to the situation she found herself in.

For many individuals it was the emotional impact of life events that was related to impulsive behaviour, as is described by Participant 2:

*'The last time I ever self harmed was when like I'd sort of tried to stop but I just got in a really scary situation and completely freaked out about it afterwards and then ending up hurting myself, um, just because I was, I felt really stupid for letting myself sort of get in that situation and I was just really upset and scared.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self-harming

In these cases, life events cause a strong emotional reaction in the individual, which then led to the impulsive behaviour. The role of affective state in impulsive behaviour will be discussed in more detail in **Section**

#### **7.2.4.3: Intense Emotional State.**

While some of the behaviours (and resulting emotional states) were linked to single life events, others were described in relation to a series of difficult experiences. A build up of these experiences increased the likelihood of highly risky impulsive behaviour. Participant 5's impulsive decision to attempt suicide came after an extremely difficult period in her life, as she describes below:

*'The people I was with weren't really the kind of people that I should have been with. They were all very much drinkers, smokers, drug takers. Which I think kind of wasn't probably quite putting me in the best place. Um, on top of*

*that home issues, like my mum and step-dad arguing, threatening divorce. Erm, my brother had just been diagnosed with his disease... A couple of days before I tried it, um, school, after school, um we went swimming and I was threatened with a knife... But that just kinda gave me that one more little push into thinking actually no one bloody wants me here, there's not really a point in being her, a point in carrying on.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing a suicide attempt

In this example, the traumatic life event of being threatened came after a series of difficult and emotional life experiences. It functioned not as the only trigger of an impulsive decision, but instead as '*one more little push*', a final trigger after a build up of difficult incidents. Clearly the events in an individual's life, over which they have little or no control, can enhance the likelihood of impulsive behaviour.

#### **7.4.2.3      Intense Emotional State**

The theme 'Intense Emotional State' emerged from participants' references to the experience of intense affect, particularly negative affect, which is described as having an impact on both the decision to engage in behaviour and the behaviour itself. Numerous participants, at all levels of MDQ

scoring, made direct reference to being more likely to behave impulsively when experiencing strong mood:

*'I'm more likely to do stuff when I am feeling down, or a bit anxious. I mean, when I feel really down I'm very likely to just, I mean I've got my car up here with me and I'm really like to just go for a drive and just be completely bombing it down the main road.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing impulsive behaviour in general

*'Generally when I'm in a bad mood I find all sorts harder to control.'*

Participant 15 (MDQ-; UPPS-P total score 113), describing impulsive behaviour in general

As above, participants' descriptions of impulsive behaviour causally related their affective state to their actions. This is also seen in the quote below, from Participant 12, whose behaviour was described as occurring as a result of her upset following an argument with her parents:

*'I was so upset that I, I think it's in the middle of the night that I, I cut my hair... with my old scissors.'*

Participant 12 (MDQ-; UPPS-P total score 134), describing drastic appearance change



The majority of participants described these changes in impulsivity as being linked to experiences of negative mood (though there was some discussion of sensation seeking, see **Section 7.4.2.7**). When asked whether intense positive mood also precipitated impulsive behaviour, participants tended to report that negative mood was instead the key trigger. One example is Participant 11:

*'I: What about any positive moods? [preceding binge eating]*

*P11: Um now that you mention it, no. No, I don't think so. I tend to be able to be a little bit more in control then.'*

Participant 11 (MDQ-; UPPS-P total score 112), describing binge eating

As well as triggering impulsive action, mood was described as continuing to influence behaviour once it commences. The quote below, from Participant 7, shows how changes in affective state - in this case emerging feelings of anger and frustration – during the behaviour caused it to progress:

*'So I think once I've started I get frustrated that I've done it and then a lot of the time it spirals from that. Cause I did one on my right arm, I did something to my right arm, I can't remember what it was, erm, and I knew that then I couldn't [go to work], and so it got worse because I was frustrated at, that I'd done it.'*

Participant 7 (MDQ+; UPPS-P total score 129), describing self-harming

Some participants described how their affective state changed their cognitions. These descriptions formed the sub-theme 'Altered State of Consciousness'. Participant 10, talking about her own experiences as well as those she had observed in others, described this changed way of thinking as follows:

*'There's a logic that I, that I saw when I was working in the hospital as well, that, that's all logical. It's all completely sort of thought through um. It's just, it's a twisted logic. You know it's a logic that's responding to emotional pressure. And, well in my case it was um emotional pressure, or emotional kind of um, the emotional temperature was very very high.'*

Participant 10 (MDQ-; UPPS-P total score 108), describing a suicide attempt

Participant 10 here implies that when an emotional state reaches a certain level of intensity, one's thinking is drastically altered, such that decision making processes function in a fundamentally different manner. Other participants echoed this sentiment, describing how their own thinking changed during periods of intense affect. Participant 2 talked about reaching an emotional threshold, which - once passed – causes her to think and consequently behave in an altered manner. When her emotional state returns to equilibrium, she views her actions with regret:

*'I think there's definitely, I dunno, it's like a different sort of consciousness... Cause I mean I guess when things get really bad I get to this horrible stage, like I get, you know, I really do try and get support and stuff, but I'll reach some point where I'll just be like "No, just go away. Leave me alone, I don't want to have anything to do with you." Even though, obviously, looking back, I know that I shouldn't have done.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing a suicide attempt

For some participants, this altered state is so different as to feel like an entirely separate person. Participant 5 referred at several points throughout the interview to her changed thinking at times of distress. One example is as follows:

*'I was looking at it all in a very distorted way... It does just feel now like it was actually a completely different person that it happened to and, oh, just that my head obviously wasn't it in the right place at that time. I was just completely on another planet.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing a suicide attempt

For a distinct sub-group of participants, changes in cognitive state extended to such a degree that they felt that they lost consciousness during the behaviour. This '*dream state*' meant that participants were not aware of their impulsive behaviour until after the event. Often this return to a usual cognitive state is brought about by the completion of a set or routine behaviour (such as self harm or binge eating), and in this way is reminiscent of a compelled or compulsive behaviour. However, as there is no conscious decision to engage in the behaviour, it warrants consideration as an impulsive action. Participant 7's description of this experience in the context of self-harm is as follows:

*'I think I do zone out. Um, like I lost passage of time on Monday night that I didn't realise what had happened until I was like "Yep, my arm really hurts now!" And then I was like "Yep, I'm back."'*

Participant 7 (MDQ+; UPPS-P total score 129), describing self-harming

Participant 4, who experienced periods of loss of consciousness during binge eating, gave a similar description.

*'I wouldn't plan it, it'd just happen and like I was in a daze and I'd kinda come round part way through and think "What on earth are you doing?" and, and afterwards just kind of be, wondered why, what it had just happened and how to deal with it now.'*

Participant 4 (MDQ+; UPPS-P total score 181), describing binge eating

In both these examples the individuals are not aware of deciding to engage in, or engaging in the behaviour. During this time they lose their conscious intentions to act, with their awareness only returning once the behaviour has been embarked upon.

The sub-theme 'Extreme Internal Focus' consists of participants' experiences of their emotional state occupying their focus, and drawing it inward. While absorbed by their internal emotional experience, individuals lost some awareness of external factors, such as time, location and others, which may be relevant to their decision to engage in the behaviour. Participant 13, for example, found herself more likely to act impulsively when experiencing affect, as she entered her '*bubble*':

*'You start going into your own bubble and stop reading other people.'*

Participant 13 (MDQ-; UPPS-P total score 129), describing impulsive behaviour in general

A further example comes from Participant 5, who described being absorbed with her own internal and emotional experience to the extent that she neglects to take into account the experiences of others:

*'I didn't think of anyone else. I was just completely inside of my own head, completely focused on myself.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing a suicide attempt

Individuals' emotional experiences can therefore be seen to impact upon their ability to access the wide range of information and resources required to make measured decisions.

A third sub-theme within Intense Emotional State, 'High Arousal/Cognitive Load' is concerned with the cognitive burden placed upon the individual by the experience of intense affect. This restricts their ability to think freely, and therefore increases the likelihood of impulsive behaviour, or at the very least, behaviour that is not well considered. This is evocatively described by Participant 2:

*'When I get so upset it's sort of like I can't think very clearly, um, sort of, so like even though like I tried to rationalise everything out, that, well obviously the logical thing to think would have been "Well, it's ok, you're out of that situation now, you're safe and, well, you're not gonna do it again" but I couldn't, you know, I didn't think like that, um. Cause yeah it is just, I dunno, it's almost like everything in my head's really loud when I'm upset and anxious.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self harming

Participant 2's description of her thinking during periods of extreme mood demonstrates the pressure high levels of affect can place on individuals. Once again, this limits their ability to appropriately consider actions and leads them towards behaviours that are less considered.

While emotional state was shown through the interviews to impact individuals' consciousness, and through this to impact behaviour, it had an important alternative function as a promoter of behaviour. As is represented by the sub-theme 'Moderating Affective State', individuals were motivated to engage in behaviours as a tool to moderate affective state (either increasing positive or decreasing negative affect). Many participants, including both MDQ- and MDQ+ individuals, referred to their impulsive behaviours as a way to 'release' negative emotions:

*'During that period I, you know, I used to binge drink more... And it was just a kind of release, like "Rah. All of that's gone for now."'*

Participant 15 (MDQ-; UPPS-P total score 113), describing binge drinking

*'It would then give me a release from the stress that I was experiencing.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing self harming

*'It feels so, it felt great. Uh I, a sense of release.'*

Participant 12 (MDQ-; UPPS-P total score 134), describing drastic appearance change

For these participants, the wide variety of behaviours described were useful in moderating their affect and alleviating negative emotions. Participants did differ in terms of the affective state that replaced the 'released' emotion. For some, the behaviours were pleasurable, and using them meant that the individual had a short-term experience of enjoyment:

*'It's kind of just like trying to counter it with a comfortable feeling of pleasure, pleasure had before. It tends to work for a short while.'*

Participant 11 (MDQ-; UPPS-P total score 112), describing binge eating

However, for other individuals, the moderation of negative emotion simply results in the absence of this negative affect. Participants referred to this as



a calm or numb state, preferable to the experience of the negative affect it replaced but not as being overtly enjoyable.

*'Cause it takes me from feeling really low and anxious and all those kind of negative feelings, it takes me from that to just calm and serene.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing self harming

In these scenarios, the behaviour is termed a '*coping mechanism*' (Participants 2, 4, 5 13 and 14). Generally, these behaviours (frequently self harm, but including other behaviours) are seen by participants as positive tool to deal with difficult emotional experiences.

A further benefit is seen when the impact of affective experience on cognition is considered. In managing or releasing the affective state, individuals are able to regain their everyday capacity to reason, and they are returned to their pre-existing cognitive state. As is shown by the quote below from Participant 7, once her episode of self-harm was completed she was able to better comprehend the implications of her actions and take steps towards her safety:

*'I think maybe there's a little bit of "Ok, so I've got to this point, now I need to step back, look at what I've done, maybe try and see the positives of what I have done and go*

*back.” But a lot of it is, a lot of it is just like “Yes, now what have I got to do? I’ve now got to find bandages, I’ve now got to clean up, now got to tell someone about it, I’ve now got to sort it out.” ’*

Participant 7 (MDQ-; UPPS-P total score 134), describing self harm

The sub-theme ‘Moderating Affective State’ demonstrates the functional role impulsive behaviours may have for individuals. While behaviours may have high associated risks, or a negative impact in the longer-term, individuals are able to see the behaviour as a positive tool to cope with experiences of extreme mood.

#### **7.4.2.4 Agency (Lack of)**

The theme ‘(lack of) Agency’ is concerned with the individuals’ sense of self as an independent agent free to and capable of making and enacting choices. During the interviews evidence emerged of this sense of self being compromised, with the participants describing feeling as though they have no choice or control in the behaviour. To some extent, behaviour occurs against their will.

In a select number of participants (n = 5; all of whom were scored either MDQ+ or MDQsub) there appeared a common experience of intrusive thoughts in the lead up to impulsive behaviour. This experience is

represented by the sub-theme 'Intrusive Thoughts'. The thoughts appear unbidden by the individual, who does not feel able to control or stop them. Participant 8 describes this experience as follows:

*'I'd gone in for mass and not been able to calm down and usually it was my way of kind of ending the day and saying "Right, I'm going to switch off now, focus in mass." And I couldn't, I could not clear my head. All I could think about was harming myself or killing myself or something.'*

Participant 8 (MDQsub; UPPS-P total score 150), describing a suicide attempt

In this extract we can see how distressing an experience the intrusive thoughts can be for individuals, and the way in which they may promote high-risk behaviour. This is mirrored in the experience of Participant 2, whose behaviour occurred when she felt no longer able to resist the relentless intrusive thoughts she had in relation to attempting suicide.

*'I would get thoughts in my head that would get, would go round and round and round, about doing ridiculous things until that like I'd sort of give in.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing a suicide attempt

For both the individuals quoted, as well as the other participants who were coded under this subtheme, the experience of intrusive thoughts regarding

behaviours increased the chance of these behaviours occurring. If or when the behaviour did occur, it did not feel to the individual as though it had been an active decision on their part. Instead they felt as though they had ‘give[n] in’ to a relentless thought that was too difficult to resist. As such, their sense of agency was compromised by the experience of intrusive thoughts regarding the behaviour.

The second sub-theme within (lack of) Agency is entitled ‘Sense of Self’. This sub-theme consists of references to the individuals’ loss of a sense of themselves as a discrete entity with individual intentions, experiences and emotions. Data coded as this sub-theme are concerned with individuals’ descriptions of their own sense of identity, and the ways in which this is relevant to their impulsive behaviour. Participant 15, talking about historical incidences of binge drinking and risky sex, described how his confusion regarding his identity had impacted upon this behaviour:

*‘I mean definitely when I went to uni and meeting people,  
er I, you know, cause I think at u-, ah, I mean you know,  
you’re still forming your sense of identity and personality  
you know, arguably, even after eighteen aren’t you?’*

Participant 15 (MDQ-; UPPS-P total score 113), describing binge drinking/ risky sex

The individual presented a view that this lack of clarity about his identity had enabled or caused him to behave in a way that was more impulsive than

he feels he now currently acts. Being unaware of the boundaries of one's personality therefore allows one to behave in ways that are potentially risky.

A complementary perspective was given by Participant 10, who described her impulsive behaviour arising as a mechanism to test out her own identity and discover more about herself:

*'It's maybe testing the boundaries of, of my personality...  
And so I, I'm wondering, I wonder whether you know, am I  
that real, am I really that person? Or am I somebody  
completely different?... I think um it's almost as if I consider  
myself to be somebody else.'*

Participant 10 (MDQ-; UPPS-P total score 108), describing impulsive behaviour in general

While these descriptions propose differing motivations for behaviour, they both indicate that impulsive behaviour can arise when the individual does not see himself or herself as a discrete individual. Without recognition of the boundaries of one's personality, it becomes difficult to control behaviour.

It is interesting at this point to refer back to the descriptions contained within the sub-theme 'Altered State of Consciousness' (seen within **Section 7.4.2.3**) The descriptions of a loss of awareness in the lead up to and during behaviour are also relevant to a discussion of the relationship between impulsivity and agency/identity, as during periods where the individual is

not consciously aware they appear to be losing also a sense of her-/himself. This is seen in the data from Participant 7:

*'I think I could probably quite easily slip into doing something more serious because I'm not aware of what I'm doing.'*

Participant 7 (MDQ+; UPPS-P total score 129), describing self harming

Here we can see that the individual's loss of awareness, and resulting loss of identity, is manifested in an inability to control behaviour.

(Lack of) Volition contains references from individuals describing a perceived inability to act of their own volition. The codes within this sub-theme include references to engaging in behaviour that the participants see as contrary to their own wishes. For example, Participant 15 described an occasion of over-eating during which he felt he did not want to continue, but was unable to stop:

*'Then ate half the chocolate bar and tried to control myself but just ate the rest of it, over the course of the afternoon. Like not wanting to really.'*

Participant 15 (MDQ-; UPPS-P total score 113), describing over-eating

This behaviour was something that the individual did not really want to engage in, but he found himself unable to exert the control to prevent the behaviour going ahead. A similar example comes from Participant 12, in the context of using the Internet when she feels she should be working:

*'I feel really bad. But I just can't help it.'*

Participant 12 (MDQ-; UPPS-P total score 134), describing over-use of the Internet

Again, behaviour is enacted that is to some degree against the individual's wishes. The individual here directly refers to feeling unable to prevent the behaviour taking place. In talking about these occasions of engaging in unwanted behaviour, some participants remarked that an unsuccessful attempt at resistance indicated that they and their behaviour were *'out of control'*:

*'I guess it just felt very sort of out of control, that maybe I didn't have, you know maybe I wasn't capable of not self harming. [pause] So yeah, cause well, well yeah I guess in those circumstances you know, I knew I could have lost an awful lot and if I still self harmed then that sort of is a loss of control then isn't it?'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self-harming

For these individuals, an inability to exert their will over their behaviour imbued the behaviour with a sense of being uncontrolled and uncontrollable.

There was reference by some individuals - all of whom were categorised as MDQ+ - of their own volition being subsumed within the will of an external force. For these individuals their own desires regarding acting (or deciding not to act) were rendered irrelevant by the presence of a stronger will to act. Participant 4 described this experience as follows:

*'It's like someone else takes over and I just have to go along with it... There's no point in thinking about it because it feels like I have no control over what's happening.'*

Participant 4 (MDQ+; UPPS-P total score 181), describing binge eating

Here we see the extent to which an individual can lose feelings of agency, and the impact this has on behaviour. Individuals described how being unable to control the behaviour made planning for future occurrences difficult, as they could not predict when their own will might dissipate and the 'external force' take over.

Given the potential for a loss of control, it is perhaps unsurprising that many individuals reported adapting their behaviour to avoid such situations arising. When one anticipates not being able to control one's own



behaviour, it follows that in order to prevent it, one should rule out the behaviour completely. Participant 11 endorsed this view, saying:

*'I think it's just yeah fear of not being able to control it. I get quite addicted to things. But, so I just keep away from anything addictive.'*

Participant 11 (MDQ-; UPPS-P total score 112), describing impulsive behaviour in general

Participant 10 proposed a similar technique:

*'Fire setting, I can understand why people do it um there's a whole kind of thing that I think if I, if I wasn't more self controlled, yes, I'd quite like sometimes to just get rid of everything... So I tend not to expose myself to the temptation.'*

Participant 10 (MDQ-; UPPS-P total score 108), describing potential fire-setting

For Participants 10 and 11, along with others, the best way to avoid losing agency is to deprive oneself of the opportunity for this to happen.

The final sub-theme within '(lack of) Agency' is absence of choice. According to this sub-theme, impulsive-type behaviours arise when individuals feel as though there are no alternative options or choices. There is no room for the

individual to act according to their own desires, as choice is removed from them. Participant 2 describes this in relation to her suicide attempt:

*'It felt like the only way out sort of thing. Like I didn't feel like things could get better.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing a suicide attempt

For Participant 2, attempting suicide was the only option available. This sense of lack of choice was seen across behaviours, including overspending:

*'It's like, it just has to be done, I don't know why, it just, I just do it.'*

Participant 3 (MDQsub; UPPS-P total score 217), describing overspending

Participant 3's assertion that the behaviour *'has to be done'*, against his own understanding, and wider needs (he went on to describe the financial implications of his behaviours), indicates the degree to which the behaviours become a singular option. This is a novel perspective on impulsive behaviour, which is frequently viewed as the product of inappropriate decision making on the part of the individual. In taking the perspective of an individual, we can see that impulsive behaviour may arise not purely from truncated decision making processes, but also potentially from a feeling that there is, in fact, no decision to be made.

#### 7.4.2.5 *Premonitory Urge*

‘Premonitory Urge’ emerged as a theme from participants’ descriptions of a compulsive element to their impulsive behaviours. This compulsive element was indicated by individuals’ descriptions of feeling driven to act. Individuals attempted to counter this powerful urge by way of resistance or distraction, but such attempts were frequently unsuccessful.

The first sub-theme within Premonitory Urge is ‘Intense Drive to Complete Act’. This sub-theme contains references to feeling propelled toward impulsive action. These feelings appear to build up over a period of time, with individuals becoming increasingly aware that an impulsive behaviour is likely to occur. It is interesting to note that 39 of the 47 references coded under this sub-theme came from MDQsub or MDQ+ participants.

*‘I will have thought about it kind of two, three days gone, this week... Yeah it will be generally you’re just kind of aware of the build up. And then, “Yes, we’ll commit to this.” ’*

Participant 13 (MDQ-; UPPS-P total score 129), describing overspending

*‘If I’ve just had one of those days where everything’s gone wrong ...that’s when it then tends like to build up and build*

*up and build up, it's kind of it, it layers itself and that's when it gets worse.'*

Participant 5 (MDQ+; UPPS-P total score 106), describing self-ham

This premonitory period does not function as a period of planning. The urge to engage in the behaviour does not take place on a cognitive level, but instead seems to be felt in a similar manner as the build up towards an itch. As our awareness of the itch builds, so does our need to scratch until, eventually, we succumb to the urge and act upon the itch. Participants in this study frequently made reference to this *'build up'* of an impulsive (or arguably compulsive) sensation preceding their impulsive behaviour. For participants such as Participant 13, quoted above, this increasing awareness triggers an action that the individual experiences as pleasurable. For other participants, the sense of being drawn towards an inevitable behaviour was a deeply unsettling and unpleasant experience:

*'I just kept feeling that lots of things were happening and there was like a cog and it kept clicking one step further to I couldn't go back, like something would happen... Because that's been what it's all been, it's been about. This impending sense of sort of "It's going to happen at some point, it's just which point I flip."'*

Participant 8 (MDQsub; UPPS-P total score 150), describing a suicide attempt

In the above quote we see Participant 8's discomfort with her premonition about the behaviour. Once more, as was seen in the theme '(lack of) Agency', the future occurrence of the behaviour is undeniable; *'It's going to happen at some point.'* Participant 4 gives a strikingly similar account when describing binge eating:

*'It feels like it's something I've gotta do. It's like coursework. [pause] That's not a good example. It's like something you've gotta do, and you just want to get it over and done with so you've not got to worry about it any more. So, soon as its there you want it to go and the only way to make it go is to follow it through and get it out of the way... So I don't want any of it to happen, but it's just like, I can't stop it.'*

Participant 4 (MDQ+; UPPS-P total score 181), describing binge-eating

We again see an awareness of the inevitability of the behaviour, which is coupled with a strong desire to act. For Participant 4 the premonitory experience is so unpleasant she feels forced into action, removing the feeling of foreboding as soon as is possible.

The second sub-theme – 'distracting and resisting' – follows on from this thought. When the behaviour individuals feel propelled toward is predicted as being unpleasant or against their wishes, steps are taken to prevent its

occurrence. Some related techniques have already been mentioned within this chapter, such as avoiding ever engaging in the behaviour, thoroughly considering consequences or removing situational/environmental triggers. Other individuals mentioned a kind of internal debate regarding the behaviour, as is described by Participant 10. In this quote, Participant 10 is relaying the techniques she has put in place to mitigate her frequent experience of suicidal urges.

*'Um so I go along and it's a sort of, it's a kind of inner negotiation I have... I guess if I'm feeling really low, I think myself out of it.'*

Participant 10 (MDQ- UPPS-P total score 108), describing coping with suicidal ideation

Other participants, including Participant 11 - who described an active struggle to overcome his desire to engage in over-eating – also experienced this effortful internal dialogue:

*'And then trying to overcome the desire to experience it... Cause if I'm there for a while it gives um my mind time to overcome the initial desire and start thinking about it... Yeah, a sensible part of my brain is telling the uh impulse part to put it back!'*

Participant 11 (MDQ-; UPPS-P total score 112), describing over-eating

Other individuals turned to external factors to support their internal struggle. Participant 8 reported striking bargains with friends and constructing complex flow charts as attempts to help her resist her strong suicidal urges:

*'I'd spent most of last year suicidal and I'd sort of built up a list of "Before I try and kill myself I must do all the following:" which was, had become quite a good way of stalling it because I kept promising people I wasn't going to etcetera... So I got into the habit of setting myself targets, which meant I couldn't do anything rash'*

Participant 8 (MDQsub; UPPS-P total score 150), describing a suicide attempt

For many individuals preventative steps also took the form of defined 'distraction behaviours'. Distraction behaviours are used as a tool to prevent the behaviour at times when the premonitory urge is felt. In line with the themes already discussed they are often mechanisms to cope with excess levels of negative affect, or to remove oneself from the triggering or isolating environment, though the exact behaviours differ from individual to individual. A comparison of some of the distraction behaviours cited by participants can be seen below:

*'Listening to music, um singing, um just doing something I enjoy or I've recently found that walking seems to help when it didn't used to.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing self-harming

*'So you know I distract myself. I, I get involved in all sorts of uh stuff. Um you know, I do love doing art.'*

Participant 10 (MDQ- UPPS-P total score 108), describing coping with suicidal ideation

*'We didn't have TV, we didn't have the internet, didn't have anything to sort of distract me, which is probably what made it worse.'*

Participant 2 (MDQ+; UPPS-P total score 177), describing self-harming

*'I came home and tried to calm myself down. Went out for a walk and tried to calm myself down, got home, tried to do some patchwork quilting, cause I thought that might calm me down.'*

Participant 7 (MDQ+; UPPS-P total score 129), describing self-harming

*'Yeah, nine times out of ten I am and I can stop myself by doing something like going out for a walk, or I mean I used to go to the gym loads.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing self-harming



These quotes all indicate the usefulness of distracting behaviours as a tool to prevent unwanted behaviour (commonly self-harm).

For all individuals, resisting urges to engage in impulsive behaviour is described as a struggle. Challenging urges was seen as an effortful process, which requires a level of focus and energy that is difficult to maintain.

Participant 8 put it as follows:

*'I think it was the day after I'd had the appointment that um I took the overdose last summer, because it was like I'd run out of energy for battling that impulse... It was exhausting me trying to keep on top of it.'*

Participant 8 (MDQsub; UPPS-P total score 150), describing a suicide attempt

Participant 14 described her attempts to resist strong urges to engage in self-harm as a *'fight'*:

*'I still feel like that sometimes. And there had to be quite a fight with myself to, to either do it or not do it.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing self-harming

It is also relevant to re-iterate, as has been explored above, that for some individuals the urge to engage in behaviour is so strong that the behaviour

feels entirely resistant to any attempts to prevent it. Participant 4 vividly described feeling this way, summarising with:

*'I don't think I can put it off.'*

Participant 4 (MDQ+; UPPS-P total score 181), describing binge-eating

The theme of 'Premonitory urge' therefore summarises the strength of powerful urge that individuals' feel is pushing them toward engaging in a behaviour. While attempts may be made at resistance, frequently through the use of distraction techniques, the force of these urges is often too great and the individual feels unable to resist.

#### **7.4.2.6      *Reflexive Action***

While reference was made within **Section 7.4.2.1** of the potential for impulsive behaviours to occur with some level of preparation and consideration, the theme 'Reflexive Action' also emerged from the data. This theme came about through descriptions of sudden and instantaneous decisions to engage in behaviour, which were followed very quickly by the occasion of behaviour. This can be summarised with the following quote from Participant 12:

*'I think "I'm gonna do something. I'm gonna cut my hair."*

*And then I went upstairs and cut it... It just popped into my head and then um I cut it right away.'*

Participant 12 (MDQ-; UPPS-P total score 134), describing drastic appearance change

In this quote we see how a sudden decision to engage in behaviour can be very quickly followed by enacting the behaviour. The three sub-themes contained within this theme explore the aspects of this process in more detail.

The first sub-theme is 'Impulsive thought', which contains references to making sudden decisions with little or no pre-planning. Participant 5 described this experience in the lead up to her suicide attempt:

*'It was just an idea that came to me, just like that. And it just kinda made sense. It just, ah, I don't know how to put it into words. It was like it wasn't there at all to start with, I was just feeling really crap, and then, it just came to me: "Actually that's a really good idea." '*

Participant 5 (MDQsub; UPPS-P total score 106), describing a suicide attempt

For Participant 5, and the other participants coded under this theme, there was no level of planning for or consideration of the behaviour before the sudden idea pops up. This idea is accepted and is often acted upon directly.

For Participant 3, reflexive decisions are triggered by the opportunity to engage in stimulating experiences. It is only after the behaviour has taken place that the behaviour is considered, and it is at this point that regret may set in:

*‘It’s just like “Yeah, that sounds like fun” and then spend however much that requires and then sort of think about that later and be like “Yeah, maybe I shouldn’t have done that.” ’*

Participant 3 (MDQsub; UPPS-P total score 217), describing over-spending

In relation to this comes the second sub-theme, ‘Consideration of alternatives or risk’. It stands to reason that when decisions come about quickly, and are followed immediately by action, there is little time for consideration of the potential consequences and risks or behaviour, or alternative routes of action. For Participant 11, whose over-spending was focused primarily upon food, the inability to consider alternatives (due to time constraints) leads to difficulty in controlling the behaviour:

*'When there's no queue and you don't really know what you want it is like "I could order this, or I could order that." If you're in a queue you have time to think about which one you want to go to, but I just kind of, instinct decision: get both!'*

Participant 11 (MDQ-; UPPS-P total score 112), describing over-spending

In other situations participants described a state of being consciously aware that there may be risks, but only evaluating these risks after the event. For Participants 3 and 6, who both engaged in physically dangerous activities and binge drinking without planning, the risks were only relevant after the event:

*'I don't tend to think about risks, I just do it... Don't think there's much point thinking about things, like if it's, if you're fine you're fine um. I don't know, I think like it's only, I only think about things if things go wrong.'*

Participant 6 (MDQ+; UPPS-P total score 191), describing physical risk taking

*'There's no real thought about it again, it's just "Are you going out tonight?" "Yes, yes I am." And that was it. There was no really like thought of "I'm going to damage myself." Yeah, I don't, it's the same thing with money really, it just happens, just deal with it later if it's bad.'*

Participant 3 (MDQsub; UPPS-P total score 217), describing binge drinking

Here we can see that consequences or risks are not considered relevant in advance of action, instead they are considered only if the outcomes are negative. The propulsion towards action prompted by an impulsive decision leaves no time or desire to weigh up the potentially negative outcomes. Risk is only considered retrospectively.

The final sub-theme within 'Reflexive Action' relates to a specific sub-set of behaviours. These 'Reinforced or Habitual Behaviours' were those that were done regularly and in a similar manner. Over time these behaviours took on a habitual element, meaning they could be done quickly and reflexively. They can therefore be considered to have an impulsive element, inasmuch as they are enacted with little forethought or pre-planning. Participant 7 talked about her over-use of the Internet in terms of a habitual behaviour, which is not consciously planned:

*'Part of it's become like a habit, that I'll just get turn-, um, wake up and turn the internet on and then like MSN will*

*log me in automatically, so then I can check my emails straight away. Erm, but like other things I'll be like "Ooh, could just go and check this out, could just go and do this, could just go and do this. [laughs] Oh look, it's twelve o'clock already!"'*

Participant 7 (MDQ+; UPPS-P total score 129), describing over-use of the internet

Here we can see how impulsive behaviours can develop into habitual patterns, whereby the behaviour can continue to progress in a similar fashion without much conscious thought. Participant 5 describes the absence of thought required for these regularly occurring behaviours:

*'I really don't think about it when I do it. It just, it just happens. I don't think about it at all in any way, about what I'm doing, how I'm doing it. I mean I probably did to start with.'*

Participant 5 (MDQsub; UPPS-P total score 106), describing self harm

The behaviours seen as part of this sub-theme often occur as a result of a defined trigger. This may be an external trigger, such as being part of the morning routine (as is described by Participant 7 above), or an internal emotional state in which the behaviour is regularly performed. Participant 14 described her self-harming as a routine behaviour, triggered by

experiences of acute stress (see **Section 7.4.2.3** for further discussion of the role of emotional states in impulsive behaviours):

*'I think it's more developed into a habit. Um that, it's gone on for so long that it's very hard to fully break. Um cause it's, it's nowhere near as bad now as it used to be um but I still experience similar stress levels.'*

Participant 14 (MDQ+; UPPS-P total score 131), describing self-harming

The behaviour is reinforced by its effectiveness in coping with certain emotional states, and from this develops into a habitual behaviour, triggered to occur reflexively by the emotional experience it seeks to control. As is shown by Participant 14's description above, this does mean that the behaviour – like a simple conditioned response - becomes difficult to control when the trigger (or 'stimulus') is present.

#### **7.4.2.7      *Sensation Seeking***

The final theme is 'Sensation Seeking', which contains descriptions of behaviours for which the motivation was a high level of anticipated sensation and/or thrill. It therefore includes those behaviours which participants engaged in impulsively and which they described as being highly enjoyable or positive. For this, these behaviours have been tentatively separated from behaviours described in **Section 7.4.2.3**, which focused



more upon experiences of negative affect prompting behaviour. For this theme the motivation to engage in behaviour was not related to current mood experience (i.e. negative mood) but instead to anticipated gains in positive affect, i.e. exclusively positive sensation was sought.

The first sub-theme for this theme is 'Anticipation of sensation'. The sub-theme relates to participants' descriptions of anticipating positive outcomes for their behaviour. Participant 6 impulsively booked flights to Thailand, with her initial response as follows:

*'I was well happy and like "Woo hoo!" Like, yeah, it was really exciting... I thought it was just generally going to be amazing.'*

Participant 6 (MDQ+; UPPS-P total score 191), describing over-spending

This quote demonstrates that an awareness of potentially positive outcomes of behaviour may enhance the chances of these behaviours being engaged in. For some participants it was the positive experience of acting impulsively that acted as the primary trigger for behaviour. One example of this is Participant 3's binge drinking. He explained that he drank in this manner because of how positive he experienced it to be, and as soon as he no longer found the behaviour enjoyable he would stop:

*'It's definitely for fun... I don't think there'll ever be a point at which I think, or maybe if it gets boring, I mean if it starts to become like "Oh look, I'm doing this again." If it gets stagnant I suppose I'll just get bored and stop.'*

Participant 3 (MDQsub; UPPS-P total score 217), describing binge drinking

This reinforces the sense that anticipated positive affect can be a key promoter of impulsive behaviour.

It is interesting to observe the ways in which anticipated positive outcomes might obstruct an understanding of other elements pertinent to the decision making process. This idea makes up the second sub-theme of 'Singular focus', which arose from participants' descriptions of neglecting to consider other aspects of the situation or outcomes when positive affect was sought. Participant 15 gives an example of this in his description of engaging in risky sex:

*'I suppose when I went into the girls' loos I wasn't thinking about what would you know, I was just very excited. And I would, I would probably have walked over broken glass etcetera and all that sort of stuff to, to go with her.'*

Participant 15 (MDQ-; UPPS-P total score 113), describing engaging in risky sex

For Participant 15, the anticipation of the positive experience of having sex was so overwhelming that the possible negative outcomes of having sex in a public place were not considered. They were, to the participant, less important than the pursuit of the positive experience. Another participant spoke of her growing realisation of the other factors involved in her decision once the behaviour had been done:

*'I was proper on top of the world for like quite a little, like a week or two about it, kind of like, but um yeah, a bit later I was a little bit daunted by how much I really hadn't thought, and how much there was to do and think about.'*

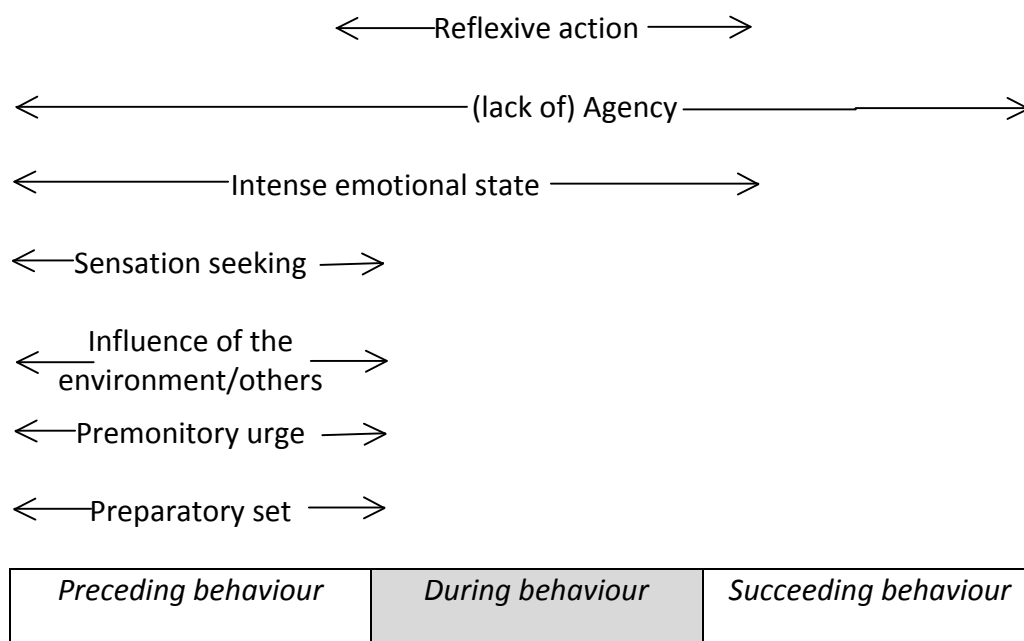
Participant 6 (MDQ+; UPPS-P total score 191), describing over-spending

This participant had not anticipated the extra aspects involved in her behaviour, and was surprised and disappointed when they arose. For a period of time her interest was focused more closely upon the positive experience of the behaviour. In summary, this sub-theme, and the theme in general, demonstrate the potential importance of positive anticipated outcomes as a promoter of impulsive behaviour.

#### **7.4.2.8      Summary**

The themes described throughout this section demonstrate the complexity of impulsive behaviour, with both internal and external triggers identified.

The locus of these triggers and their temporal relationship with impulsive behaviour was a key aim of the study. To aid the understanding of these aspects of the data, the themes are summarised in temporal order within **Figure Twenty-Eight** below. The reader is also signposted to **Appendix 14**, where timelines for the behaviours discussed with each participant can be found. These timelines can be used to identify where relevant themes occur.



**FIGURE TWENTY-EIGHT: Temporal Relationships Between Themes**

## 7.5 DISCUSSION

### 7.5.1 Summary of Findings

Study Two used qualitative methods to better understand the individual's experience of impulsive behaviour. The researchers were particularly interested in understanding processes that underlie impulsive behaviour as

well as identifying triggers to impulsive behaviour (e.g. affective state) and the time frame in which these triggers and resultant behaviour operate. In line with the previous study, these questions were explored within the context of the bipolar spectrum by including participants who screened as having experience of extreme mood state (MDQ+ and MDQsub).

Thematic analysis of interviews with 15 participants resulted in seven key themes, which summarised pertinent points in relation to research questions. While certain of the themes supported processes that have already been identified as being relevant to impulsive behaviour (e.g. '*Sensation Seeking*'), others were novel to the research area (e.g. the role of environmental context to behaviour). Exact definitions of the (sub-)themes and the data in support of them have been presented within **Section 7.4.2**. The discussion will therefore focus upon a synthesis of the themes, in terms of what they tell us about impulsivity, mood and impulsive behaviour. Themes and sub-themes will be referred to in italics.

Together the themes highlighted the importance of context to impulsive behaviour. The environment and other people surrounding the individual appeared to influence behaviour in multiple ways. Other individuals were sought out, both directly and indirectly, to provide information ('*Seeking out external sources of information*') and support ('*Ability to access support*') in the lead up to the behaviour. Where others were unable or unavailable to provide appropriate support or advice, impulsive behaviours became more

likely. It is suggested that this is in part because it drives the individual toward an '*extreme internal focus*' brought about by an '*intense emotional state*'. This disconnection from external reality may result in making a decision based on internal, and not external factors e.g. acting to ease current emotional state without consideration of the impact this may have on relationships, occupational functioning or finances. Other individuals surrounding the participant also had some influence over the behaviour by way of '*life events*', which frequently preceded impulsive behaviour. It is likely that these events also influenced behaviour through their emotional impact, which will be discussed in more detail later in this section.

Physical aspects of the environment are also highly salient. It was found that certain objects or aspects of the environment seemed to prompt individuals toward behaviour, such as Participant 2 reporting that the presence of a lighter had fed into her decision to self harm ('*Immediate physical trigger*'). At the same time, many individuals also remarked upon needing to modify their own physical environment to enable them to act, for example by obtaining money or tools ('*Engineering the environment*'). These sub-themes – one of which relates to bottom-up instinctive behaviour, and the other of which is more closely related to top-down planning strategies - indicate the ways in which individuals interact with their environment in the lead-up to impulsive behaviour, suggesting that in order to better understand impulsivity we need also to understand the environment in which it takes place. In other words, the actor does not act within a vacuum.

Several sub-themes that emerged from the data related to consideration and analysis of behaviour, usually taking place in the lead up to behaviour. Given that many major definitions of the construct focus upon impulsivity as resulting from dysfunctional or absent planning processes (see **Section 1.2.1**) this is perhaps not surprising. However, the sub-themes indicate a broad range of planning styles preceding impulsive behaviour. There was evidence within the data that supported ‘classic’ conceptualisations of impulsivity. That is to say, for some individuals impulsive behaviour appears to arrive without any pre-existing consideration (*‘Impulsive thought’*) or analysis of other options or consequences of behaviour (*‘Consideration of alternatives/risk’*). This is consistent with constructs such as Barratt’s non-planning impulsivity, which is defined as the absence of forethought or future planning (Barratt, 1972).

However, other themes indicated that certain other behaviours, which were still categorised by participants as being impulsive, did involve some degree of premeditation. In the lead up to these events, individuals participated in some degree of consideration of the behaviour (*‘Consideration of behaviour’*) and were able, at least to some degree, to predict and plan for the consequences of their behaviour (*‘Anticipating outcomes’*). Often though, this consideration was not proportional to the behaviour itself and was not thorough enough to prevent potentially risky actions. Consideration of behaviour was also temporally detached from the behaviour itself, with

little analysis taking place at the exact time the behaviour happened. The data suggested rather superficial consideration taking place over an extended time period, during which potential consequences may or may not be considered. Any consideration of consequences is likely to overestimate the potential for a positive outcome, and underestimate the possibility of negative consequences. However, at the time the behaviour is engaged in there is little analysis, meaning that it may occur suddenly after the onset of relevant triggers (e.g. mood state, environmental triggers).

Identifying a form of 'impulsive planning' is somewhat surprising, as there has been little attention given in the literature as to how impulsive decision-making may proceed. This absence is almost certainly due to the implicit assertion within the literature that for behaviour to be impulsive it must not have been planned or considered by the individual to any significant degree. On reflection, this argument is clearly untenable, or at the very least highly unlikely. It is more realistic to see impulsivity as occurring after a dysfunctional or incomplete process of planning, which is supported by the data of this study. Further analysis of the exact process of decision making involved in impulsive behaviour, including more detail about the time frame during which this occurs and the impact of other variables (e.g. mood) upon it, is likely to contribute substantially to our understanding of impulsivity.

While this thesis is broadly interested in the interactions between impulsivity and mood, the authors strongly resisted allowing ideas and



perspectives around this to permeate qualitative analysis of the data. This was notably achieved through the use of the coding panel, which contained three members who were naïve to the main research questions driving the study. In spite of this, affective state came out strongly as a theme. This theme, named '*Intense emotional state*', contains ideas within the data about the role of affect throughout impulsive behaviour. Individuals described numerous behaviours as providing a method to help moderate and control their emotional states ('*Modifying affective state*'). As well as a tool to help decrease/control negative affective states, behaviours were sometimes described as being engaged in as a means of achieving positive or exciting sensations ('*Anticipation of sensation*'). The use of behaviour to regulate affect is not a novel idea within the behaviour-specific literatures (see, for example, Chapman et al., 2006), and has been considered within wider theories (Selby et al., 2008), but the relevance of this notion to impulsivity in general has not been scrutinised. Understanding the individuals' potential motivation for engaging in these behaviours, which are often seen as having predominantly negative outcomes, will help with the development of effective interventions that are acceptable to the individuals themselves.

The other three sub-themes within '*Intense emotional state*' related to the impact of emotional state on cognition, and the consequent influence upon behaviour. Many individuals described their emotional state as restricting their ability to think freely ('*High arousal/cognitive load*'). In heightened

emotional states, individuals find themselves unable to think about their behaviour to the same degree they would be able to when experiencing less intense emotion. As such, they become more likely to engage in high-risk behaviours. The impact of this is enhanced when we also consider that individuals' attention appeared to become fixed on their internal state when experiencing strong affective states, to the exclusion of externally oriented attention (*'Extreme internal focus'*). In this way, decisions are biased towards consideration of these internal factors (e.g. those which are immediately salient to the self) and not external factors (e.g. salience for others, long term consequences). A similar phenomenon was found for sensation seeking behaviours, where individuals found themselves focused very strongly upon the anticipated positive outcomes of their actions (i.e. the sensation), with less awareness of the other relevant factors (*'Singular focus'*). For some individuals, these internally-directed attentional states went so far as to constitute a change of consciousness (*'Altered state of consciousness'*). This altered state was contrasted by individuals to their 'normal' state, with the suggestion that emotional experiences triggered a change of cognitive functioning into something very different to normal experience. In this state individuals made decisions that they may not otherwise have made.

Together these sub-themes provide ideas as to how urgency might manifest in real world terms. It is likely that the experience of heightened affect can lead to an altered cognitive state, such that normal decision making

processes are changed. This may be because the experience of intense emotion usurps resources that are typically engaged by externally oriented attention (cf. default mode network as compared to salience network; White et al., 2010). It may also be due to a high value being placed upon emotion in the decision making process, with actions which will modify emotion or achieve desired emotional states valued more highly than more distal considerations (e.g. long term impact of behaviour on self and others). Further experimental investigation is needed to understand how experiences such as this might be related to individuals' trait urgency levels.

Finally, the data brought up ideas around control in impulsive behaviour. There was a broad consensus across participants that behaving impulsively in some way represented a loss of control over behaviour. This loss of control was variously experienced as a loss of a sense of personal agency, an absence of alternative choices, a result of a habitual pattern of action or as a compulsive urge. The theme '*(lack of) Agency*' summarised participants' experiences of having their sense of will compromised, in the form of experiencing '*Intrusive thoughts*', a loss of themselves as a discrete entity ('*Sense of self*') able to act of their own will ('*(lack of) Volition*') and feeling unable to access alternative options ('*Absence of choice*'). For some of the participants these were intensely powerful experiences, during which they felt they had little or no control over their own decisions or actions. These states could be described as dissociative. There has been little analysis of the potential role of agency within the context of impulsive acts, though the

prominence of this experience for certain participants in this research certainly warrants further exploration.

A strong sense of compulsivity was found in many 'impulsive' acts. This is summarised within the sub-theme '*Intense drive to complete act*'.

Compulsive urges to act were experienced by some participants as being so strong it was impossible to resist them, though some effort was made to do so ('*Distracting/resisting*'). These themes constitute another way in which participants did not feel in control of their impulsive actions. It is notable that compulsivity emerged from the data, as there has been some debate in the literature as to the potential relationship between impulsivity and compulsivity. Some authors have seen the two constructs as orthogonal, even opposing (Hollander, 1996), though more recently some authors have suggested the potential for greater overlap (Ferrao et al., 2006; see **Section 5.3.2** for more discussion of this area). It is clear from the findings of this study that the two are at times intrinsically linked in the time-line of impulsive acts, and that qualitative methods provide the means to further investigate this association.

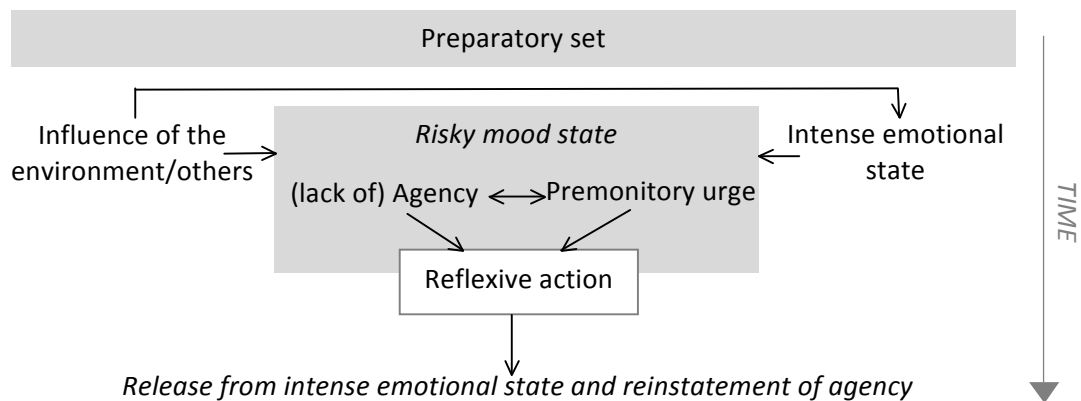
Control was also surrendered for individuals who felt their behaviours had become ingrained into a habitual pattern ('*Reinforced/habitual behaviour*'), being repeated frequently in a set pattern. These behaviours had the potential to occur reflexively, with little conscious control on the part of the individual. The idea that habitual patterns of behaviour may have an

impulsive element is novel, and must be viewed as a tentative finding. It is possible that this theme may only be relevant to specific behaviours, such as self-injury. It is interesting that participants who described occurrences of habitual behaviour as being compulsive also reflected that their original motivations for behaviour had been different, including a more classically impulsive presentation. This suggests that nominally impulsive behaviours may become ingrained over time, and become 'habitual' or compulsive. Their external presentation is likely to be unchanged (e.g. similar triggers to and actions within the original impulsive behaviour) while the participant's motivations for and understanding of the behaviour does change over time. This underscores the need for impulsivity research to understand the individual's own experience of impulsivity, and to better define the point at which apparent impulsivity may no longer be 'impulsive'.

The research also attempted to develop a better understanding of the temporal aspects of impulsive behaviour. Initial steps in understanding this involved the construction of timelines for each of the behaviours discussed by each participant. These can be found in **Appendix 14**. These timelines provide a rich insight into the course of impulsive behaviour, and the impact of a wide range of triggers. The rich material that has come out of these narratives has led to a tentative model of the escalation to psychopathological impulsive acts, which attempts to combine the rich data from both the timelines and the qualitative themes by placing the themes

themselves within a temporal framework. This model can be seen below in

**Figure Twenty-Nine.**



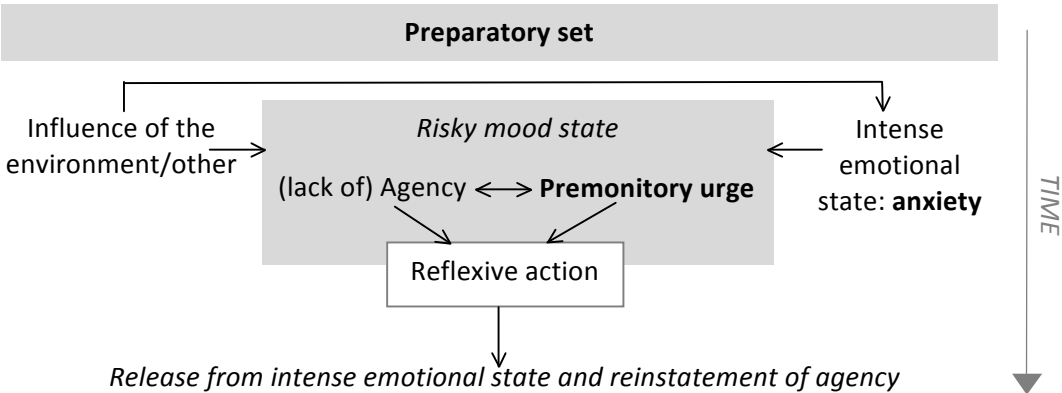
**FIGURE TWENTY-NINE: Proposed Model of the Temporal Relationship  
Between Themes in Impulsive Behaviour**

Preparatory set emerges first in the model, acting as a ‘scene-setter’. The occasion of behaviour is triggered primarily by external influences (e.g. life events, physical triggers), which interact with the experience of intense emotion. These two phenomena combine and escalate into a reflexive state, termed ‘risky mood state’. In this state individuals lose some sense of agency, to a greater or lesser degree. They may also experience a sense of inevitability regarding the behaviour; frequently reporting a sense that an impulsive act outside of their personal control will occur, and that they are unable to predict the form this act might take. Most importantly, during this state the individual experiences some loss of conscious control over their behaviour, either as a result of a loss of their usual sense of self, their habitual acting out of the behaviour or due to the intensity of their urge to

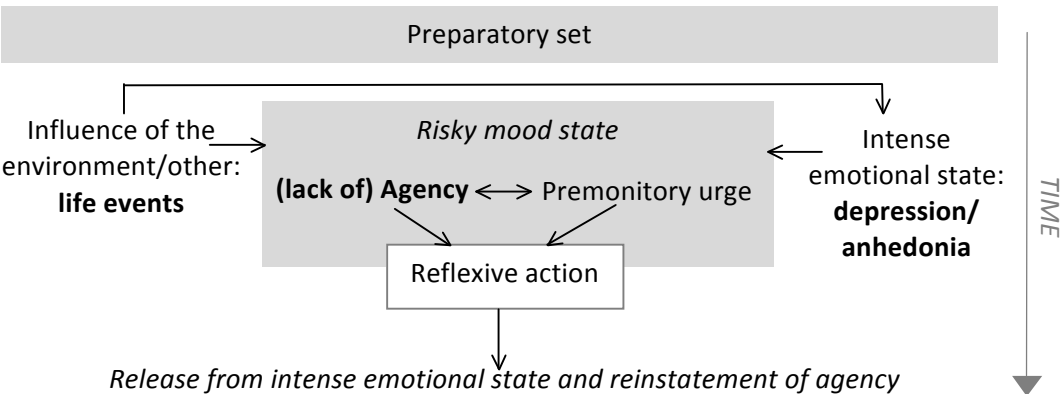
act. At the culmination of this 'risky mood' or 'reflexive' state, reflexive action occurs with little thought. The action brings about the conclusion of the risky state, with the individual typically regaining a sense of personal and emotional control.

Adaptations can be made to the model to demonstrate the subtle differences between behaviours. As suicide attempts and self harm were the two behaviours most commonly spoken about within Study Two, specific models could be made to summarise these behaviours separately (see **Figures Thirty** and **Thirty-One**). It should also be noted that these behaviours were seen most frequently in MDQ+ and MDQsub individuals, and therefore may reflect aspects specific to these populations. Themes highlighted in bold were identified as being particularly relevant to the described behaviour. Explored in this way, the key difference between the two models can be seen in the theme '*Intense Emotional State*'. For self harm the preceding emotion was frequently anxiety; whereas for suicide, participants described an affective state centred on feelings of depression or anhedonia (cf. hopelessness as a risk factor for suicide; Beck et al., 1985). '*Preparatory set*' and '*Premonitory urge*' played a large role in self-harm behaviour, reflecting the compulsive or ritualised nature of the self-harming acts participants described. In suicide, the most important theme was '*(Lack of) Agency*'. Suicide attempts were also more frequently preceded by external life events. Structuring the models in this way shows the flexible nature of the analysis and of the model itself. Further work is needed to

explore these models, and to develop alternative models for the various other impulsive acts. While the models are tentative, they provide a promising focus for further work.



**FIGURE THIRTY: Proposed Model of the Temporal Relationship Between Themes in Self Harm**



**FIGURE THIRTY-ONE: Proposed Model of the Temporal Relationship Between Themes in Suicidal Behaviour**

7.5.2 Strengths and Limitations



There are several limitations to the study that must be noted. First, the nature of qualitative research itself produces challenges. Moving away from positivist ontology creates room for novel insights, but invariably also introduces elements of subjectivity to the work. While the intention was to allow the data to speak for themselves, with a less defined analytic process there is always potential for the researcher(s) to impose their own ideas, whether this is consciously or subconsciously. In this study, steps were taken to limit the potential for this occurring, including the use of a more structured analytical method (thematic analysis, see **Section 7.3.6**) and employing a coding panel. An important aspect of the coding panel used in this study was their broad range of experience and skills, which meant the themes could be robustly tested from broad theoretical perspectives. However, it is naïve to suggest that a researcher can come to a data set untainted by their own knowledge, both academic and personal (cf. grounded theory), and it goes without saying that the themes that have emerged from this study will require replication and further study to ensure their validity.

It should also be noted at this point that some of the tenets of qualitative research were not met within the study. As a novel study in the area, which attempted to analyse a wide range of disparate behaviours and individuals, as well as having an interest in a number of other factors (for example the influence of trait impulsivity and MDQ status), it was not possible to saturate the themes within the available time frame of the work. While it

may have been simpler to achieve saturation by studying only one behaviour, or only individuals with experience of extreme mood, it was felt that it was important for the first qualitative study in the area to take a broader view. The study was intended to generate hypotheses for future investigation, both qualitative and quantitative, and the study should be viewed as the first step on a much longer path.

The study was designed to allow participants the space to describe their own behaviour with a supportive and interested outsider. However, sourcing information entirely from the individual presents some difficulties. Impulsive behaviour is by its very nature difficult to relate, particularly for those behaviours which had no prior consideration or which took place under extremes of emotion. Individuals' descriptions can therefore be limited by their memory for the event and by their insight into their own behaviour. However, while the study did not employ Interpretative Phenomenological Analysis (IPA) as an analytical tool (it was considered that constructing an understanding of the phenomenon underlying the data would be best suited to more advanced stages of the research), it was informed by the perspective this methodology imbues: that the focus of qualitative research should be the experience of the individual. As such, the study did not aim to bring out generalisable findings from the data or to determine any objective truths about impulsive behaviour; instead we felt it was important to gain insights as to how impulsivity was experienced on the personal level. Given this goal, the bias of the individual (as a result of

difficulties in relating the experience, insight, memory, etc.) can be seen as a fundamental part of the data, to be embraced and not eradicated.

It is also likely that individuals may have felt some pressure of social desirability when describing their behaviours, many of which are viewed negatively by society. As well as making the study an unpleasant experience for the individual, this also raises the chances of participants deliberately excluding information from their description, or not talking about the behaviour at all. These issues were in part addressed by the voluntary nature of participation in the study, and through attempts to create a non-judgemental, accepting environment in which the research could take place.

Participants were invited to select the impulsive behaviours they felt most comfortable and able to talk about, and therefore it was participants who shaped the group of behaviours included within this data set. Each individual endorsed the behaviour they discussed as being 'impulsive', aiding the validity of describing the acts as such. However, together the behaviours constitute a heterogeneous set, and it is not clear to what extent they can be considered as representative of the same 'form' of impulsivity (cf. different facets of trait impulsivity). It is also notable that many relevant impulsive acts were not discussed (e.g. shoplifting). However, together the behaviours represent an appropriate starting point in considering the possible links between different forms of impulsive behaviour. Discussions around this area are also important in informing the development of our

understanding of the wider construct of impulsivity. It is also relevant that, as the majority of the relevant literature within mood disorder relates to the relationship between impulsivity and suicidal behaviour, both this study and the first study were particularly interested in how these relationships might manifest throughout the bipolar spectrum. That suicide attempts constituted the most discussed behaviour is therefore appropriate.

An interesting finding within the study was that impulsivity (UPPS Impulsive Behaviour Scale, Positive Urgency Measure and Barratt Impulsiveness Scale) and Mood Disorder Questionnaire (MDQ) scores frequently changed between the initial questionnaire (Study One) and the interview for Study Two (see **Section 7.4.1.2**). In some cases this change was quite striking. This presents questions about the reliability of both these purported trait measures. Longitudinal studies investigating fluctuations in these measures over time would be important in analysing these changes further.

It is also relevant to note that in discussions surrounding the interviews, several of the participants disclosed a history of contact with mental health services as well as psychiatric diagnoses (notably bipolar disorder or borderline personality disorder, see **Section 5.2**). The inclusion criteria of Study One, from which these participants were sourced, specifically stated that the presence of psychiatric history did not negate inclusion within the study, and participants were at no point formally asked to disclose any details of their medical history. The finding that at least a proportion of

participants did represent a clinical population is relevant to the analysis of both studies, which were intended as a broad look at the bipolar spectrum. It should be noted that while participants may have had a history of clinically relevant psychiatric episodes, all were currently full and active members of the University community, and as such can be seen at very least as high functioning at the time of the study. In some ways the finding that some participants possessed clinical histories supports the use of the MDQ as a screening tool, as all participants who mentioned experience of this kind had scored as MDQ+. It does however suggest that the study sample may not have been as 'non-clinical' as was initially anticipated.

The main strength of this study lies in its originality. Qualitative methods have not often been applied to the study of impulsivity, and have not, to the author's knowledge, been specifically used to explore the association between impulsivity, mood and behaviour. Despite this, qualitative methods arguably have an important role in developing an understanding of the context and temporal ordering of impulsive behaviour, as well as the experience of the individual. The use of thematic analysis (TA) also supported the synthesis of the data to generate further hypotheses in the area. The success of this is demonstrated by the emerging novel ideas about the construct of impulsivity in the context of extreme mood.

The qualitative analysis was undertaken with continual reflection, leading to a nuanced understanding of the data and the emergent themes. This

reflection was appropriately aided by the use of a multi-skilled coding panel, who tested the validity of the themes and their grounding within the data as well as offering novel insights. It is hoped that this process has resulted in a data set that is firmly grounded in the data offered by participants, as well as more broadly relevant in both research and clinical terms.

The broad range of behaviours and participants has already been discussed as a potential limitation to the data, however this can also be seen as a strength. The wide range of impulsivity scores, behaviour and MDQ statuses meant the study had a depth and breadth of information, resulting in themes that are sufficiently generalised to be of use to the wider literature. While the themes were differently applicable to individuals and behaviour, it is felt that the eight themes together represent something fundamental about impulsive behaviour. Further research will show to what degree this is the case.

### **7.5.3 Implications**

As has been discussed, there is little clarity within the literature as to the definition of impulsivity. This study implies that some relevant aspects of impulsivity and impulsive behaviour have been neglected from common definitions, many of which are based within personality frameworks and see impulsivity as a trait variable. Findings arising from this study instead indicate that impulsivity, in the form of impulsive behaviour, is promoted by

the interaction between a number of inter-related personality variables – including mood and arousal - as well as the individuals' social and environmental context. As such, it is important that definitions of impulsivity incorporate the role these other variables and environmental aspects may play. At the same time, research which attempts to measure impulsivity – using both self-report and laboratory behavioural measures - should accommodate the potential contributory role of these aspects, and where possible measure them.

Affective state was found to be particularly key as a promoter of impulsive behaviour. This is in line with Whiteside and Lynam's (2001) and Cyders and colleagues' (2007) assertion that mood – both positive and negative – is relevant as a pathway to impulsivity. This theory predicts that affect management techniques, as are found within Dialectical Behaviour Therapy (DBT), constitute an appropriate intervention for impulsivity. Such techniques aim to enable individuals to better control their heightened emotions. It will be interesting to see the impact of such approaches in the treatment of impulsivity.

The data also suggest that behaviour rarely occurs in the absence of planning, as is implied by the accepted definitions of impulsivity. Instead, some ideation or basic formulation of behaviour often occurs in the lead up to action, though this planning process is likely to be influenced by the affective state of the individual at the time, and the extent of planning is

therefore variable across individuals and occasions. This finding is important as it suggests that a clinically meaningful definition of impulsivity cannot be based on the absence of planning. The occurrence of planning is also relevant to the development of interventions, which may be able to act to prevent behaviour at this stage.

The study contributes to the debate regarding the relationship between impulsivity and compulsivity. While several authors have suggested that the two constructs are opposed, the data arising from this study suggests that the two states are instead enmeshed, with a complex relationship existing between the two. This seems to be particularly true for certain of the behaviours discussed within the study, which despite being initially impulsive became more compulsive as they develop into reflexive habit. Other ostensibly impulsive behaviours presented with a strong sense of compulsivity in the form of a 'premonitory urge'. It therefore appears as though the complexity of the relationship between impulsivity and compulsivity may have been underestimated, and further work is needed to investigate the extent to which they are dissociable from one another.

The development of a potential model for impulsive behaviour has resulted in the identification of a 'risky mood state', in which individuals experience varying degrees of loss of control over their own behaviour. In this state impulsive behaviour becomes increasingly likely. This is a relatively novel development within the literature – though it bears some similarities to



Baumeister's (1990) state of cognitive deconstruction – and provides a different perspective on impulsivity from current conceptualisations. As a novel discovery further work is needed to first replicate and then extend this concept, and examine its potential use within the area.

The small number of participants within the study prevented in-depth analysis of the role of a history of extreme mood experience (as measured by the MDQ) or trait impulsivity levels upon impulsive behaviour. This is not to say that the findings do not contribute to the area. The experience of impulsive behaviour throughout our sample suggests that neither high levels of trait impulsivity nor extreme mood experience are necessary or sufficient in explaining the occurrence of what are broadly termed impulsive acts. Impulsivity, in one form or another, is relevant to the vast majority of the population. However, when the results of Study One are considered along with the selected experiences of the participants of Study Two, it seems clear that these two factors (i.e. a history of elevated mood experience and high trait impulsivity) constitute an elevation in risk for impulsive behaviour. As has been summarised within this chapter, many other variables are relevant to impulsivity, and extreme mood experience and trait impulsivity cannot explain, in isolation, the occurrence of impulsive acts.

There are important implications in allowing participants to voice their own experiences of impulsivity. The literature up to this point has focused upon the potential of impulsive behaviour to have negative consequences. This

study has indicated the potential for impulsive behaviour to be enjoyable for individuals (cf. 'Sensation seeking'), and the high value individuals place in this enjoyment. It has also highlighted how certain impulsive behaviours can be functional for the participant in the short-term. They can be 'tools' to moderate affective state and regain a sense of control. As is noted by Maloney and colleagues (2009) the positive experience impulsive behaviour can afford individuals suggests that it should not necessarily be approached with the intention of eliminating it. Instead, individuals need to be supported in managing impulsivity where it is dysfunctional for them.

In summary, while the study may not bring clarity to the definition of impulsivity, it does indicate numerous important avenues for investigation, which have been neglected. This includes an improved understanding of the temporal progression of impulsive behaviour, the role of affect and triggers to impulsivity, the importance of agency and the relationship between compulsivity and impulsivity. It is hoped that these ideas will prove fruitful in the continued search for an understanding of the complex construct of impulsivity.

#### **7.5.4 Next Steps**

This study has provided numerous avenues for future research. First, it is clear that an improved understanding of the temporal progression of impulsive acts is vital in developing an understanding of the nature of impulsivity. Longitudinal studies, which are able to track the causal

pathways and progressions of impulsive behaviour, should become a fundamental part of future impulsivity research. Experience sampling might also provide an appropriate tool to measure participants' real time and real world experiences of impulsivity alongside other potentially relevant variables (e.g. mood states).

A key finding from this study was that the individuals' social and environmental context influences their impulsive behaviour. While there are challenges in studying these elements experimentally, both logistically and ethically, it is possible to imagine the development of experimental paradigms in which laboratory manipulations of the environment can be investigated in relation to resulting behaviour. Experience sampling methods, which would not involve direct manipulations of the environment but are still able to record some measure of these variables (e.g. by asking individuals about their social and environmental context at the moment of recording), would also prove an appropriate route of study.

The study indicated that both agency and compulsivity are constructs relevant to impulsivity and impulsive behaviour. It would be interesting to investigate whether these relationships can be quantified in cross-sectional studies, like Study One, which use trait measures of these variables to explore relationships between them. As there has up to now been relatively little investigation of this nature into the relationship between impulsivity and these two constructs, it may first be necessary to develop appropriate

measures or to modify existing measures (e.g. Yale-Brown Obsessive Compulsive Scale and the Dissociative Experiences Scale). It is entirely possible that it is only state fluctuations in agency and compulsivity which have an influence upon impulsive behaviour, and that trait-based studies will be unable to find relationships, but this cannot be determined until the studies themselves have taken place.

It is clear that the progression of the impulsivity literature requires an improved understanding of the role of affective state upon expressed impulsivity. While this study has shed some light upon potential shared mechanisms, there is still much work needed. Sub-themes from this study suggest that there are many different reasons impulsive behaviour arises when individuals experience extreme affect. These were primarily related to the impact of extreme emotion on cognition, when the individual may struggle with the load of the emotional state, may become internally focused upon their emotions to the detriment of other relevant factors, or may enter some form of altered state of consciousness. There was also a strong indication that impulsive behaviours can have an important role in the moderation of affect, and are pursued with this motivation. These perspectives on the links between impulsivity and mood are interesting, and further work is needed to investigate their individual relevance. The identification of affect-moderated pathways to impulsive behaviour appears to be highly relevant for the impulsivity field in general. This work can build upon mechanisms emerging in the decision making literature such as Selby

and colleagues' (2008) 'emotional cascades' and Tice and colleagues' (2001) 'emotion distress regulation' (see **Chapter 3**).

The 'risky mood' state identified from the synthesis of the themes and timelines indicates the presence of a dis-controlled state immediately preceding impulsive behaviour. The potential clinical relevance of this finding suggests further work is needed. Work should progress to investigate whether the state is common to the general population, and is generalisable to all impulsive-type behaviours. It is again suggested that carefully designed experience-sampling studies provide an appropriate route for analysis in this regard.

## CHAPTER EIGHT: GENERAL DISCUSSION

### 8.1 SUMMARY OF FINDINGS

Study One, a quantitative study using a cross-sectional survey design, replicated findings from clinical bipolar disorder (BD) populations (Swann et al., 2003) by demonstrating elevated trait impulsivity in individuals who had experienced a period of extreme positive mood (MDQ+). Trait impulsivity was also found to be closely related to a wide range of potentially impulse-mediated behaviours, with affective impulsivity forming a pathway between experiences of extreme mood and impulsive behaviour. Affective impulsivity can therefore be seen as being at least as important as cognitive impulsivity in predicting impulsive acts within bipolar spectrum individuals.

The second study, a qualitative study using semi-structured interviews with participants, found that the participants' internal and external environment was important in bringing about impulsive behaviour. A range of physical, social, psychological and emotional triggers prompted impulsive acts. It was also found that participants engaged in decision making - to differing degrees - in the lead up to behaviour, with many taking preparatory steps towards the act itself. Data also indicated that impulsivity was associated with feelings of loss of control and/or agency, and that impulsive acts frequently contained a compulsive element.

Together, these findings highlight the complexity of the impulsivity construct, and the importance of the interaction between trait impulsivity and other psychological and environmental factors in promoting behaviour. The data are particularly strong in support of the importance of an interaction between impulsivity and mood; both in terms of the tendency to experience extreme mood states in individuals across the bipolar spectrum, and in day-to-day fluctuations in affect. The structural equation model developed within Study One (see **Section 6.4.10**) highlighted the role of trait affective impulsivity in moderating the relationship between the tendency to experience extreme positive mood and impulsive behaviour. Affective impulsivity can therefore be seen to represent the tendency to respond to mood fluctuations with impulsive behaviour (Whiteside and Lynam, 2001). Study Two explored this relationship further, investigating the role of mood throughout the duration of impulsive behaviour. The data from this study suggested that affect might increase the potential for impulsive behaviour either by reducing cognitive resources, or because the act itself may be a means to manage affect. Taken together, the results of the two studies emphasise the importance of considering affect, both positive and negative, when defining or measuring impulsivity.

The two studies contribute to the definition of impulsivity, which has long been debated in the literature (Moeller et al., 2001a). The findings of Study One led to the hypothesis that impulsivity comprises both affective and cognitive aspects, with the two factors having a strong relationship with one

another, but having separate predictive abilities for behaviour (i.e. affective impulsivity was seen to be related to impulsive behaviour, while cognitive impulsivity was not). Despite the differing methodology, Study Two also highlighted the importance of both affective (e.g. 'Intense emotional state' theme) and cognitive (e.g. 'Consideration of behaviour' sub-theme) aspects to impulsivity, and the potential for relationships between these two aspects.

While the dichotomisation of impulsivity in to cognitive and affective factors is novel, it does fit with the existing literature. Cognitive impulsivity represents the vast majority of historical perspectives on the construct, including Barratt's (1972) attentional impulsivity and Whiteside and Lynam's (2001) (lack of) premeditation. These factors cast impulsivity as arising from ineffective processing strategies, which restrict the individual's ability to engage in appropriate decision making. As has been discussed within **Chapter 3**, the construct of affective impulsivity has received considerably less attention in recent years (despite its appearance in many early descriptions of impulsivity, see Esquirol on p.64 or as cited in Ferrao et al., 2006). However, the development of the UPPS Impulsive Behaviour Scale (Whiteside and Lynam, 2001) and the Positive Urgency Measure (Cyders et al., 2007) have enabled researchers to consider affective impulsivity within their studies, which have uniformly supported its relevance. It appears, both within the existing literature (Billieux et al., 2008, Fischer and Smith, 2004, Zolowski et al., 2009) and within the studies reported here, that affective



impulsivity is an important predictor of behaviour. While further development of the construct is needed to better understand the exact mechanism(s) by which affect is associated with impulsivity, it is vital that on-going work includes reference to this aspect of impulsivity and behaviour.

Both studies have shown that impulsivity is a far from isolated construct. The structural equation model in Study One provides a visual representation of the wide range of factors involved in modelling impulsive behaviours. It is likely that other factors also have a role to play and, had more factors been included for measurement, the model would be yet more complex. Study Two highlighted a wide range of triggering or predictive factors that participants felt were relevant to their impulsive behaviours, including their social networks and physical environments. The studies therefore highlight a need to understand impulsivity as operating within a wider context, and to create ways of measuring and understanding the relevant impact of these factors upon impulsive behaviour.

In summary, the thesis proposes that affective impulsivity, arising from both positive and negative mood, is important in relation to impulsive acts. This is likely to be particularly true for individuals who have historical experience of extreme mood (MDQ+ and MDQsub). Both affective impulsivity and cognitive impulsivity interact with other cognitive, environmental and social process to increase or decrease the likelihood of impulsive behaviour.

## 8.2 STRENGTHS AND LIMITATIONS

### 8.2.1 Limitations

Bearing in mind that the discussion of limitations has been covered separately for the studies in **Sections 6.5.2** and **7.5.2**, it will not be repeated here. It is however important to discuss the limitations inherent in bringing together the two studies, which come from differing epistemological perspectives. While mixed-method programs of research have become increasingly popular and have clear benefits, there are relevant limitations to combining quantitative and qualitative work. The ontology of the two methodologies can prove a barrier to the synthesis of the results; while quantitative work hopes to test hypotheses and generate firm, generalisable results, qualitative research is interested in the idiosyncratic experience of the individual, and in generating hypotheses. In other words, the researcher may be attempting to unite two entities with entirely contrasting, and potentially incompatible, purposes (Doyle et al., 2009).

These difficulties were to some degree avoided by the studies of this thesis, as the research questions were tailored to the strengths of the methodologies. In other words, a quantitative study was used to identify the statistical relationships between measurable constructs; while a qualitative study was designed to more closely explore the personal experience of the individual, as well as contextual and temporal factors of interest. By

matching the research questions to the methodologies in this manner, each set of findings was examined in its own right, before exploring how these findings might, or might not, complement one another. It was never expected that triangulation would occur neatly, but instead that each methodology would be able to bring a fresh perspective on the results of the other. To some extent it is therefore surprising – and extremely pleasing – that the findings adhere to such a high degree (as summarised in **Section 8.1**), together generating novel insights upon similar areas of interest.

### **8.2.2 Strengths**

While it has been noted that the differing epistemologies of quantitative and qualitative methods can present obstacles to mixed-methodology research, it is also clear that the contrasting perspectives can together be greater than their two parts. This view is elegantly explained by Leahey (p.150, 2007), who states that *‘integrating qualitative and quantitative data may be the best way to gain a complete understanding of social phenomena if... larger-scale quantitative work can tap the more structural effects of interest, and qualitative work can better address interpretive reasons and mechanisms.’* The work described within this thesis has attempted to work in this manner, and in so doing to allow the strengths of both data sets to work together to form rich, three-dimensional answers to the research questions. Clearly a *‘complete understanding’* of impulsivity has not been reached, but the synergistic relationship between the two methods as

displayed in this thesis may go some way towards an improved understanding of impulsivity in situ.

As well as providing some – tentative - answers to the questions posed, a strength of the thesis lies in the ability of the two methods to together suggest potential areas of interest for future work. In taking a wider view of the construct of impulsivity, the work is able to identify areas of the research field (for example mood, or environmental context), which are relevant but have in recent years been neglected from the literature. In allowing individuals themselves to describe their own experiences of impulsivity as well as quantify the nature of some of these experiences, it is hoped that the work will provide some much needed clarity to the field of impulsivity research.

## **8.3 IMPLICATIONS**

### **8.3.1 Theoretical Implications**

The theoretical implications of the thesis relate primarily to the definition and measurement of impulsivity. It is clear from both studies that affect, both positive and negative, is highly relevant to the concept of impulsivity, particularly in terms of predicting impulsive behaviour. It is therefore apparent that future modifications of the impulsivity definition, and associated measures of impulsivity, will need to take in to account the role of affective impulsivity. At the same time, the studies imply that a cognitive

form of impulsivity exists and may be relevant to actual impulsive acts. This has been demonstrated by the formation of a cognitive impulsivity factor within the Structural Equation Model of Study One, and by the emergence of themes related to planning and cognitive control in Study Two. It is also clear from the results of the studies included in this thesis that impulsive acts do not arise in a vacuum, and that situational (e.g. environmental triggers) and personal (e.g. psychopathological experiences) factors are important in the prediction of impulsive acts. Together these findings suggest that more work is needed to refine the definition and measurement of impulsivity, particularly in terms of the relationship between impulsivity and other constructs.

The study also showed that the relationship between impulsivity and behaviour, which had been established in clinical bipolar disorder (BD) samples (see for example Swann et al., 2005), could be replicated in a broadly non-clinical sample of individuals with suspected hypomanic experience. The non-clinical participant group were also able to present with and discuss a range of clinically relevant behaviours (e.g. suicide) within Study Two. The successful use of a continuum sample in these studies underscores the findings of other researchers, who suggest that student populations form an appropriate source of participants for dimensional clinical research (Vredenburg et al., 1993). As such, the thesis can be seen to support the growing use of continuum samples in psychological research. As has been noted, future research using continuous measures of bipolar

spectrum experience are likely to further reinforce the usefulness of the bipolar spectrum construct.

As well as supporting the use of continuum samples, the studies of the thesis also endorse the on-going use of qualitative and mixed methodologies within impulsivity research. As this study has indicated, these methodologies - which are not frequently used together in the area – are able to contribute an informative and novel perspective to the study of impulsivity and impulsive behaviour. It is likely their continued use would contribute vastly to the field.

### **8.3.2 Clinical Implications**

Although the studies used a (broadly) non-clinical sample, many of the findings are highly clinically relevant. The Medical Research Council (p.6, MRC Strategic Review Group, 2010) recently reported that developing an *‘understanding [of] the psychological basis of aberrant processes such as inattention, impulsivity and aggression that may underpin maladaptive behaviour in different clinically-diagnosed psychiatric disorders’* constitutes a vital research priority for the development of therapy. This recommendation highlights the importance of the construct of impulsivity trans-diagnostically. While the bipolar spectrum, and to a lesser extent borderline personality disorder, have been specifically targeted within this thesis, impulsivity is also relevant to a broad range of psychiatric diagnoses including attention-deficit hyperactivity disorder (ADHD), impulse control

disorders and substance use disorders (see **Section 2.2**). The contributions to our understanding of impulsivity made by these findings may therefore have implications for the role and treatment of impulsivity in other diagnoses. Initial studies in the context of other psychopathological constructs should first confirm the extent to which impulsivity manifests in the same or a similar form across diagnoses.

More specifically, the studies have further highlighted the importance of trait impulsivity within the bipolar spectrum. Given the results of both studies, it is highly likely that impulsivity is an important factor underpinning the frequency of a wide range of 'impulsive' behaviours common within bipolar disorder, as has already been suggested in the literature (Swann et al., 2004). Impulsivity may also form an explanatory link between BD and some of the most common comorbidities seen in this disorder (for example with impulse control disorders, see Karakus and Tamam, 2011). It is particularly interesting that many of the behaviours seen in clinically diagnosable BD were also reported in our MDQ+ participants, suggesting that the presentation of BD is similar throughout the bipolar spectrum, and that interventions to control dysfunctional impulsivity – and therefore dysfunctional impulsive behaviour - may be useful even in non-clinical populations.

Impulsivity is important not only as a trans-diagnostic construct, but also in terms of the relationship between impulsivity and behaviour. As the studies

of this thesis have shown, trait impulsivity is strongly related to a wide range of high-risk behaviours. Many of these behaviours, including for example suicide (Potter et al., 1995), have a large public health cost, not to mention the potential personal impact of the acts on the individual and those around them. As such, it is important that research looks to explore the predictors of these behaviours and identify appropriate targets for psychological intervention. The studies making up this thesis suggest that the context of impulsive behaviour may constitute a modifiable target for intervention. Furthermore, it is clear that impulsivity-targeted interventions must also understand the impact of affect upon impulsivity, and how this may relate to impulsive behaviour. It is likely that affect management techniques – as are found within the emotion regulation component of dialectical behavioural therapy (McMain et al., 2001) – will be particularly effective in managing impulsive behaviour, as these techniques would enable individuals to manage elevated affective states without recourse to potentially risky acts. Future research will show if such therapeutic techniques are useful.

The second study of the thesis also highlighted the role impulsive behaviour may have for the individual, suggesting many impulsive behaviours – which are frequently seen by health professionals as high-risk and pathological – hold important, ego-syntonic functions (Maloney et al., 2009). Impulsive acts can be used as a means to gain positive or exciting sensations, as well as to moderate or control negative affect. As such, it is understandable that



individuals may be resistant to interventions that act to remove these coping strategies, without offering any alternative strategies in their place. On-going work, informed by service user experience, will further illuminate the function of impulsive behaviours and aid the development of interventions which are acceptable to those they are targeted at.

The 'risky state' identified within Study Two - in which participants feel they are not in control of their behaviour and are likely to act in an impulsive manner (but may be unable to be precise as to what form this behaviour might take) - is highly clinically relevant, particularly in terms of suicidal behaviour. Suicide risk assessment emphasises a high level of hopelessness and suicidal ideation as key predictors of suicide risk (Truant et al., 1991). The findings of Study Two suggest that assessment based upon measuring solely these factors would be ineffective in identifying at least some individuals who attempted suicide, i.e. those individuals who are experiencing a risky state at the time of their attempt. These individuals are likely to present with neither a plan to attempt, nor any strong ideation. They may not even display hopelessness. In these individuals, questions or measures regarding their feelings of control over their behaviour may form a better predictor of potential suicide risk. Risky impulsive mood state may therefore constitute the elusive element behind unplanned suicide attempts, which have been shown to be difficult to predict (Conner, 2004). This finding therefore certainly warrants further investigation.

## 8.4 NEXT STEPS

An urgent priority within the impulsivity literature is undoubtedly a consensus as to what the construct of impulsivity encompasses, and therefore how it might best be measured. As has been shown throughout this thesis, it is likely that an effective impulsivity definition will include reference to affective impulsivity. It is also clear that the cognitive elements of impulsivity are important factors within the construct. What else the definition might include is not yet clear, though it may comprise other important aspects identified within the thesis, including compulsivity, agency and habitual behaviour. Further research will help to define this.

An appropriate start point for future research would be to continue the iterative process of mixed-methodology research, and take the conclusions of Study Two forward into a quantitative study. This would help to explore and refine hypotheses emerging from this qualitative study, and in so doing investigate the generalisability of the findings. It would be particularly interesting to explore quantitative relationships between trait impulsivity and constructs such as agency and compulsivity, which were found to have relationships with narrative accounts of impulsive acts.

Replications of the methods used in the studies of this thesis need to be undertaken in clinical samples. The use of a qualitative study to explore impulsivity and impulsive behaviour in individuals with a diagnosis of BD is

likely to unearth novel insights about the role and function of impulsivity in this population. It is difficult to predict the degree to which themes from Study Two would also be seen in a clinical sample, but given the emphasis on emotion regulation and sense of self in the narratives reported here, one might expect there to be significant overlap between the themes of this 'non-clinical' work and those that emerge in a clinical sample. Qualitative studies in replication of Study Two could also explore a wider set of impulsive acts where possible, to investigate whether identified themes hold for a full gamut of impulsive behaviours, particularly those which were not included within this study.

The studies of this thesis have looked at impulsivity using a cross-sectional survey, and an interview dependent upon recall of past events. While the qualitative interview was able to begin to explore changes in impulsivity over time, it is apparent that further longitudinal work is needed.

Longitudinal studies would enable investigation into how variables fluctuate over time, as well as illuminate the causal pathways involved in the relationships between variables. Appropriate quantitative longitudinal designs would include repeated questionnaires over an extended time period, which would also allow further investigation into the reliability of some of the questionnaires used. Similarly, qualitative longitudinal work could use the experience sampling or diary method to explore impulsive behaviour over time. Using this method would enable investigators to track

the build up to impulsive behaviour across time, and look to quantify the presence of co-occurring factors (e.g. life events).

There is also the need for more experimental studies in the area. Studies could particularly focus upon the impact of manipulations of the environment, affective state and sense of agency upon impulsivity. These experimental studies may use laboratory tasks of impulsivity as outcome measures. Therefore, it is also important that research strives to increase correlations between state and trait measures of impulsivity. It is possible that the poor correlation between behavioural and self-report measures of impulsivity (Dougherty et al., 2005) arises from the inability of many of the current self-report measures to take into account important contextual variables such as e.g. mood or social relationships. As such, as the accuracy of self-report measures improves to include reference to these variables (cf. urgency) it is possible that correlations between the two forms of impulsivity measurement will increase (Gay et al., 2008). However, it may also be the case that current behavioural measures of impulsivity are removed from real-world experience. In this case, experience-sampling studies constitute a valuable route of investigation.

As both studies have shown, trait impulsivity has a strong relationship with real-world impulsive behaviour. Experimental studies wishing to investigate impulsivity in action may therefore also choose to use behaviour as an index of impulsivity. There are some examples of this already in the literature; for

example, Cyders (2008) use of volume of alcohol drunk as a measure of impulsivity. It is clear that other impulsive acts, such as overspending or binge eating, have the potential to be investigated within a laboratory setting using innovative study designs. These studies would be able to quantitatively investigate how manipulations in the environment and the affective state of the individual (i.e. using mood induction) can influence impulsivity. Studies such as these will help illuminate the exact processes underpinning impulsive behaviour.

Behavioural experiments might also be used in tandem with imaging tools to examine the physiological correlates of impulsivity. Imaging work, for example using fMRI, would be well placed to explore the role of reduced cognitive resources on impulsive behaviour and in so doing explore the suggestion that strong affect increases impulsivity as it consumes resources. Adaptations of tasks such as the emotional Stroop across samples that differ in levels of trait impulsivity might be relevant for studies of this kind.

The first study showed that urges to engage in impulsive behaviour were very common, with participants throughout the sample reporting experiences of resisting impulsive acts. In contrast, the data of the second study presented a view of impulsive acts as being frequently impossible to resist. It is clear that in order to better understand impulsivity - and especially to understand better how to prevent impulsive acts - we need not only to understand why and how impulsive behaviour occurs, but also why

and how it does not occur. Work to identify effective brakes to impulsive behaviour may employ behavioural tasks such as the Go/No Go task (see **Section 1.2.3**), or real-world experiences of urge resistance, investigated using qualitative or experience-sampling methods. The literature demonstrating enhanced cognitive control in Tourette's syndrome (Mueller et al., 2006) is likely to be relevant, as individuals with Tourette's typically have to resist urges to tic that build up in the context of somatic arousal on a daily basis.

## 8.5 CONCLUSIONS

The studies of this thesis have attempted to explore the intersection between mood and impulsivity. Mood has been understood both in terms of state fluctuations in affect and the tendency to experience periods of extreme positive mood (i.e. hypomania). At the same time, impulsivity has been seen not only as a personality trait but also as real-world behaviour in terms of impulsive acts. This broad understanding of the two key concepts has allowed the flexibility to view impulsivity from novel perspectives, and has generated some important findings and well as suggesting some innovative routes for future work.

Some of the insights arising from the studies are methodological in theme. First, the work has again demonstrated that continuum models of mental health can be valuable in studying psychological processes. A dimensional

understanding of mental health and experience is important in not only tackling the stigma associated with mental illness but also in aiding both researchers and clinicians to tap in to and understand the common mechanisms underlying human psychology. Within this thesis the continuum sample has provided numerous insights into the occurrence and experience of impulsivity, and these insights are relevant both theoretically and clinically. The thesis has also demonstrated the value in using mixed methodologies in the study of impulsivity. Exploring the construct of impulsivity using qualitative methodology has enabled the identification of relevant factors that have been neglected from the research field (such as the environmental context, or motivations of the individual), while quantitative methodology allowed for the exploration of structural relationships between the concepts of interest.

The key finding of this thesis is that affect is, and should be recognised as, a fundamental driver of impulsive behaviour, which is itself characterised by a complex set of enmeshed affective and cognitive processes. Impulsive behaviour is tightly interwoven with the experience of emotion. Affect can influence impulsivity distally, via a personal predisposition to experience periods of extreme positive mood, or proximally, through the powerful experience of negative or positive affect changing one's cognitive state or motivating one to engage in a particular behaviour. Definitions and measurements of impulsivity that take account of mood experience and level of affect (such as the UPPS-P) are therefore vital to the field of

impulsivity research and to the understanding and prevention of maladaptive impulsive behaviour.



## REFERENCES

- Abler, B., Greenhouse, I., Ongur, D., Walter, H., & Heckers, S. (2008). Abnormal reward system activation in mania. *Neuropsychopharmacology*, 33(9), 2217-2227. doi: 1301620 [pii] 10.1038/sj.npp.1301620
- Abraham, K. (1911/1927). Notes on the psychoanalytic investigation and treatment of manic-depressive insanity and allied conditions. In E. Jones (Ed.), *Selected Papers of Karl Abraham*. London: Hogarth.
- Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin*, 82(4), 463-496.
- Akiskal, H. S. (2003). Validating 'hard' and 'soft' phenotypes within the bipolar spectrum: continuity or discontinuity? *Journal of Affective Disorders*, 73(1-2), 1-5.
- Akiskal, H. S., Bourgeois, M. L., Angst, J., Post, R., Möller, H.-J., & Hirschfeld, R. (2000). Re-evaluating the prevalence of and diagnostic composition within the broad clinical spectrum of bipolar disorders. *Journal of Affective Disorders*, 59(Supplement 1), S5-S30.
- Alessi, S. M., & Petry, N. M. (2003). Pathological gambling severity is associated with impulsivity in a delay discounting procedure. *Behavioural Processes*, 64(3), 345-354.
- Allilaire, J. F., Hantouche, E. G., Sechter, D., Bourgeois, M. L., Azorin, J. M., Lancrenon, S., . . . Akiskal, H. S. (2001). Frequency and clinical aspects of bipolar II disorder in a French multicenter study: EPIDEP. *Encephale*, 27(2), 149-158.
- Alloy, L.B. & Abramson, L.Y. (2010) The role of the Behavioral Approach System (BAS) in bipolar spectrum disorders. *Current Directions in Psychological Science*, 19(3), 189-194
- Alloy, L.B., Abramson, L.Y., Walshaw, P.D., Cogswell, A., Grandin, L.D., Hughes, M.E., Iacoviello, B.M., Whitehouse, W.G., Urosevic, S., Nusslock, R. & Hogan, M.E. (2008) Behavioral Approach System and Behavioral Inhibition System sensitivities and bipolar spectrum disorders: prospective prediction of bipolar mood episodes. *Bipolar Disorders*, 10(2), 310-322
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)* Washington, DC: APA.

- American Psychiatric Association (2010, February 2010). DSM-5 Development: Proposed Revisions. <http://www.dsm5.org/proposedrevision/Pages/Default.aspx> Retrieved 07/12/10, 2010
- Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- Andersson, G., Kaldö-Sandström, V., Ström, L., & Strömgren, T. (2003). Internet administration of the Hospital Anxiety and Depression Scale in a sample of tinnitus patients. *Journal of Psychosomatic Research*, 55(3), 259-262. doi: S0022399902005755 [pii]
- Anestis, M. D., Anestis, J. C., & Joiner, T. E. (2009). Affective considerations in antisocial behavior: An examination of negative urgency in primary and secondary psychopathy. *Personality and Individual Differences*, 47(6), 668-670.
- Anestis, M. D., & Joiner, T. E. (2011). Examining the role of emotion in suicidality: Negative urgency as an amplifier of the relationship between components of the interpersonal-psychological theory of suicidal behavior and lifetime number of suicide attempts. *Journal of Affective Disorders*, 129(103), 261-269
- Anestis, M. D., Selby, E. A., Fink, E. L., & Joiner, T. E. (2007a). The multifaceted role of distress tolerance in dysregulated eating behaviors. *International Journal of Eating Disorders*, 40, 718-726.
- Anestis, M. D., Selby, E. A., & Joiner, T. E. (2007b). The role of urgency in maladaptive behaviors. *Behaviour Research and Therapy*, 45(12), 3018-3029.
- Angst, F., Stassen, H. H., Clayton, P. J., & Angst, J. (2002). Mortality of patients with mood disorders: follow-up over 34-38 years. *Journal of Affective Disorders*, 68(2-3), 167-181. doi: S0165032701003779 [pii]
- Angst, J. (1998). The emerging epidemiology of hypomania and bipolar II disorder. *Journal of Affective Disorders*, 50(2-3), 143-151. doi: S0165-0327(98)00142-6 [pii]
- Angst, J. (2007). The bipolar spectrum. *The British Journal of Psychiatry*, 190(3), 189-191. doi: 10.1192/bjp.bp.106.030957
- Angst, J., Adolfsson, R., Benazzi, F., Gamma, A., Hantouche, E., Meyer, T. D., . . . Scott, J. (2005). The HCL-32: towards a self-assessment tool for hypomanic symptoms in outpatients. *Journal of Affective Disorders*, 88(2), 217-233. doi: S0165-0327(05)00147-3 [pii] 10.1016/j.jad.2005.05.011

- Angst, J., Gamma, A., Benazzi, F., Ajdacic, V., Eich, D., & Rössler, W. (2003). Toward a re-definition of subthreshold bipolarity: epidemiology and proposed criteria for bipolar-II, minor bipolar disorders and hypomania. *Journal of Affective Disorders*, 73(1-2), 133-146.
- Angst, J., & Sellaro, R. (2000). Historical perspectives and natural history of bipolar disorder. *Biological Psychiatry*, 48(6), 445-457.
- Arce, E., & Santisteban, C. (2006). Impulsivity: A review. *Psicothema*, 18(2), 213-220.
- Baldessarini, R. J. (2000). A plea for integrity of the bipolar disorder concept. *Bipolar Disorders*, 2(1), 3-7.
- Barratt, E. S. (1959). Anxiety and impulsiveness related to psychomotor efficiency. *Perceptual and Motor Skills*, 9, 191-198.
- Barratt, E. S. (1972). Anxiety and impulsiveness: Toward a neuropsychological model. In C. D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (pp. 195-122). New York: Academic Press.
- Barratt, E. S., & Patton, J. H. (1983). Impulsivity: cognitive, behavioral and psychophysiological correlates. In M. Zuckerman (Ed.), *Biological Basis of Sensation-Seeking, Impulsivity, and Anxiety* (pp. 77-116). Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Barratt, E. S., & Slaughter, L. (1998). Defining, measuring, and predicting impulsive aggression: a heuristic model. *Behavioral Sciences & the Law*, 16(3), 285-302. doi: 10.1002/(sici)1099-0798(199822)16:3<285::aid-bsl308>3.0.co;2-4
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Special issue on Structural Equation Modeling*, 42(5), 815-824.
- Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review*, 97(1), 90-113. doi: 10.1037/0033-295x.97.1.90
- Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: a 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry*, 142(5), 559-563.
- Benazzi, F. (2003). Improving the Mood Disorders Questionnaire to detect Bipolar II Disorder. *Canadian Journal of Psychiatry*, 48(11), 770.

Benazzi, F. (2006). Borderline personality-bipolar spectrum relationship. *Progress in Neuropsychopharmacology and Biological Psychiatry*, 30(1), 68-74. doi: S0278-5846(05)00205-8 [pii] 10.1016/j.pnpbp.2005.06.010

Benazzi, F. (2007). Impulsivity in bipolar-II disorder: Trait, state, or both? *European Psychiatry*, 22(7), 472-478.

Bender, T. W., Gordon, K. H., Bresin, K., & Joiner Jr, T. E. (2011). Impulsivity and suicidality: The mediating role of painful and provocative experiences. *Journal of Affective Disorders*, 129(1-3), 301-307

Bentall, R. P., Rowse, G., Shryane, N., Kinderman, P., Howard, R., Blackwood, N., . . . Corcoran, R. (2009). The cognitive and affective structure of paranoid delusions: a transdiagnostic investigation of patients with schizophrenia spectrum disorders and depression. *Archives of General Psychiatry*, 66(3), 236-247. doi: 66/3/236 [pii] 10.1001/archgenpsychiatry.2009.1

Berlin, H. A., Rolls, E. T., & Iversen, S. D. (2005). Borderline personality disorder, impulsivity, and the orbitofrontal cortex. *American Journal of Psychiatry*, 162, 2360-2373.

Bernardi, S., & Pallanti, S. (2010). Internet addiction: a descriptive clinical study focusing on comorbidities and dissociative symptoms. *Comprehensive Psychiatry*, 50(6), 510-516.

Billieux, J., Rochat, L., Rebetez, M. M. L., & Van der Linden, M. (2008). Are all facets of impulsivity related to self-reported compulsive buying behavior? *Personality and Individual Differences*, 44(6), 1432-1442.

Billieux, J., Van der Linden, M., & Ceschi, G. (2007). Which dimensions of impulsivity are related to cigarette craving? *Addictive Behaviors*, 32(6), 1189-1199.

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale. An updated literature review. *Journal of Psychosomatic Research*, 52(2), 69-77. doi: S0022399901002963 [pii]

Blanco, C., Grant, J., Petry, N.M., Simpson, H.B., Alegria, A., Liu, S., & Hasin, D. (2008). Prevalence and correlates of shoplifting in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *American Journal of Psychiatry*, 165, 905-913.

Blanco, C., Potenza, M. N., Kim, S. W., Ibáñez, A., Zaninelli, R., Saiz-Ruiz, J., & Grant, J. E. (2009). A pilot study of impulsivity and compulsivity in pathological gambling. *Psychiatry Research*, 167(1-2), 161-168.

- Blascovich, J., & Tomaka, J. (1993). Measures of Self-Esteem. In J. P. Robinson, P. R. Shaver & L. S. Wrightsman (Eds.), *Measures of Personality and Social Psychological Attitudes. Third Edition*. Ann Arbor: Institute for Social Research.
- Block, J. J. (2008). Issues for DSM-V: Internet Addiction. *American Journal of Psychiatry*, 165(3), 306-307. doi: 10.1176/appi.ajp.2007.07101556
- Boomsma, A. (2000). Teacher's corner: Reporting analyses of covariance structures. *Structural Equation Modeling: A Multidisciplinary Journal*, 7(3), 461-483.
- Bornovalova, M. A., Cashman-Rolls, A., O'Donnell, J. M., Ettinger, K., Richards, J. B., deWit, H., & Lejuez, C. W. (2009). Risk taking differences on a behavioral task as a function of potential reward/loss magnitude and individual differences in impulsivity and sensation seeking. *Pharmacology Biochemistry and Behavior*, 93(3), 258-262.
- Bornovalova, M. A., Lejuez, C. W., Daughters, S. B., Rosenthal, M.Z., & Lynch, T. R. (2005). Impulsivity as a common process across borderline personality and substance use disorders. *Clinical Psychology Review*, 25(6), 790-812.
- Bowins, B. (2008). Hypomania: A depressive inhibition override defense mechanism. *Journal of Affective Disorders*, 109(3), 221-232.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- British Psychological Society Working Group (2010). *Understanding Bipolar Disorder*. Leicester: British Psychological Society: Division of Clinical Psychology.
- Brown, G. K., Beck, A. T., Steer, R. A., & Grisham, J. R. (2000). Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology*, 68(3), 371-377.
- Buchanan, T. (2000). Potential of the Internet for personality research. In Birnbaum MH (Ed.), *Psychological experiments on the Internet*. (pp. 121-140). San Diego: Academic Press.
- Buchanan, T., & Smith, J. L. (1999). Using the Internet for psychological research: personality testing on the World Wide Web. *British Journal of Psychology*, 90(Pt 1), 125-144.

Caci, H., Nadalet, L., Baylé, F. J., Robert, P., & Boyer, P. (2003). Cross-cultural study of the impulsiveness-venturesomeness-empathy questionnaire (IVE-7). *Comprehensive Psychiatry*, 44(5), 381-387.

Cao, F., Su, L., Liu, T., & Gao, X. (2007). The relationship between impulsivity and Internet addiction in a sample of Chinese adolescents. *European Psychiatry*, 22(7), 466-471.

Carli, V., Jovanovic, N., Podlesek, A., Roy, A., Rihmer, Z., Maggi, S., . . . Sarchiapone, M. (2010). The role of impulsivity in self-mutilators, suicide ideators and suicide attempters -- A study of 1265 male incarcerated individuals. *Journal of Affective Disorders*, 123(1-3), 116-122.

Carlson, S. R., Johnson, S. C., & Jacobs, P. C. (2010). Disinhibited characteristics and binge drinking among university student drinkers. *Addictive Behaviors*, 35(3), 242-251.

Carpiniello, B., Lai, L., Pirarba, S., Sardu, C., & Pinna, F. (2011). Impulsivity and aggressiveness in bipolar disorder with co-morbid borderline personality disorder. *Psychiatry Research*, 188, 40-44.

Carver, C. S., & Johnson, S. L. (2009). Tendencies toward mania and tendencies toward depression have distinct motivational, affective, and cognitive correlates. *Cognitive Therapy and Research*, 33(6), 552-569. doi: 10.1007/s10608-008-9213-y

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology*, 67(2), 319-333.

Cassano, G. B., Rucci, P., Frank, E., Fagiolini, A., Dell'Osso, L., Shear, M. K., & Kupfer, D. J. (2004). The mood spectrum in unipolar and bipolar disorder: arguments for a unitary approach. *American Journal of Psychiatry*, 161(7), 1264-1269.

Cerullo, M., & Strakowski, S. (2007). The prevalence and significance of substance use disorders in bipolar type I and II disorder. *Substance Abuse Treatment, Prevention, and Policy*, 2(29), 1-9

Chamberlain, S. R., Fineberg, N. A., Blackwell, A. D., Clark, L., Robbins, T. W., & Sahakian, B. J. (2007). A neuropsychological comparison of obsessive-compulsive disorder and trichotillomania. *Neuropsychologia*, 45(4), 654-662.

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, 44(3), 371-394.

- Chiaroni, P., Hantouche, E. G., Gouvernet, J., Azorin, J. M., & Akiskal, H. S. (2005). The cyclothymic temperament in healthy controls and familially at risk individuals for mood disorder: endophenotype for genetic studies? *Journal of Affective Disorders*, 85(1-2), 135-145. doi: S0165032704000254 [pii] 10.1016/j.jad.2003.12.010
- Chinese Society of Psychiatry (2000). *Chinese Classification of Mental Disorders* (3rd ed.). Jinan, China: Shandong Science Press.
- Christenson, G. A., Faber, R. J., de Zwaan, M., Raymond, N. C., Specker, S. M., Ekern, M. D., . . . Eckert, E.D. (1994). Compulsive buying: Descriptive characteristics and psychiatric comorbidity. *Journal of Clinical Psychiatry*, 55, 5-11.
- Christodoulou, T., Lewis, M., Ploubidis, G. B., & Frangou, S. (2006). The relationship of impulsivity to response inhibition and decision-making in remitted patients with bipolar disorder. *European Psychiatry*, 21, 270–273.
- Chung, K.-F., Tso, K.-C., & Chung, R. T.-Y. (2009). Validation of the Mood Disorder Questionnaire in the general population in Hong Kong. *Comprehensive Psychiatry*, 50(5), 471-476.
- Claes, L., Vandereycken, W., & Vertommen, H. (2005). Impulsivity-related traits in eating disorder patients. *Personality and Individual Differences*, 39(4), 739-749.
- Claes, L., Vertommen, H., & Braspenning, N. (2000). Psychometric properties of the Dickman Impulsivity Inventory. *Personality and Individual Differences*, 29(1), 27-35.
- Clark, L., Robbins, T. W., Ersche, K. D., & Sahakian, B. J. (2006). Reflection impulsivity in current and former substance users. *Biological Psychiatry*, 60(5), 515-522.
- Coffey, S. F., Schumacher, J. A., Baschnagel, J. S., Hawk, L. W., & Holloman, G. (2011). Impulsivity and risk-taking in borderline personality disorder with and without substance use disorders. *Personality Disorders: Theory, Research, and Treatment*, 2(2), 128-141.
- Colder, C. R., & Chassin, L. (1997). Affectivity and impulsivity: Temperament risk for adolescent alcohol involvement. *Psychology of Addictive Behaviors*, 11(2), 83-97.
- Compton, W. M., Thomas, Y. F., Stinson, F. S., & Grant, B. F. (2007). Prevalence, correlates, disability, and comorbidity of DSM-IV drug abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry*, 64(5), 566-576. doi: 10.1001/archpsyc.64.5.566

Conner, K. R. (2004). A call for research on planned vs. unplanned suicidal behavior. *Suicide and Life-Threatening Behavior*, 34(2), 89-98.

Corruble, E., Benyamina, A., Bayle, F., Falissard, B., & Hardy, P. (2003). Understanding impulsivity in severe depression? A psychometrical contribution. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 27(5), 829-833.

Coryell, W., Endicott, J., Keller, M., Andreasen, N., Grove, W., Hirschfeld, R. M., & Scheftner, W. (1989). Bipolar affective disorder and high achievement: a familial association. *American Journal of Psychiatry*, 146(8), 983-988.

Costa, P.T. & McCrae, R.R. (1992) *Revised NEO Personality Inventory (NEOPI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources

Crean, J. P., de Wit, H., & Richards, J. B. (2000). Reward discounting as a measure of impulsive behavior in a psychiatric outpatient population. *Experimental and Clinical Psychopharmacology*, 8(2), 155-162.

Cuthbert, B. N. (2005). Dimensional models of psychopathology: Research agenda and clinical utility. *Journal of Abnormal Psychology*, 114(4), 565-569. doi: 10.1037/0021-843x.114.4.565

Cyders, M. A. (2008). *Manipulation of Positive Emotion and its Effects on Negative Outcomes of Gambling Behaviors and Alcohol Consumption: The Role of Positive Urgency*. (Doctor of Philosophy) University of Kentucky, Lexington, Kentucky.

Cyders, M. A., & Coskunpinar, A. (2010). Is urgency emotionality? Separating urgent behaviors from effects of emotional experiences. *Personality and Individual Differences*, 48(7), 839-844.

Cyders, M. A., Flory, K., Rainer, S., & Smith, G. T. (2009). The role of personality dispositions to risky behavior in predicting first-year college drinking. *Addiction*, 104(2), 193-202. doi: 10.1111/j.1360-0443.2008.02434.x

Cyders, M. A., & Smith, G. T. (2007). Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*, 43(4), 839-850.

Cyders, M. A., & Smith, G. T. (2008a). Clarifying the role of personality dispositions in risk for increased gambling behavior. *Personality and Individual Differences*, 45(6), 503-508.



- Cyders, M. A., & Smith, G. T. (2008b). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin*, 134(6), 807-828. doi: 10.1037/a0013341
- Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S., Annus, A. M., & Peterson, C. (2007). Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*, 19(1), 107-118.
- Dalton, E. J., Cate-Carter, T.D., Mundo, E., Parikh, S.V. & Kennedy, J.L. (2003). Suicide risk in bipolar patients: the role of co-morbid substance use disorders. *Bipolar Disorders*, 5, 58–61.
- Dannon, P. N., Lowengrub, K., Sasson, M., Shalgi, B., Tuson, L., Saphir, Y., & Kotler, M. (2004). Comorbid psychiatric diagnoses in kleptomania and pathological gambling: a preliminary comparison study. *European Psychiatry*, 19(5), 299-302.
- Davis, R. N. (1999). Web-based administration of a personality questionnaire: comparison to traditional methods. *Behavior Research Methods, Instruments, & Computers*, 31, 572-577.
- Depue, A., Krauss, M.R., Spont, M.R. & Arbisi, P. (1989) General Behaviour Inventory identification of unipolar and bipolar affective conditions in a nonclinical university population. *Journal of Abnormal Psychology*, 98(2), 117-126
- Deschesnes, M., Finès, P., & Demers, S. (2006). Are tattooing and body piercing indicators of risk-taking behaviours among high school students? *Journal of Adolescence*, 29(3), 379-393.
- Dhossche, D., Snell, K. S., & Larder, S. (2000). A case-control study of tattoos in young suicide victims as a possible marker of risk. *Journal of Affective Disorders*, 59(2), 165-168.
- Di Nicola, M., Tedeschi, D., Mazza, M., Martinotti, G., Harnic, D., Catalano, V., . . . Janiri, L. (2010). Behavioural addictions in bipolar disorder patients: role of impulsivity and personality dimensions. *Journal of Affective Disorders*, 125(1-3), 82-88. doi: S0165-0327(09)00568-0 [pii] 10.1016/j.jad.2009.12.016
- Dicicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321. doi: MED2418 [pii] 10.1111/j.1365-2929.2006.02418.x
- Dickman, S. J. (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*, 58(1), 95-102.

- Dickson-Swift, V., James, E. L., Kippen, S., & Liamputtong, P. (2008). Risk to researchers in qualitative research on sensitive topics: issues and strategies. *Qualitative Health Research, 18*(1), 133-144. doi: 18/1/133 [pii] 10.1177/1049732307309007
- Dillman, D. A., & Bowker, D. (2001). The Web Questionnaire Challenge to Survey Methodologists. In U. D. Reips & M. Bosnjak (Eds.), *Dimensions of Internet Science* (pp. 159-178). Lengerich: Pabst Science Publishers.
- Dillman, D. A., Gertseva, A., & Mahon-Haft, T. (2005). Achieving usability in establishment surveys through the application of visual design principles. *Journal of Official Statistics, 21*(2), 183-214.
- Dillman, D. A., Tortora, R. D., & Bowker, D. (1999). *Principles for constructing web surveys*. <http://survey.sesrc.wsu.edu/dillman/papers.htm>.
- Dodd, A. L., Mansell, W., Morrison, A. P., & Tai, S. (2011). Factor structure of the Hypomanic Attitudes and Positive Predictions Inventory and associations with analogue bipolar symptoms in a student sample. *Personality and Individual Differences, 50*(3), 349-354.
- Donohew, L., Zimmerman, R., Cupp, P. S., Novak, S., Colon, S., & Abell, R. (2000). Sensation seeking, impulsive decision-making, and risky sex: implications for risk-taking and design of interventions. *Personality and Individual Differences, 28*(6), 1079-1091.
- Dougherty, D., Mathias, C., Marsh, D., & Jagar, A. (2005). Laboratory behavioral measures of impulsivity. *Behavior Research Methods, 37*(1), 82-90.
- Dougherty, D. M., Bjork, J. M., Huckabee, H. C., Moeller, F. G., & Swann, A. C. (1999). Laboratory measures of aggression and impulsivity in women with borderline personality disorder. *Psychiatry Research, 85*(3), 315-326. doi: S0165-1781(99)00011-6 [pii]
- Dougherty, D. M., Mathias, C. W., Marsh, D. M., Moeller, F. G., & Swann, A. C. (2004a). Suicidal behaviors and drug abuse: impulsivity and its assessment. *Drug and Alcohol Dependence, 76*(Supplement 1), S93-S105.
- Dougherty, D. M., Mathias, C. W., Marsh, D. M., Papageorgiou, T. D., Swann, A. C., & Moeller, F. G. (2004b). Laboratory measured behavioral impulsivity relates to suicide attempt history. *Suicide and Life-Threatening Behavior, 34*(4), 374-385.
- Dougherty, D. M., Mathias, C. W., Marsh-Richard, D. M., Prevetie, K. N., Dawes, M. A., Hatzis, E. S., . . . Nouvion, S. O. (2009). Impulsivity and clinical symptoms among

adolescents with non-suicidal self-injury with or without attempted suicide.

*Psychiatry Research*, 169(1), 22-27.

Dowling, Z. (2003). *Web questionnaire design: some practical considerations*. Paper presented at the Virtual Methods seminar series, University of Surrey.

Dowson, J., Bazanis, E., Rogers, R., Prevost, A., Taylor, P., Meux, C., . . . Sahakian, B. (2004). Impulsivity in patients with borderline personality disorder. *Comprehensive Psychiatry*, 45(1), 29-36. doi: S0010440X03001755 [pii] 10.1016/j.comppsy.2003.09.013

Doyle, L., Brady, A.-M., & Byrne, G. (2009). An overview of mixed methods research. *Journal of Research in Nursing*, 14(2), 175-185.

Duffy, D. F. (2009). Self-injury. *Psychiatry*, 8(7), 237-240.

Duke, D. C., Keeley, M. L., Geffken, G. R., & Storch, E. A. (2010) Trichotillomania: A current review. *Clinical Psychology Review*, 30(2), 181-193.

Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology*, 95(3), 214-222.

Eisner, L. R., Johnson, S. L., & Carver, C. S. (2008). Cognitive responses to failure and success relate uniquely to bipolar depression versus mania. *Journal of Abnormal Psychology*, 117(1), 154-163.

Elliott, R., Fischer, C. T., & Rennie, D. L. (1999). Evolving guidelines for publication of qualitative research studies in psychology and related fields. *British Journal of Clinical Psychology*, 38 (Pt 3), 215-229.

Endicott, J., & Spitzer, R. L. (1978). A diagnostic interview: The Schedule for Affective Disorders and Schizophrenia. *Archives of General Psychiatry*, 35(7), 837-844.

Engel, S. G., Boseck, J. J., Crosby, R. D., Wonderlich, S. A., Mitchell, J. E., Smyth, J., . . . Steiger, H. (2007). The relationship of momentary anger and impulsivity to bulimic behavior. *Behavior Research and Therapy*, 45(3), 437-447. doi: S0005-7967(06)00074-X [pii] 10.1016/j.brat.2006.03.014

Enticott, P., & Ogloff, J. (2006). Elucidation of impulsivity. *Australian Psychologist*, 41(1), 3-14.

Evenden, J. (1999). Varieties of impulsivity. *Psychopharmacology*, 146, 348-361.

- Eysenck, H. J. (1993). The nature of impulsivity. In J. J. McCown WG, Shure MB (Ed.), *The impulsive client: theory, research and treatment*. Washington, D.C: American Psychological Association.
- Eysenck, S., & Eysenck, H. J. (1978). Impulsiveness and venturesomeness: Their position in a dimensional system of personality description. *Psychological Reports*, 43, 1247-1255.
- Eysenck, S. B. G., Pearson, P. R., Easting, G., & Allsopp, J. F. (1985). Age norms for impulsiveness, venturesomeness and empathy in adults. *Personality and Individual Differences*, 6(5), 613-619.
- Favaro, A., Zanetti, T., Tenconi, E., Degortes, D., Ronzan, A., Veronese, A., & Santonastaso, P. (2004). The relationship between temperament and impulsive behaviors in eating disordered subjects. *Eating Disorders: The Journal of Treatment & Prevention*, 13(1), 61 - 70.
- Fernández-Aranda, F., Pinheiro, A. P., Thornton, L. M., Berrettini, W. H., Crow, S., Fichter, M. M., . . . Bulik, C. M. (2008). Impulse control disorders in women with eating disorders. *Psychiatry Research*, 157(1-3), 147-157.
- Ferrao, Y. A., Almeida, V. P., Bedinc, N. R., Rosac, R., & Busnell, E. D. (2006). Impulsivity and compulsivity in patients with trichotillomania or skin picking compared with patients with obsessive-compulsive disorder. *Comprehensive Psychiatry*, 47, 282– 288.
- Field, A. (2005). *Discovering Statistics Using SPSS (2nd ed.)*. London: SAGE Publications LTD.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). *Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition*. New York: Biometrics Research, New York State Psychiatric Institute.
- Fischer, S., & Smith, G. T. (2004). Deliberation affects risk taking beyond sensation seeking. *Personality and Individual Differences*, 36(3), 527-537.
- Fischer, S., & Smith, G. T. (2008). Binge eating, problem drinking, and pathological gambling: Linking behavior to shared traits and social learning. *Personality and Individual Differences*, 44(4), 789-800.
- Fischer, S., Smith, G. T., & Cyders, M. A. (2008). Another look at impulsivity: A meta-analytic review comparing specific dispositions to rash action in their relationship to bulimic symptoms. *Clinical Psychology Review*, 28(8), 1413-1425.

- Flint, A. J., Black, S. E., Campbell-Taylor, I., Gailey, G. F., & Levinton, C. (1993). Abnormal speech articulation, psychomotor retardation, and subcortical dysfunction in major depression. *Journal of Psychiatric Research*, 27(3), 309-319.
- Fortune, S., Stewart, A., Yadav, V., & Hawton, K. (2007). Suicide in adolescents: using life charts to understand the suicidal process. *Journal of Affective Disorders*, 100(1-3), 199-210. doi: S0165-0327(06)00461-7 [pii] 10.1016/j.jad.2006.10.022
- Fossati, A., Barratt, E. S., Borroni, S., Villa, D., Grazioli, F., & Maffei, C. (2007). Impulsivity, aggressiveness, and DSM-IV personality disorders. *Psychiatry Research*, 149(1-3), 157-167.
- Franken, I. H. A., & Muris, P. (2006). Gray's impulsivity dimension: A distinction between Reward Sensitivity versus Rash Impulsiveness. *Personality and Individual Differences*, 40(7), 1337-1347.
- Franken, R. E., Gibson, K. J., & Rowland, G. L. (1992). Sensation seeking and the tendency to view the world as threatening. *Personality and Individual Differences*, 13(1), 31-38.
- French, S. A., Jeffery, R. W., Sherwood, N. E., & Neumark-Sztainer, D. (1999). Prevalence and correlates of binge eating in a nonclinical sample of women enrolled in a weight gain prevention program. *International Journal of Obesity*, 23(6), 576-585.
- Funk, J. B., Chessare, J. B., Weaver, M. T., & Exley, A. R. (1993). Attention Deficit Hyperactivity Disorder, creativity, and the effects of methylphenidate. *Pediatrics*, 91(4), 816-819.
- Gamma, A., Angst, J., Ajdacic-Gross, V., & Rössler, W. (2008). Are hypomanics the happier normals? *Journal of Affective Disorders*, 111(2-3), 235-243.
- García-Forero, C., Gallardo-Pujol, D., Maydeu-Olivares, A., & Andrés-Pueyo, A. (2009). Disentangling impulsiveness, aggressiveness and impulsive aggression: An empirical approach using self-report measures. *Psychiatry Research*, 168(1), 40-49.
- Gay, P., Courvoisier, D. S., Billieux, J., Rochat, L., Schmidt, R. E., & Van der Linden, M. (2009). Can the distinction between intentional and unintentional interference control help differentiate varieties of impulsivity? *Journal of Research in Personality*, 44, 46-52
- Gay, P., Rochat, L., Billieux, J., d'Acremont, M., & Van der Linden, M. (2008). Heterogeneous inhibition processes involved in different facets of self-reported impulsivity: Evidence from a community sample. *Acta Psychologica*, 129(3), 332-339.

Gervasoni, N., Weber Rouget, B., Miguez, M., Dubuis, V., Bizzini, V., Gex-Fabry, M., . . . Aubry, J.-M. (2009). Performance of the Mood Disorder Questionnaire (MDQ) according to bipolar subtype and symptom severity. *European Psychiatry, 24*(5), 341-344.

Ghaemi, N. S., Miller, C. J., Berv, D. A., Klugman, J., Rosenquist, K. J., & Pies, R. W. (2005). Sensitivity and specificity of a new bipolar spectrum diagnostic scale. *Bipolar Depression: Focus on Phenomenology, 84*(2-3), 273-277.

Giegling, I., Olgiati, P., Hartmann, A. M., Calati, R., Möller, H.-J., Rujescu, D., & Serretti, A. (2009). Personality and attempted suicide. Analysis of anger, aggression and impulsivity. *Journal of Psychiatric Research 43*(16), 1262-1271

Glenn, C. R., & Klonsky, E. D. (2010). A multimethod analysis of impulsivity in nonsuicidal self-injury. *Personality Disorders: Theory, Research, and Treatment, 1*(1), 67-75.

Glow, R.A., Lange, R.V., Glow, P.H. & Barnett, J.A. (1983) Cognitive and self-reported impulsiveness: Comparison of Kagan's MFFT and Eysenck's EPQ Impulsiveness measures. *Personality and Individual Differences, 4*(2), 179-187

Goodwin, F. K., & Jamison, K. R. (1990). *Manic-depressive Illness*. London: Oxford University Press.

Gordon, C., Tony, B., Adrian Raine, T. L., & Sarnoff, A. M. (1995). Fully and quasi-dimensional constructions of schizotypy. In A. Raine, T. Lencz & S. A. Mednick (Eds.), *Schizotypal Personality*. Cambridge University Press.

Gorlyn, M., Keilp, J. G., Tryon, W. W., & Mann, J. J. (2005). Performance test correlates of component factors of impulsiveness. *Personality and Individual Differences, 38*(7), 1549-1559.

Goudriaan, A. E., Oosterlaan, J., De Beurs, E., & Van Den Brink, W. (2008). The role of self-reported impulsivity and reward sensitivity versus neurocognitive measures of disinhibition and decision-making in the prediction of relapse in pathological gamblers. *Psychological Medicine, 38*, 41–50.

Gough, H. G. (1979). A creative personality scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37*(8), 1398-1405.

Grant, J. E., Levine, L., Kim, D., & Potenza, M. N. (2005). Impulse control disorders in adult psychiatric inpatients. *American Journal of Psychiatry, 162*, 2184-2188.

- Granö, N., Virtanen, M., Vahtera, J., Elovainio, M., & Kivimäki, M. (2004). Impulsivity as a predictor of smoking and alcohol consumption. *Personality and Individual Differences*, 37(8), 1693-1700.
- Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246-276). Berlin: Springer-Verlag.
- Gullo, M. J., & Dawe, S. (2008). Impulsivity and adolescent substance use: Rashly dismissed as "all-bad"? *Neuroscience & Biobehavioral Reviews*, 32(8), 1507-1518.
- Gunderson, J. G., Weinberg, I., Daversa, M. T., Kueppenbender, K. D., Zanarini, M. C., Shea, M. T., . . . Dyck, I. (2006). Descriptive and longitudinal observations on the relationship of borderline personality disorder and bipolar disorder. *American Journal of Psychiatry*, 163(7), 1173-1178. doi: 10.1176/appi.ajp.163.7.1173
- Gvion, Y., & Apter, A. (2011). Aggression, impulsivity, and suicide behavior: A review of the literature. *Archives of Suicide Research*, 15(2), 93-112.
- Harvey, P. D., Greenberg, B. R., & Serper, M. R. (1989). The affective lability scales: development, reliability, and validity. *Journal of Clinical Psychology*, 45(5), 786-793.
- Healey, C., Peters, S., Kinderman, P., McCracken, C., & Morriss, R. (2009). Reasons for substance use in dual diagnosis bipolar disorder and substance use disorders: A qualitative study. *Journal of Affective Disorders*, 113(1-2), 118-126.
- Healy, D. (2006). The latest mania: Selling bipolar disorder. *PLoS Medicine*, 3(4), e185.
- Heatherton, T. F., & Wyland, C. L. (2003). Assessing self-esteem. In S. J. Lopez & C. R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures* (Vol. xvii, pp. 219-233). Washington DC: American Psychological Association.
- Helmers, K. F., Young, S. N., & Pihl, R. O. (1995). Assessment of measures of impulsivity in healthy male volunteers. *Personality and Individual Differences*, 19(6), 927-935.
- Helzer, J. E., Kraemer, H. C., & Krueger, R. F. (2006). The feasibility and need for dimensional psychiatric diagnoses. *Psychological Medicine*, 36(12), 1671-1680. doi: 10.1017/S003329170600821X
- Henry, C., Mitropoulou, V., New, A. S., Koenigsberg, H. W., Silverman, J., & Siever, L. J. (2001). Affective instability and impulsivity in borderline personality and bipolar II disorders: similarities and differences. *Journal of Psychiatric Research*, 35(6), 307-312.

Herpertz, S., Gretzer, A., Steinmeyer, E. M., Muehlbauer, V., Schuerkens, A., & Sass, H. (1997a). Affective instability and impulsivity in personality disorder: Results of an experimental study. *Journal of Affective Disorders*, 44(1), 31-37.

Herpertz, S., Sass, H., & Favazza, A. (1997b). Impulsivity in self-mutilative behavior: Psychometric and biological findings. *Journal of Psychiatric Research*, 31(4), 451-465.

Hirschfeld, R., Holzer, C., Calabrese, J. R., Weissman, M., Reed, M., Davies, M., . . . Wagner, K. D. (2003). Validity of the Mood Disorder Questionnaire: A general population study. *American Journal of Psychiatry*, 160, 178-180.

Hirschfeld, R. M., Williams, J. B., Spitzer, R. L., Calabrese, J. R., Flynn, L., Keck, P. E., . . . Zajecka, J. (2000). Development and validation of a screening instrument for bipolar spectrum disorder: the Mood Disorder Questionnaire. *American Journal of Psychiatry*, 157(11), 1873-1875.

Hjelmeland, H., & Knizek, B. L. (2010). Why we need qualitative research in suicidology. *Suicide and Life Threatening Behavior*, 40(1), 74-80. doi: 10.1521/suli.2010.40.1.74 [pii] 10.1521/suli.2010.40.1.74

Hollander, E. (1996). *New developments in impulsivity and compulsivity*. Paper presented at the European Neuropsychopharmacology Conference.

Hollander, E., Swann, A. C., Coccaro, E. F., Jiang, P., & Smith, T. B. (2005). Impact of trait impulsivity and state aggression on divalproex versus placebo response in borderline personality disorder. *American Journal of Psychiatry*, 162, 621-624.

Holmes, M. K., Bearden, C. E., Barguil, M., Fonseca, M., Monkul, E. S., Nery, F. G., . . . Glahn, D. C. (2009). Conceptualizing impulsivity and risk taking in bipolar disorder: importance of history of alcohol abuse. *Bipolar Disorders*, 11(1), 33-40.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60.

Hopson, R. E. (1993). A thematic analysis of the addictive experience: Implications for psychotherapy. *Psychotherapy*, 30(3), 481-494.

Horn, W. (1983). *Leistungsprüfsystem, L-P-S: Handanweisung für die Durchführung, Auswertung und Interpretation (2nd ed.)*. Oxford: Hogrefe.



- Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hudson, J. I., Hiripi, E., Pope Jr, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61(3), 348-358.
- Iancu, I., Lowengrub, K., Dannon, P. N., Anholt, G., & Alter, C. (2007). Impulse control disorders: association with obsessive compulsive disorder, addiction and impulsivity. *European Psychiatry*, 22(Supplement 1), S81-S82.
- International Society for Research on Impulsivity (2011). *BIS-11A Issue*. <http://www.impulsivity.org/measurement/bis11> Retrieved 23/10/11, 2011
- Ireland, J. L., & Archer, J. (2008). Impulsivity among adult prisoners: A confirmatory factor analysis study of the Barratt Impulsivity Scale. *Personality and Individual Differences*, 45(4), 286-292.
- Iribarren, C., Sidney, S., Jacobs Jr, D. R., & Weisner, C. (2000). Hospitalization for suicide attempt and completed suicide: epidemiological features in a managed care population. *Social Psychiatry and Psychiatric Epidemiology*, 35(7), 288-296. doi: 10.1007/s001270050241
- Isometsä, E., Suominen, K., Mantere, O., Valtonen, H., Leppämäki, S., Pippingsköld, M., & Arvilommi, P. (2003). The mood disorder questionnaire improves recognition of bipolar disorder in psychiatric care. *BMC Psychiatry*, 3, 8. doi: 10.1186/1471-244X-3-8
- James, L. M., & Taylor, J. (2007). Impulsivity and negative emotionality associated with substance use problems and Cluster B personality in college students. *Addictive Behaviors*, 32(4), 714-727.
- Jamison, K. R. (1995). Manic-depressive illness and creativity. *Scientific American*, 272(2), 62-67.
- Johnson, S. L. (2005a). Life events in bipolar disorder: Towards more specific models. *The Psychology of Bipolar Disorder*, 25(8), 1008-1027.
- Johnson, S. L. (2005b). Mania and dysregulation in goal pursuit: a review. *Clinical Psychology Review*, 25(2), 241-262.
- Johnson, S. L., & Carver, C. S. (2006). Extreme goal setting and vulnerability to mania among undiagnosed young adults. *Cognitive Therapy and Research*, 30(3), 377-395. doi: 10.1007/s10608-006-9044-7

- Johnson, S. L., Eisner, L. R., & Carver, C. S. (2009). Elevated expectancies among persons diagnosed with bipolar disorder. *British Journal of Clinical Psychology, 48*(Pt 2), 217-222. doi: bjcp547 [pii] 10.1348/014466509X414655
- Johnson, S. L., Meyer, B., Winett, C., & Small, J. (2000). Social support and self-esteem predict changes in bipolar depression but not mania. *Journal of Affective Disorders, 58*(1), 79-86. doi: S0165-0327(99)00133-0 [pii]
- Johnson, S. L., Morriss, R., Scott, J., Paykel, E., Kinderman, P., Kolamunnage-Dona, R., & Bentall, R. P. (2011). Depressive and manic symptoms are not opposite poles in bipolar disorder. *Acta Psychiatrica Scandinavica, 123*(3), 206-210. doi: ACP1602 [pii] 10.1111/j.1600-0447.2010.01602.x
- Joiner, T. E. (2005). *Why People Die by Suicide*. Cambridge, MA: Harvard University Press.
- Jones, S., & Day, C. (2008). Self appraisal and behavioural activation in the prediction of hypomanic personality and depressive symptoms. *Personality and Individual Differences, 45*(7), 643-648.
- Jones, S. H., Tai, S., Evershed, K., Knowles, R., & Bentall, R. (2006). Early detection of bipolar disorder: a pilot familial high-risk study of parents with bipolar disorder and their adolescent children. *Bipolar Disorders, 8*(4), 362-372.
- Judd, L. L., & Akiskal, H. S. (2003). The prevalence and disability of bipolar spectrum disorders in the US population: re-analysis of the ECA database taking into account subthreshold cases. *Journal of Affective Disorders, 73*(1-2), 123-131.
- Kagan, J., Rosman, B.L., Day, D., Albert, J. & Phillips, W. (1964) Information processing in the child: significance of analytic and reflective attitudes. *Psychological Monographs: General and Applied, 78*(1)
- Kämpfe, N., & Mitte, K. (2009). A German validation of the UPPS impulsive behavior scale: Further evidence for a four-dimensional model of impulsivity. *European Journal of Psychological Assessment, 25*(4), 252-259. doi: 10.1027/1015-5759.25.4.252
- Karakus, G., & Tamam, L. (2011). Impulse control disorder comorbidity among patients with bipolar I disorder. *Comprehensive Psychiatry* 52(4), 378-385.
- Kashner, T. M., Shoaf, T., & Rush, A. J. (2000). The economic burden of suicide in the United States in the year 2000. *The Economics of Neuroscience* 2, 44-48.

- Keilp, J. G., Sackeim, H. A., & Mann, J. J. (2005). Correlates of trait impulsiveness in performance measures and neuropsychological tests. *Psychiatry Research, 135*(3), 191-201.
- Kenny, D. A. (2011). *Structural Equation Modeling*. Retrieved 30/10/11, from <http://www.davidakenny.net/cm/causalm.htm>
- Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. (2006). The prevalence and correlates of DSM-IV intermittent explosive disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 63*, 669-678.
- Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., . . . Kendler, K. S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 51*(1), 8-19. doi: 10.1001/archpsyc.1994.03950010008002
- Ketzenberger, K. E., & Forrest, L. (2000). Impulsiveness and compulsiveness in alcoholics and nonalcoholics. *Addictive Behaviors, 25*(5), 791-795.
- Kim, B., Wang, H. R., Son, J. I., Kim, C. Y., & Joo, Y. H. (2008). Bipolarity in depressive patients without histories of diagnosis of bipolar disorder and the use of the Mood Disorder Questionnaire for detecting bipolarity. *Comprehensive Psychiatry, 49*(5), 469-475.
- Kim, S. W., Grant, J. E., Eckert, E. D., Faris, P. L., & Hartman, B. K. (2006). Pathological gambling and mood disorders: Clinical associations and treatment implications. *Journal of Affective Disorders, 92*(1), 109-116.
- Kipper, D. A., Green, D. J., & Prorak, A. (2010). The relationship among spontaneity, impulsivity, and creativity. *Journal of Creativity in Mental Health, 5*(1), 39 - 53.
- Knowles, R., Tai, S., Christensen, I., & Bentall, R. (2005). Coping with depression and vulnerability to mania: A factor analytic study of the Nolen-Hoeksema (1991) Response Styles Questionnaire. *British Journal of Clinical Psychology, 44*(1), 99-112.
- Knowles, R., Tai, S., Jones, S. H., Highfield, J., Morriss, R., & Bentall, R. P. (2007). Stability of self-esteem in bipolar disorder: comparisons among remitted bipolar patients, remitted unipolar patients and healthy controls. *Bipolar Disorders, 9*(5), 490-495.
- Koran, L. M., Faber, R. J., Aboujaoude, E., Large, M. D., & Serpe, R. T. (2006). Estimated prevalence of compulsive buying behavior in the United States. *American Journal of Psychiatry, 163*(10), 1806-1812. doi: 10.1176/appi.ajp.163.10.1806

- Kumari, V., Barkataki, I., Goswami, S., Flora, S., Das, M., & Taylor, P. (2009). Dysfunctional, but not functional, impulsivity is associated with a history of seriously violent behaviour and reduced orbitofrontal and hippocampal volumes in schizophrenia. *Psychiatry Research: Neuroimaging*, 173(1), 39-44.
- Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the Hypomanic Personality Scale. *Journal of Abnormal Psychology*, 109(2), 222-226. doi: 10.1037/0021-843x.109.2.222
- Labree, W., Nijman, H., van Marle, H., & Rassin, E. (2010). Backgrounds and characteristics of arsonists. *International Journal of Law and Psychiatry*, 33(3), 149-153.
- Leahey, E. (2007). Convergence and confidentiality? Limits to the implementation of mixed methodology. *Social Science Research*, 36(1), 149-158.
- Leshem, R., & Glicksohn, J. (2007). The construct of impulsivity revisited. *Personality and Individual Differences*, 43(4), 681-691.
- Lewis, M., Scott, J., & Frangou, S. (2009). Impulsivity, personality and bipolar disorder. *European Psychiatry*, 24(7), 464-469.
- Liddle, E. B., Scerif, G., Hollis, C. P., Batty, M. J., Groom, M. J., Liotti, M., & Liddle, P. F. (2009). Looking before you leap: A theory of motivated control of action. *Cognition*, 112(1), 141-158.
- Linehan, M. M., Comtois, K. A., Brown, M. Z., Heard, H. L., & Wagner, A. (2006). Suicide Attempt Self-Injury Interview (SASII): Development, reliability, and validity of a scale to assess suicide attempts and intentional self-injury. *Psychological Assessment*, 18(3), 303-312.
- Loos, M., Van Der Sluis, S., Bochdanovits, Z., Van Zutoen, I.J., Pattij, T., Steidl, O., Neuro-BSIK Mouse Phenomics Consortium, Smit, A.B. & Spiker, S. (2009) Activity and impulsive action are controlled by different genetic and environmental factors. *Genes, Brain and Behaviour*, 8(8), 817-828
- Luengo, M. A., Carrillo-De-La-Peña, M. T., & Otero, J. M. (1991). The components of impulsiveness: A comparison of the I.7 impulsiveness questionnaire and the Barratt impulsiveness scale. *Personality and Individual Differences*, 12(7), 657-667.
- Lunde, A. V., Fasmer, O. B., Akiskal, K. K., Akiskal, H. S., & Oedegaard, K. J. (2008). The relationship of bulimia and anorexia nervosa with bipolar disorder and its temperamental foundations. *Journal of Affective Disorders*, 115(3), 309-314

- Lynam, D. R., and Miller, J.D. (2004). Personality pathways to impulsive behavior and their relations to deviance: Results from three samples. *Journal of Quantitative Criminology*, 20(4), 319-341.
- Maccallum, F., Blaszczyński, A., Ladouceur, R., & Nower, L. (2007). Functional and dysfunctional impulsivity in pathological gambling. *Personality and Individual Differences*, 43(7), 1829-1838.
- MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin*, 114(1), 185-199.
- Mackinnon, D. F., & Pies, R. (2006). Affective instability as rapid cycling: Theoretical and clinical implications for borderline personality and bipolar spectrum disorders. *Bipolar Disorders*, 8(1), 1-14. doi: BDI283 [pii] 10.1111/j.1399-5618.2006.00283.x
- Magid, V., & Colder, C. R. (2007). The UPPS Impulsive Behavior Scale: Factor structure and associations with college drinking. *Personality and Individual Differences*, 43(7), 1927-1937.
- Maloney, E., Degenhardt, L., Darke, S., & Nelson, E. C. (2009). Impulsivity and borderline personality as risk factors for suicide attempts among opioid-dependent individuals. *Psychiatry Research*, 169(1), 16-21. doi: S0165-1781(08)00196-0 [pii] 10.1016/j.psychres.2008.06.026
- Mann, J., Waternaux, C., Haas, G. L., & Malone, K. M. (1999). Toward a clinical model of suicidal behavior in psychiatric patients. *American Journal of Psychiatry*, 156, 181-189.
- Mansell, W., Morrison, A. P., Reid, G., Lowens, I., & Tai, S. (2007). The interpretation of, and responses to, changes in internal states: An integrative cognitive model of mood swings and bipolar disorders. *Behavioural and Cognitive Psychotherapy*, 35, 515-539.
- Mansell, W., & Pedley, R. (2008). The ascent into mania: A review of psychological processes associated with the development of manic symptoms. *Clinical Psychology Review*, 28(3), 494-520.
- Marquis, K. H., Marquis, M. S., & Polich, J. M. (1986). Response bias and reliability in sensitive topic surveys. *Journal of the American Statistical Association*, 81(394), 381-389.
- Marsh, D. M., Dougherty, D. M., Mathias, C. W., Moeller, F. G., & Hicks, L. R. (2002). Comparisons of women with high and low trait impulsivity using behavioral models

of response-disinhibition and reward-choice. *Personality and Individual Differences*, 33(8), 1291-1310.

Martens, M. P., & Haase, R. F. (2006). Advanced applications of structural equation modeling in counseling psychology research. *The Counseling Psychologist*, 34(6), 878-911.

Maser, J. D., Akiskal, H. S., Schettler, P., Scheftner, W., Mueller, T., Endicott, J., . . . Clayton, P. (2002). Can temperament identify affectively ill patients who engage in lethal or near-lethal suicidal behavior? A 14-year prospective study. *Suicide and Life-Threatening Behavior*, 32(1), 10-32.

Mathias, C. W., Dougherty, D. M., Marsh, D. M., Moeller, F. G., Hicks, L. R., Dasher, K., & Bar-Eli, L. (2002). Laboratory measures of impulsivity: a comparison of women with or without childhood aggression. *Psychological Record*, 52, 289-303.

Matsuo, K., Nielsen, N., Nicoletti, M. A., Hatch, J. P., Monkul, E. S., Watanabe, Y., . . . Soares, J. C. (2010). Anterior genu corpus callosum and impulsivity in suicidal patients with bipolar disorder. *Neuroscience Letters*, 469(1), 75-80.

McCrae, R. R., & Costa, P. T. J. (1990). *Personality in adulthood*. New York: Guilford.

Mcdonald, R. A., Thurston, P. W., & Nelson, M. R. (2000). A Monte Carlo study of missing item methods. *Organizational Research Methods*, 3, 71-92.

McElroy, S. L., Kotwal, R., Keck, J. P. E., & Akiskal, H. S. (2005). Comorbidity of bipolar and eating disorders: distinct or related disorders with shared dysregulations? *Journal of Affective Disorders*, 86(2-3), 107-127.

McElroy, S. L., Pope, H. G., Keck, P. E., Hudson, J. I., Phillips, K. A., & Strakowski, S. M. (1996). Are impulse-control disorders related to bipolar disorder? *Comprehensive Psychiatry*, 37(4), 229-240.

McIntyre, R. S., McElroy, S. L., Konarski, J. Z., Soczynska, J. K., Wilkins, K., & Kennedy, S. H. (2007). Problem gambling in bipolar disorder: Results from the Canadian Community Health Survey. *Journal of Affective Disorders*, 102(1-3), 27-34.

McIntyre, R. S., Soczynska, J. K., Bottas, A., Bordbar, K., Konarski, J. Z., & Kennedy, S. H. (2006). Anxiety disorders and bipolar disorder: a review. *Bipolar Disorders*, 8(6), 665 - 676.

McMain, S., Korman, L. M., & Dimeff, L. (2001). Dialectical behavior therapy and the treatment of emotion dysregulation. *Journal of Clinical Psychology*, 57(2), 183-196. doi: 10.1002/1097-4679(200102)57:2<183::AID-JCLP5>3.0.CO;2-Y [pii]

Meade, C. S., Graff, F. S., Griffin, M. L., & Weiss, R. D. (2008). HIV risk behavior among patients with co-occurring bipolar and substance use disorders: Associations with mania and drug abuse. *Drug and Alcohol Dependence*, 92(1-3), 296-300.

Medical Research Council Strategic Review Group (2010). *Review of Mental Health Research*. London: Medical Research Council

Merikangas, K. R., Akiskal, H. S., Angst, J., Greenberg, P. E., Hirschfeld, R., Petukhova, M., & Kessler, R. C. (2007). Lifetime and 12-month prevalence of bipolar spectrum disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 64, 543-552.

Merikangas, K. R., Herrell, R., Swendsen, J., Rossler, W., Ajdacic-Gross, V., & Angst, J. (2008). Specificity of bipolar spectrum conditions in the comorbidity of mood and substance use disorders. *Archives of General Psychiatry*, 65(1), 47-52.

Meyer, B., Johnson, S., & Winters, R. (2001). Responsiveness to threat and incentive in bipolar disorder: Relations of the BIS/BAS scales with symptoms. *Journal of Psychopathology and Behavioral Assessment*, 23(3), 133-143.

Michaelis, B. H., Goldberg, J. F., Davis, G. P., Singer, T. M., Garno, J. L., & Wenze, S. J. (2004). Dimensions of impulsivity and aggression associated with suicide attempts among bipolar patients: a preliminary study. *Suicide and Life Threatening Behavior*, 34(2), 172-176. doi: 10.1521/suli.34.2.172.32783

Michaelis, B. H., Goldberg, J. F., Singer, T. M., Garno, J. L., Ernst, C. L., & Davis, G. P. (2003). Characteristics of first suicide attempts in single versus multiple suicide attempters with bipolar disorder. *Comprehensive Psychiatry*, 44(1), 15-20.

Miklowitz, D. J., Wisniewski, S. R., Miyahara, S., Otto, M. W., & Sachs, G. S. (2005). Perceived criticism from family members as a predictor of the one-year course of bipolar disorder. *Psychiatry Research*, 136(2-3), 101-111. doi: S0165-1781(05)00162-9 [pii] 10.1016/j.psychres.2005.04.005

Miller, C. J., Klugman, J., Berv, D. A., Rosenquist, K. J., & Nassir Ghaemi, S. (2004a). Sensitivity and specificity of the Mood Disorder Questionnaire for detecting bipolar disorder. *Journal of Affective Disorders*, 81(2), 167-171.

Miller, E., Joseph, S., & Tudway, J. (2004b). Assessing the component structure of four self-report measures of impulsivity. *Personality and Individual Differences*, 37(2), 349-358.

Mischel, W., Shoda, Y. & Rodriguez, M. (1989) Delay of gratification in children. *Science*, 244, 933-937

- Mobbs, O., Ghisletta, P., & Van der Linden, M. (2008). Clarifying the role of impulsivity in dietary restraint: A structural equation modeling approach. *Personality and Individual Differences, 45*(7), 602-606.
- Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001a). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158*, 1783-1793.
- Moeller, F. G., Dougherty, D. M., Barratt, E. S., Schmitz, J. M., Swann, A. C., & Grabowski, J. (2001b). The impact of impulsivity on cocaine use and retention in treatment. *Journal of Substance Abuse Treatment, 21*(4), 193-198.
- Morriss, R., Scott, J., Paykel, E., Bentall, R., Hayhurst, H., & Johnson, T. (2007). Social adjustment based on reported behaviour in bipolar affective disorder. *Bipolar Disorders, 9*(1-2), 53-62. doi: BDI343 [pii] 10.1111/j.1399-5618.2007.00343.x
- Muehlenkamp, J. J., & Gutierrez, P. M. (2004). An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide and Life Threatening Behavior, 34*(1), 12-23.
- Mueller, S. C., Jackson, G. M., Dhalla, R., Datsopoulos, S., & Hollis, C. P. (2006). Enhanced cognitive control in young people with Tourette's syndrome. *Current Biology, 16*(6), 570-573.
- Murray, B. L. (2003). Qualitative research interviews: therapeutic benefits for the participants. *J Psychiatric and Mental Health Nursing, 10*(2), 233-236. doi: 553 [pii]
- Nagata, T., Kawarada, Y., Kiriike, N., & Iketani, T. (2000). Multi-impulsivity of Japanese patients with eating disorders: primary and secondary impulsivity. *Psychiatry Research, 94*(3), 239-250.
- Naimi, T. S., Brewer, R. D., Mokdad, A., Denny, C., Serdula, M. K., & Marks, J. S. (2003). Binge drinking among US adults. *JAMA: The Journal of the American Medical Association, 289*(1), 70-75. doi: 10.1001/jama.289.1.70
- Najt, P., Perez, J., Sanches, M., Peluso, M. A. M., Glahn, D., & Soares, J. C. (2007). Impulsivity and bipolar disorder. *European Neuropsychopharmacology, 17*(5), 313-320.
- National Institute for Health and Clinical Excellence (2006). *Bipolar disorder: The management of bipolar disorder in adults, children and adolescents, in primary and secondary care*. London: National Institute for Health and Clinical Excellence.
- Neale, J. M. (1988). *Defensive function of manic episodes*. In T. F. Oltmanns & B. A. Maher (Eds.), *Delusional beliefs* (pp. 138-156). New York: Wiley.



Nelson Laird, T. F., Shoup, R., & Kuh, D. G. (2005). *Measuring Deep Approaches to Learning Using the National Survey of Student Engagement*. Paper presented at the Annual Meeting of the Association for Institutional Research, Chicago, IL.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569-582.

O'Connor, R. C., Rasmussen, S., Miles, J., & Hawton, K. (2009). Self-harm in adolescents: self-report survey in schools in Scotland. *The British Journal of Psychiatry, 194*(1), 68-72. doi: 10.1192/bjp.bp.107.047704

Oquendo, M. A., Waternaux, C., Brodsky, B., Parsons, B., Haas, G. L., Malone, K. M., & Mann, J. J. (2000). Suicidal behavior in bipolar mood disorder: clinical characteristics of attempters and nonattempters. *Journal of Affective Disorders, 59*(2), 107-117.

Östlund, U., Kidd, L., Wengström, Y., & Rowa-Dewar, N. (2011). Combining qualitative and quantitative research within mixed method research designs: A methodological review. *International Journal of Nursing Studies, 48*(3), 369-383.

Osvath, P., Omboli, Z., Voros, V., & Fekete, S. (2008). P.2.e.009 Affective disorders - bipolarity - impulsivity. Results of a study with the Hungarian version of mood disorder questionnaire (MDQ). *European Neuropsychopharmacology, 18*(Supplement 4), S364-S364.

Paris, J. (2004). Borderline or bipolar? Distinguishing borderline personality disorder from bipolar spectrum disorders. *Harvard Review of Psychiatry, 12*(3), 140-145. doi: 6RNMQUVU66LH5YJK [pii] 10.1080/10673220490472373

Paris, J., Gunderson, J., & Weinberg, I. (2007). The interface between borderline personality disorder and bipolar spectrum disorders. *Comprehensive Psychiatry, 48*(2), 145-154. doi: S0010-440X(06)00107-6 [pii]10.1016/j.comppsy.2006.10.001

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*(6), 768-774.

Peluso, M. A. M., Hatch, J. P., Glahn, D. C., Monkul, E. S., Sanches, M., Najt, P., . . . Soares, J. C. (2007). Trait impulsivity in patients with mood disorders. *Journal of Affective Disorders, 100*(1-3), 227-231.

Perroud, N., Baud, P., Mouthon, D., Courtet, P., & Malafosse, A. (2011). Impulsivity, aggression and suicidal behavior in unipolar and bipolar disorders. *Journal of Affective Disorders, 134*(1-3), 112-118. doi: S0165-0327(11)00310-7 [pii] 10.1016/j.jad.2011.05.048

- Petry, N. M. (2001). Substance abuse, pathological gambling, and impulsiveness. *Drug and Alcohol Dependence*, 63(1), 29-38.
- Petterson, U. (1977). Manic-depressive illness. A clinical, social and genetic study. *Acta Psychiatrica Scandinavica Supplement*, (269), 1-93.
- Phelps, J., Angst, J., Katzow, J., & Sadler, J. (2008). Validity and utility of bipolar spectrum models. *Bipolar Disorders*, 10(1 Pt 2), 179-193. doi: BDI562 [pii] 10.1111/j.1399-5618.2007.00562.x
- Pies, R. (2007). The historical roots of the "bipolar spectrum": Did Aristotle anticipate Kraepelin's broad concept of manic-depression? *Journal of Affective Disorders*, 100(1-3), 7-11.
- Plutchik, R. & Van Praag, H. (1989) The measurement of suicidality, aggressivity and impulsivity. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 13: S23–S34
- Potter, L. B., Powell, K. E., & Kachur, S. P. (1995). Suicide prevention from a public health perspective. *Suicide and Life-Threatening Behaviour*, 25(1), 82-91.
- Preti, A., Pinna, C., Nocco, S., Mulliri, E., Pilia, S., Petretto, D. R., & Masala, C. (2006). Body of evidence: Tattoos, body piercing, and eating disorder symptoms among adolescents. *Journal of Psychosomatic Research*, 61(4), 561-566.
- Quraishi, S., & Frangou, S. (2002). Neuropsychology of bipolar disorder: a review. *Journal of Affective Disorders*, 72(3), 209-226.
- Rahman, S., Sahakian, B. J., Cardinal, R. N., Rogers, R. D., & Robbins, T. W. (2001). Decision making and neuropsychiatry. *Trends in Cognitive Sciences*, 5(6), 271-277.
- Raylu, N., & Oei, T. P. S. (2002). Pathological gambling: A comprehensive review. *Clinical Psychology Review*, 22(7), 1009-1061.
- Raymond, N. C., Coleman, E., & Miner, M. H. (2003). Psychiatric comorbidity and compulsive/impulsive traits in compulsive sexual behavior. *Comprehensive Psychiatry*, 44(5), 370-380.
- Raymont, V., Bettany, D., & Frangou, S. (2003). The Maudsley bipolar disorder project: Clinical characteristics of bipolar disorder I in a Catchment area treatment sample. *European Psychiatry*, 18(1), 13-17.

- R Core Development Team (2011) *R: A language and environment for statistical computing*. (Version 2.13.1). Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <http://www.R-project.org/>
- Reeve, C. L. (2007). Functional impulsivity and Speeded Ability Test performance. *International Journal of Selection and Assessment*, 15(1), 56-62.
- Regier, D. A. (2007). Dimensional approaches to psychiatric classification: refining the research agenda for DSM-V: an introduction. *International Journal of Methods in Psychiatric Research*, 16(S1), S1-S5. doi: 10.1002/mpr.209
- Regier, D. A., Myers, J. K., Kramer, M., Robins, L. N., Blazer, D. G., Hough, R. L., . . . Locke, B. Z. (1984). The NIMH Epidemiologic Catchment Area program: Historical context, major objectives, and study population characteristics. *Archives of General Psychiatry*, 41(10), 934-941.
- Reynolds, B., Ortengren, A., Richards, J. B., & de Wit, H. (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and Individual Differences*, 40(2), 305-315.
- Riva, G., Teruzzi, T., & Anolli, L. (2003). The use of the Internet in psychological research: Comparison of online and offline questionnaires. *CyberPsychology & Behavior*, 6(1), 73-80.
- Rochat, L., Delbeuck, X., Billieux, J., d'Acremont, M., Van der Linden, A.C., & Van der Linden, M. (2008). Assessing impulsivity changes in Alzheimer Disease. *Alzheimer Disease & Associated Disorders*, 22(3), 278-283.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rosenberg, M. (1989). *Society and the adolescent self-image. Revised edition*. Middletown, CT: Wesleyan University Press.
- Rothenberg, A. (2001). Bipolar illness, creativity, and treatment. *Psychiatric Quarterly*, 72(2), 131-147.
- Ryb, G. E., Dischinger, P. C., Kufera, J. A., & Read, K. M. (2006). Risk perception and impulsivity: Association with risky behaviors and substance abuse disorders. *Accident Analysis & Prevention*, 38(3), 567-573.
- Salkovskis, P. M., & Harrison, J. (1984). Abnormal and normal obsessions--A replication. *Behaviour Research and Therapy*, 22(5), 549-552.

- Sarasalo, E., Bergman, B., & Toth, J. (1997). Theft behaviour and its consequences among kleptomaniacs and shoplifters -- a comparative study. *Forensic Science International*, 86(3), 193-205.
- Schmidt, R. E., Gay, P., d'Acremont, M., & Van der Linden, M. (2008). A German adaptation of the UPPS Impulsive Behavior Scale: Psychometric properties and factor structure. *Swiss Journal of Psychology*, 67(2), 107-112.
- Seal, K., Mansell, W., & Mannion, H. (2008). What lies between hypomania and bipolar disorder? A qualitative analysis of 12 non-treatment-seeking people with a history of hypomanic experiences and no history of major depression. *Psychology and Psychotherapy*, 81(Pt 1), 33-53.
- Seibert, L. A., Miller, J. D., Pryor, L. R., Reidy, D. E., & Zeichner, A. (2010). Personality and laboratory-based aggression: Comparing the predictive power of the Five-Factor Model, BIS/BAS, and impulsivity across context. *Journal of Research in Personality*, 44(1), 13-21.
- Selby, E. A., Anestis, M. D., & Joiner, T. E. (2008). Understanding the relationship between emotional and behavioral dysregulation: Emotional cascades. *Behaviour Research and Therapy*, 46(5), 593-611.
- Shaffer, H. J., Hall, M. N., & Bilt, J. V. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health*, 89(9), 1369-1376.
- Sharpe, M. (1992). The life chart: historical curiosity or modern clinical tool? In K. Hawton & P. Cowen (Eds.), *Practical Problems in Clinical Psychiatry*. (pp. 222-230). Oxford: Oxford University Press.
- Sher, K. J., & Trull, T. J. (1996). Methodological issues in psychopathology research. [Review]. *Annual Review of Psychology*, 47, 371-400.
- Sher, L., Oquendo, M. A., & Mann, J. J. (2001). Risk of suicide in mood disorders. *Clinical Neuroscience Research*, 1(5), 337-344.
- Shevlin, M. E., Bunting, B. P., & Lewis, C. A. (1995). Confirmatory factor analysis of the Rosenberg self-esteem scale. *Psychological Reports*, 76(3, Pt 1), 707-710.
- Simon, N. M., Pollack, M. H., Ostacher, M. J., Zalta, A. K., Chow, C. W., Fischmann, D., . . . Otto, M. W. (2007). Understanding the link between anxiety symptoms and suicidal ideation and behaviors in outpatients with bipolar disorder. *Journal of Affective Disorders*, 97(1-3), 91-99.

- Simons, J. S., Maisto, S. A., & Wray, T. B. (2010). Sexual risk taking among young adult dual alcohol and marijuana users. *Addictive Behaviors*, 35(5), 533-536.
- Sinclair, J., & Green, J. (2005). Understanding resolution of deliberate self harm: qualitative interview study of patients' experiences. *British Medical Journal*, 330(7500), 1112. doi: *bmj*.38441.503333.8F [pii] 10.1136/bmj.38441.503333.8F
- Smillie, L., & Jackson, C. (2006). Functional impulsivity and reinforcement sensitivity theory. *Journal of Personality*, 74(1), 47-84
- Smith, D. J., & Ghaemi, S. N. (2006). Hypomania in clinical practice. *Advances in Psychiatric Treatment*, 12(2), 110-120. doi: 10.1192/apt.12.2.110
- Smith, D. J., Muir, W. J., & Blackwood, D. H. (2004). Is borderline personality disorder part of the bipolar spectrum? *Harvard Review of Psychiatry*, 12(3), 133-139. doi: 8Y6MYEFLNGH42UUH [pii] 10.1080/10673220490472346
- Smith, G. T., Fischer, S., Cyders, M. A., Annus, A. M., Spillane, N. S., & McCarthy, D. M. (2007). On the validity and utility of discriminating among impulsivity-like traits. *Assessment*, 14(2), 155-170.
- Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back: a technique for assessing self-reported alcohol consumption. In R. Z. Litten & J. P. Allen (Eds.), *Measuring alcohol consumption: psychosocial and biochemical methods* (pp. 41-72). Totowa, NJ: Humana.
- Soloff, P. H., Lynch, K. G., Kelly, T. M., Malone, K. M., & Mann, J. J. (2000). Characteristics of suicide attempts of patients with major depressive episode and borderline personality disorder: A comparative study. *American Journal of Psychiatry*, 157, 601-608.
- Solomon, D. A., Leon, A. C., Endicott, J., Coryell, W. H., Mueller, T. I., Posternak, M. A., & Keller, M. B. (2003). Unipolar mania over the course of a 20-year follow-up study. *American Journal of Psychiatry*, 160(11), 2049-2051.
- Spillane, N. S., Smith, G. T., & Kahler, C. W. (2010). Impulsivity-like traits and smoking behavior in college students. *Addictive Behaviors*, 35(7), 700-705.
- Stanford, M. S., Greve, K. W., Boudreaux, J. K., Mathias, C. W., & L. Brumbelow, J. (1996). Impulsiveness and risk-taking behavior: comparison of high-school and college students using the Barratt Impulsiveness Scale. *Personality and Individual Differences*, 21(6), 1073-1075.

- Stanford, M. S., Mathias, C. W., Dougherty, D. M., Lake, S. L., Anderson, N. E., & Patton, J. H. (2009). Fifty years of the Barratt Impulsiveness Scale: An update and review. *Personality and Individual Differences, 47*(5), 385-395.
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences, Special issue on Structural Equation Modeling, 42*(5), 893-898.
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology, 44*(6), 1764-1778.
- Stern, G. S., & Berrenberg, J. L. (1979). Skill-set, success outcome, and mania as determinants of the illusion of control. *Journal of Research in Personality, 13*(2), 206-220.
- Stern, M. J., Dillman, D. A., & Smyth, J. D. (2007). Visual design, order effects, and respondent characteristics in a self-administered survey. *Survey Research Methods, 1*(3), 121-138.
- Stice, E., Telch, C.F. & Rizvi, S.L. (2000) Development and validation of the Eating Disorder Diagnostic Scale: a brief self-report measure of binge eating disorder. *Psychological Assessment, 12*, 123-131
- Strakowski, S. M., Fleck, D. E., DelBello, M. P., Adler, C. M., Shear, P. K., McElroy, S. L., . . . Arndt, S. (2009). Characterizing impulsivity in mania. *Bipolar Disorders, 11*(1), 41-51.
- Sublette, M. E., Carballo, J., J., Carmen, M., Galfalvy, H. C., Brent, D. A., Birmaher, B., . . . Oquendo, M. A. (2009). Substance use disorders and suicide attempts in bipolar subtypes. *Journal of Psychiatric Research, 43*(3), 230-238
- Sugisaki, M., Kino, K., Yoshida, N., Ishikawa, T., Amagasa, T., & Haketa, T. (2005). Development of a new questionnaire to assess pain-related limitations of daily functions in Japanese patients with temporomandibular disorders. *Community Dentistry and Oral Epidemiology, 33*(5), 384-395. doi: COM238 [pii] 10.1111/j.1600-0528.2005.00238.x
- Surís, A., Borman, P. D., Lind, L., & Kashner, T. M. (2007). Aggression, impulsivity, and health functioning in a veteran population: equivalency and test-retest reliability of computerized and paper-and-pencil administrations. *Computers in Human Behaviour, 23*(1), 97-110.

- Sutton, S. K., & Johnson, S. L. (2002). Hypomanic tendencies predict lower startle magnitudes during pleasant pictures. *Psychophysiology*, 39, S80.
- Swann, A. C., Anderson, J. C., Dougherty, D. M., & Moeller, F. G. (2001). Measurement of inter-episode impulsivity in bipolar disorder. *Psychiatry Research*, 101(2), 195-197.
- Swann, A. C., Bjork, J. M., Moeller, F. G., & Dougherty, D. M. (2002). Two models of impulsivity: relationship to personality traits and psychopathology. *Biological Psychiatry*, 51(12), 988-994.
- Swann, A. C., Dougherty, D. M., Pazzaglia, P. J., Pham, M., & Moeller, F. G. (2004). Impulsivity: a link between bipolar disorder and substance abuse. *Bipolar Disorders*, 6(3), 204-212.
- Swann, A. C., Dougherty, D. M., Pazzaglia, P. J., Pham, M., Steinberg, J. L., & Moeller, F. G. (2005). Increased impulsivity associated with severity of suicide attempt history in patients with bipolar disorder. *American Journal of Psychiatry*, 162, 1680-1687.
- Swann, A. C., Lijffijt, M., Lane, S. D., Steinberg, J. L., & Moeller, F. G. (2009a). Severity of bipolar disorder is associated with impairment of response inhibition. *Journal of Affective Disorders*, 116(1-2), 30-26
- Swann, A. C., Lijffijt, M., Lane, S. D., Steinberg, J. L., & Moeller, F. G. (2009b). Increased trait-like impulsivity and course of illness in bipolar disorder. *Bipolar Disorders*, 11(3), 280-288.
- Swann, A. C., Moeller, F. G., Steinberg, J. L., Schneider, L., Barratt, E. S., & Dougherty, D. M. (2007). Manic symptoms and impulsivity during bipolar depressive episodes. *Bipolar Disorders*, 9(3), 206-212.
- Swann, A. C., Pazzaglia, P., Nicholls, A., Dougherty, D. M., & Moeller, F. G. (2003). Impulsivity and phase of illness in bipolar disorder. *Journal of Affective Disorders*, 73(1-2), 105-111.
- Swann, A. C., Steinberg, J. L., Lijffijt, M., & Moeller, F. G. (2008). Impulsivity: Differential relationship to depression and mania in bipolar disorder. *Journal of Affective Disorders*, 106(3), 241-248.
- Taylor, C. T., Hirshfeld-Becker, D. R., Ostacher, M. J., Chow, C. W., LeBeau, R. T., Pollack, M. H., . . . Simon, N. M. (2008). Anxiety is associated with impulsivity in bipolar disorder. *Journal of Anxiety Disorders*, 22(5), 868-876.

- Thomas, J., & Bentall, R. P. (2002). Hypomanic traits and response styles to depression. *British Journal of Clinical Psychology, 41*, 309-313.
- Thomas, J., Knowles, R., Tai, S., & Bentall, R. P. (2007). Response styles to depressed mood in bipolar affective disorder. *Journal of Affective Disorders, 100*(1-3), 249-252.
- Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*(1), 53-67.
- Truant, G. S., O'Reilly, R., & Donaldson, L. (1991). How psychiatrists weigh risk factors when assessing suicide risk. *Suicide and Life-Threatening Behavior, 21*(2), 106-114.
- Twiss, J., Jones, S., & Anderson, I. (2008). Validation of the Mood Disorder Questionnaire for screening for bipolar disorder in a UK sample. *Journal of Affective Disorders, 110*(1-2), 180-184.
- Udachina, A., & Mansell, W. (2007). Cross-validation of the Mood Disorders Questionnaire, the Internal State Scale, and the Hypomanic Personality Scale. *Personality and Individual Differences, 42*(8), 1539-1549.
- Valtonen, H., Suominen, K., Mantere, O., Leppamäki, S., Arvilommi, P., & Isometsä, E. T. (2005). Suicidal ideation and attempts in bipolar I and II disorders. *The Journal of Clinical Psychiatry, 66*(11), 1456-1462.
- Van der Gucht, E., Morriss, R., Lancaster, G., Kinderman, P., & Bentall, R. P. (2009). Psychological processes in bipolar affective disorder: negative cognitive style and reward processing. *The British Journal of Psychiatry, 194*, 146-151.
- Van der Linden, M., d'Acremont, M., Zermatten, A., Jermain, F., Larøi, F., Willems, S., . . . Bechara, A. (2006). A French adaptation of the UPPS Impulsive Behavior Scale: Confirmatory factor analysis in a sample of undergraduate students. *European Journal of Psychological Assessment, 22*(1), 38-42.
- Verdejo-García, A., Bechara, A., Recknor, E. C., & Pérez-García, M. (2007). Negative emotion-driven impulsivity predicts substance dependence problems. *Drug and Alcohol Dependence, 91*(2-3), 213-219.
- Vieta, E., Colom, F., Martínez-Arán, A., Benabarre, A., & Gastó, Cristóbal. (1999). Personality disorders in bipolar II patients. *Journal of Nervous & Mental Disease, 187*(4), 245-248.



- Vieta, E., & Suppes, T. (2008). Bipolar II disorder: arguments for and against a distinct diagnostic entity. *Bipolar Disorders*, 10(1 Pt 2), 163-178. doi: BDI561 [pii] 10.1111/j.1399-5618.2007.00561.x
- Vispoel, W. P., Boo, J., & Bleiler, T. (2001). Computerized and paper-and-pencil versions of the Rosenberg Self-Esteem scale: A comparison of psychometric features and respondent preferences. *Educational and Psychological Measurement*, 61(3), 461-474.
- Vredenburg, K., Flett, G. L., & Krames, L. (1993). Analogue versus clinical depression: A critical reappraisal. *Psychological Bulletin*, 113(2), 327-344. doi: 10.1037/0033-2909.113.2.327
- Watson, D. (2005). Rethinking the mood and anxiety disorders: A quantitative hierarchical model for DSM-V. *Journal of Abnormal Psychology*, 114(4), 522-536. doi: 10.1037/0021-843x.114.4.522
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
- Weinhardt, L. S., Carey, M. P., Maisto, S. A., Carey, K. B., Cohen, M. M., & Wickramasinghe, S. M. (2008). Reliability of the Timeline Follow-Back sexual behavior interview. *Annals of Behavioral Medicine*, 20(1), 25-30.
- Weissman, M. M., & Meyers, J. K. (1978). Affective disorders in a US urban community: the use of research diagnostic criteria in an epidemiological survey. *Archives of General Psychiatry*, 35(11), 1304-1311.
- White, T. P., Joseph, V., Francis, S. T., & Liddle, P. F. (2010). Aberrant salience network (bilateral insula and anterior cingulate cortex) connectivity during information processing in schizophrenia. *Schizophrenia Research*, 123(2-3), 105-115.
- White, H.R. & Labouvie, E.W. (1989) Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*, 50(1), 30-37
- Whiteside, S. P., & Lynam, D. R. (2001). The Five Factor Model and impulsivity: using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, 30(4), 669-689.
- Whiteside, S. P., & Lynam, D. R. (2003). Understanding the role of impulsivity and externalizing psychopathology in alcohol abuse: Application of the UPPS Impulsive Behavior Scale. *Experimental and Clinical Psychopharmacology*, 11(3), 210-217.

- Whiteside, S. P., Lynam, D. R., Miller, J. D., & Reynolds, S. K. (2005). Validation of the UPPS Impulsive Behaviour Scale: A four-factor model of impulsivity. *European Journal of Personality, 19*, 559–574.
- Whiteside, U., Chen, E., Neighbors, C., Hunter, D., Lo, T., & Larimer, M. (2007). Difficulties regulating emotions: Do binge eaters have fewer strategies to modulate and tolerate negative affect? *Eating Behaviors, 8*(2), 162-169.
- Widiger, T. A., & Samuel, D. B. (2005). Diagnostic categories or dimensions? A question for the Diagnostic and Statistical Manual of Mental Disorders--Fifth Edition. *Journal of Abnormal Psychology, 114*(4), 494-504.
- Widiger, T. A., & Weissman, M. M. (1991). Epidemiology of borderline personality disorder. *Hospital and Community Psychiatry, 42*(10), 1015-1021.
- Wildes, J. E., Marcus, M. D., & Fagiolini, A. (2008). Prevalence and correlates of eating disorder co-morbidity in patients with bipolar disorder. *Psychiatry Research, 161*(1), 51-58.
- Wojnar, M., Ilgen, M. A., Czyz, E., Strobbe, S., Klimkiewicz, A., Jakubczyk, A., . . . Brower, K. J. (2009). Impulsive and non-impulsive suicide attempts in patients treated for alcohol dependence. *Journal of Affective Disorders, 115*(1-2), 131-139.
- World Health Organization (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. World Health Organization: Geneva.
- Wong, A., & Carducci, B. J. (1991). Sensation seeking and financial risk taking in everyday money matters. *Journal of Business and Psychology, 5*(4), 525-530. doi: 10.1007/bf01014500
- Wu, C. S., & Cheng, F. F. (2007). Internet café addiction of Taiwanese adolescents. *Cyberpsychology and Behavior, 10*(2), 220-225.
- Wyder, M., & De Leo, D. (2007). Behind impulsive suicide attempts: Indications from a community study. *Journal of Affective Disorders, 104*(1-3), 167-173.
- Yuen, K. S. L., & Lee, T. M. C. (2003). Could mood state affect risk-taking decisions? *Journal of Affective Disorders, 75*(1), 11-18.
- Zapolski, T. C. B., Cyders, M. A., & Smith, G. T. (2009). Positive urgency predicts illegal drug use and risky sexual behavior. *Psychology of Addictive Behaviors, 23*(2), 348-354.

Zermatten, A., & Van der Linden, M. (2008). Impulsivity in non-clinical persons with obsessive-compulsive symptoms. *Personality and Individual Differences*, 44(8), 1824-1830.

Zhong, J., & Leung, F. (2009). Diagnosis of borderline personality disorder in China: current status and future directions. *Current Psychiatry Reports*, 11(1), 69-73.

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandanavica*, 67(6), 361-370.

Zimmerman, M., Galione, J. N., Ruggero, C. J., Chelminski, I., McGlinchey, J. B., Dalrymple, K., & Young, D. (2009). Performance of the mood disorders questionnaire in a psychiatric outpatient setting. *Bipolar Disorders*, 11(7), 759-765. doi: BDI755 [pii] 10.1111/j.1399-5618.2009.00755.x

Zuckerman, M., Eysenck, S. B., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology*, 46(1), 139-149.

## APPENDICES

Appendix 1: Study One Ethics Approval .....	371
Appendix 2: Study One Ethics Extension .....	373
Appendix 3: Study One Consent Form.....	375
Appendix 4: Study One Information Sheet .....	376
Appendix 5: Study One Advert.....	378
Appendix 6: Study One Questionnaire .....	379
Appendix 7: Study Two Ethics Approval .....	409
Appendix 8: Study Two Consent Form.....	411
Appendix 9: Study Two Debrief .....	413
Appendix 10: Study Two Information Sheet .....	415
Appendix 11: Study Two Invitation Email .....	418
Appendix 12: Study Two Interview Schedule .....	419
Appendix 13: Study Two Memo Exerts .....	421
Appendix 14: Study Two Timelines.....	423
Appendix 15: Study Two Coded Interview Exerts .....	452
Appendix 16: Study Two Initial Themes.....	453
Appendix 17: Study Two Revised Themes .....	457
Appendix 18: Study Two Final Themes and Code Book.....	459

## Appendix 1: Study One Ethics Approval

---



The University of  
Nottingham

Please quote ref no: **I/3/2009**

Direct line/e-mail  
+44 (0) 115 8231063  
Louise.Sabin@nottingham.ac.uk

Professor Richard Morris  
Professor of Psychiatry  
Ms Jodie Burden  
Division of Psychiatry  
A Floor, South Block  
QMC Campus  
Nottingham University Hospitals  
NG7 2UH

**Faculty of Medicine and Health  
Sciences**

Medical School Research Ethics  
Committee  
Division of Therapeutics &  
Molecular Medicine  
D Floor, South Block  
Queen's Medical Centre  
Nottingham  
NG7 2UH

Tel: +44 (0) 115 8231063  
Fax: +44 (0) 115 8231059

01 May 2009

Dear Professor Morris

**Ethics Reference No: I/3/2009 - Please quote this number on all  
correspondence**

**Study Title:** The role of impulsivity and related traits in predicting behaviour within  
a bipolar continuum sample.

**Lead Investigator:** Professor Richard Morris, Professor of Psychiatry

**Co Investigators:** Ms Jodie Finlayson-Burden, PhD Student, Division of Psychiatry,  
Community Health Sciences, Dr Rhiannon Corcoran, Associate Professor, Division of  
Psychiatry Community Health Sciences.

Thank you for submitting the above application which was considered at the Medical  
School Research Ethics Committee at its meeting on 12<sup>th</sup> March 2009. The following  
documents were reviewed:

- Application form dated 2/24/2009
- Detailed study protocol v1.3: 24 February 2009
- E-mail invite
- E-mail invite for students
- Information sheet
- Online questionnaire

This study was approved.

The Committee doubted that departmental heads would agree to blanket e-mails  
which are something of a nuisance and suggested you think of alternatives such as  
electronic posters, pop ups on the Internet during log in or as part of the news on  
the staff portal or an explanation of your study to a large group of students at the  
end of a lecture might be more successful.

Approval is given on the understanding that the Conditions of Approval set out below  
are followed.

**Conditions of Approval**

You must follow the protocol agreed and any changes to the protocol will require prior Ethic's Committee approval.

This study is approved for the period of active recruitment requested. The Committee also provides a further 5 year approval for any necessary work to be performed on the study which may arise in the process of publication and peer review.

You promptly inform the Chairman of the Ethic's Committee of

- (i) Deviations from or changes to the protocol which are made to eliminate immediate hazards to the research subjects.
- (ii) Any changes that increase the risk to subjects and/or affect significantly the conduct of the research.
- (iii) All adverse drug reactions that are both serious and unexpected.
- (iv) New information that may affect adversely the safety of the subjects or the conduct of the study.
- (v) The attached End of Project Progress Report is completed and returned when the study has finished.

Yours sincerely



**Professor R C Spiller**  
**Chairman, Nottingham University Medical School Ethics Committee**

## Appendix 2: Study One Ethics Extension

15 April 2010

Professor Richard Morriss  
Professor of Psychiatry  
Ms Jodie Burden  
Division of Psychiatry  
A Floor, South Block  
QMC Campus  
Nottingham University Hospitals  
NG7 2UH

### Health Sciences

Medical School Research  
Committee  
Division of Therapeutic  
Molecular Medicine  
D Floor, South Block  
Queen's Medical Centre  
Nottingham  
NG7 2UH

Tel: +44 (0) 115 823  
Fax: +44 (0) 115 823

Dear Professor Morriss

**Ethics Reference No: I/3/2009 - Please quote this number on all correspondence**

**Study Title:** The role of impulsivity and related traits in predicting behaviour within a bipolar continuum sample.

**Lead Investigator:** Professor Richard Morriss, Professor of Psychiatry

**Co Investigators:** Ms Jodie Finlayson-Burden, PhD Student, Division of Psychiatry, Community Health Sciences, Dr Rhiannon Corcoran, Associate Professor, Division of Psychiatry Community Health Sciences.

Thank you for your letter dated 31<sup>st</sup> March 2010 requesting a time extension of up to the 31<sup>st</sup> October 2010 in order to achieve a recruitment target of 1000 subjects in order to strengthen the power of the study.

On review this is satisfactory and the study time extension and increased recruitment target is approved.

Approval is given on the understanding that the Conditions of Approval set out below are followed.

### Conditions of Approval

You must follow the protocol agreed and any changes to the protocol will require prior Ethic's Committee approval.

This study is approved for the period of active recruitment requested. The Committee also provides a further 5 year approval for any necessary work to be performed on the study which may arise in the process of publication and peer review.

You promptly inform the Chairman of the Ethic's Committee of

- (i) Deviations from or changes to the protocol which are made to eliminate immediate hazards to the research subjects.

- (ii) Any changes that increase the risk to subjects and/or affect significantly the conduct of the research.
- (iii) All adverse drug reactions that are both serious and unexpected.
- (iv) New information that may affect adversely the safety of the subjects or the conduct of the study.
- (v) The attached End of Project Progress Report is completed and returned when the study has finished.


Yours sincerely

A handwritten signature in purple ink, appearing to read 'R C Spiller', is positioned above the printed name.

**Professor R C Spiller**  
**Chairman, Nottingham University Medical School Research Ethics**  
**Committee**



### Appendix 3: Study One Consent Form

The University of Nottingham

Exit this survey

Questionnaire v1.3

Please read the following and then check the 'yes' box to indicate consent:

- I voluntarily agree to take part in this study
- I have read and understood the information provided to me in regard to this study
- I have been given the opportunity to ask questions and discuss the study
- I authorise the investigators to disclose the results of my participation in the study but not my name
- I understand that information about me recorded during the study will be kept in a secure database. If data is transferred to others it will be made anonymous. Data will be kept for 7 years after the results of this study have been published
- I understand that I can ask for further instructions or explanations at any time
- I understand that I am free to withdraw from the study at any time, without having to give a reason for withdrawing

**Do you consent to taking part in the study?**

☐ ☐ No

2%

PrevNext

## Appendix 4: Study One Information Sheet

*University of Nottingham, Division of Psychiatry*

*A Floor South Block, Queens Medical Centre*



The University of  
**Nottingham**

### *Volunteer Information Sheet*

**Title of Project:** *The role of impulsivity and related traits in predicting unplanned behaviour*

#### **Name of Investigators:**

Jodie Finlayson-Burden

Dr Rhiannon Corcoran

Prof Richard Morriss

#### **Invitation paragraph**

You have been invited to take part in a research study. Before you decide whether to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends and relatives if you wish to. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part or not. Thank you for reading.

#### **Background**

Research has found that individuals with bipolar disorder are highly impulsive, and it is suggested that this has some impact on their risk taking behaviour. We are looking at impulsivity and other traits in a healthy population to see if, like in bipolar disorder, certain behaviours can be predicted by high levels of personality traits such as impulsivity. We hope that this research will be able to inform research and treatment of bipolar patients.

#### **What does the study involve?**

The questionnaire should take no longer than thirty minutes. It includes several common psychological tests for such personality traits as impulsivity and anxiety. These tests will ask you to think about yourself and your behaviour, including the sort of things you do and the feelings you have associated with them. During the questionnaire you will also be asked to indicate whether you have committed certain behaviours, like driving recklessly or spending too much. All your answers throughout the questionnaire are anonymous, so please be as honest as you feel able.

#### **Do you have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to give your consent. If you decide to take part you are still free to withdraw at any time and without giving a reason.

**What if something goes wrong?/Who can I complain to?**

In case you have a complaint on anything to do with the study, you can initially approach the lead investigators. (Rhiannon Corcoran, [Rhiannon.Corcoran@nottingham.ac.uk](mailto:Rhiannon.Corcoran@nottingham.ac.uk); Richard Morriss, [Richard.Morriss@nottingham.ac.uk](mailto:Richard.Morriss@nottingham.ac.uk)). If you are not comfortable with this or it achieves no satisfactory outcome, you should then contact the Ethics Committee Secretary, Mrs Louise Sabir, Division of Therapeutics and Molecular Medicine, D Floor, South Block, Queen's Medical Centre, Nottingham, NG7 2UH. Telephone 0115 8231063. E-mail [louise.sabir@nottingham.ac.uk](mailto:louise.sabir@nottingham.ac.uk).

**Will my taking part in this study be kept confidential?**

All information which is collected about you during the course of the research will be kept on a password protected database and is strictly confidential.

**What will happen to the results of the research study?**

The results of the study will hopefully be published in an appropriate journal. If this is the case, you will not be alerted. Your personal responses will not be identifiable.

**Who has reviewed the study?**

This study has been reviewed and approved by the University of Nottingham Medical School Ethics Committee.

**Contact for Further Information**

Jodie Finlayson-Burden  
Division of Psychiatry  
A Floor, South Block  
Queen's Medical Centre  
Nottingham  
Telephone: 01158230525  
Email: [mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk)

**Appendix 5: Study One Advert**

Intranet : Portal

Search website...

News

University | My School | Course | Library | IT | Me | Support | SU | Vote Now

[Student News Home](#) > [opportunities](#) > Personality and behaviour questionnaire

### Personality and behaviour questionnaire


September 20th, 2010

An online questionnaire is currently being conducted within the Division of Psychiatry, QMC. The questionnaire consists of several short scales looking at a variety of personality traits and behaviours, and should take no longer than 30 minutes to complete. It has been approved by the medical school ethics committee and is entirely anonymous. It should hopefully also be interesting to complete.

[Take part in the research](#)

If you have any questions regarding the questionnaire, or our research in general please do not hesitate to contact me at [mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk). Thank you!

## Appendix 6: Study One Questionnaire


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Welcome!

Thank you for considering participating in this study! We are investigating how a wide variety of feelings, personality traits and behaviours relate to one another. The research will be used to help patients with bipolar disorder (also known as manic depression) control certain aspects of their disorder. As such, your participation in this study is really important and could have a big impact on treatment. However, **please do not complete this study if you have already completed it before.**

Part of the questionnaire is made up of a series of commonly used psychological measures, which look at a variety of personality traits and behaviours which are widespread in the general population. Other sections in the questionnaire will ask you whether you have done certain behaviours, like driving recklessly or drinking too much. The questionnaire should take around 30 minutes to complete.

Some of the questions are fairly personal, but please rest assured that the questionnaire is entirely anonymous and has been approved by the University of Nottingham Medical School Ethics Committee. If you find anything contained in the questionnaire distressing, feel free to stop the questionnaire at any time. Alternatively you can contact the investigators (see addresses at the bottom of the page) or any of the following support organisations:

**NHS Direct** Website: <http://www.nhs.uk/nhsdirect/Pages/nhsdlanding.aspx> Telephone: 0845 4647

**Samaritans** Website: <http://www.samaritans.org> Telephone: 08457 90 90 90 Email: [jo@samaritans.org](mailto:jo@samaritans.org)


**Nightline** Telephone: 0115 9514985 Email: [nightlineanon@sumail.nottingham.ac.uk](mailto:nightlineanon@sumail.nottingham.ac.uk)

If there is anything else you would like to know about the study please feel free to contact us at any of the email addresses given below.

Many thanks,

Ms Jodie Burden ([mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk)), Dr Rhiannon Corcoran ([rhiannon.corcoran@nottingham.ac.uk](mailto:rhiannon.corcoran@nottingham.ac.uk)), Prof Richard Morriss ([richard.morriss@nottingham.ac.uk](mailto:richard.morriss@nottingham.ac.uk))

1%


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Please read the following and then check the 'yes' box to indicate consent:


- I voluntarily agree to take part in this study
- I have read and understood the information provided to me in regard to this study
- I have been given the opportunity to ask questions and discuss the study
- I authorise the investigators to disclose the results of my participation in the study but not my name
- I understand that information about me recorded during the study will be kept in a secure database. If data is transferred to others it will be made anonymous. Data will be kept for 7 years after the results of this study have been published
- I understand that I can ask for further instructions or explanations at any time
- I understand that I am free to withdraw from the study at any time, without having to give a reason for withdrawing

**Do you consent to taking part in the study?**

☐ Yes
 ☐ No

2%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Thank you for agreeing to participate in this study! Your participation is really appreciated.

Firstly, we would like to know your age and gender, and how long you have been in education.

**What is your gender?**


☐ Female
 ☐ Male
 ☐ Prefer not to say

**How old are you? (in years)**

**How many years have you spent in education?**

3%

Prev
Next


The University of  
Nottingham


Exit this survey

Questionnaire v1.3

We are now going to ask you some questions about ways in which your mood may have affected your behaviour. Please think carefully about these behaviours and whether they relate to you and how you have behaved in the past.

4%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**Has there ever been a period of time when you were not your usual self and...**

	Yes	No
You felt so good or so hyper that other people thought you were not your normal self or you were so hyper that you got into trouble?	<input type="radio"/>	<input type="radio"/>
You were so irritable that you shouted at people or started fights or arguments?	<input type="radio"/>	<input type="radio"/>
You felt much more self-confident than usual?	<input type="radio"/>	<input type="radio"/>
You got much less sleep than usual and found you didn't really miss it?	<input type="radio"/>	<input type="radio"/>
You were much more talkative or spoke much faster than usual?	<input type="radio"/>	<input type="radio"/>
Thoughts raced through your head or you couldn't slow your mind down?	<input type="radio"/>	<input type="radio"/>
You were so easily distracted by things around you that you had trouble concentrating or staying on track?	<input type="radio"/>	<input type="radio"/>
You had much more energy than usual?	<input type="radio"/>	<input type="radio"/>
You were much more active or did many more things than usual?	<input type="radio"/>	<input type="radio"/>
You were much more social or outgoing than usual, for example, you telephoned friends in the middle of the night?	<input type="radio"/>	<input type="radio"/>
You were much more interested in sex than usual?	<input type="radio"/>	<input type="radio"/>
You did things that were unusual for you or that other people might have thought were excessive, foolish, or risky?	<input type="radio"/>	<input type="radio"/>
Spending money got you or your family into trouble?	<input type="radio"/>	<input type="radio"/>

If you checked YES to more than one of the above, have several of these ever happened during the same period of time?


☐ Yes
☐ No

How much of a problem did any of these cause you – like being unable to work; having family, money or legal troubles; getting into arguments or fights?

☐ No Problem
☐ Minor Problem
☐ Moderate Problem
☐ Serious Problem

5%


Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3


Those questions were looking at mania. People experiencing mania will feel extremely elated. They may be more sociable and outgoing, or take more risks than they usually would. They may also speak, act and move at an increased speed, feeling irritable when other people can't keep up with them. A less severe form of mania, known as 'hypomania', is fairly common: around 11% of the general population will experience hypomania at some point in their lifetime (*Hirschfeld et al, 2003*). It has been suggested that experiencing symptoms of hypomania is a good thing, with one study reporting that hypomanic people have higher incomes than those people who do not experience hypomania! (*Gamma et al, 2008*)



Next we'd like to ask you a series of questions about your behaviour and preferences, and the ways in which you interact with the world. This section will spread over two pages.

6%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Please indicate by ticking the appropriate box how often you behave or think in the following ways.

	Rarely/Never	Occasionally	Often	Almost always/Always
I plan tasks carefully	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do things without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am happy-go-lucky	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have "racing" thoughts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan trips well ahead of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am self-controlled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I concentrate easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I save regularly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it hard to sit still for long periods of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a careful thinker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan for job security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I say things without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to think about complex problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I change jobs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7%

Prev
Next


The University of  
Nottingham
Exit this survey

Questionnaire v1.3


Please indicate by ticking the appropriate box how often you behave or think in the following ways.

	Rarely/Never	Occasionally	Often	Almost always/Always
I get easily bored when solving thought problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have regular medical/dental checkups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I act on the spur of the moment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a steady thinker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I change where I live	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I buy things on impulse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I finish what I start	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I walk and move fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I solve problems by trial-and-error	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spend or charge more than I earn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I talk fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have outside thoughts when thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more interested in the present than the future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am restless at lectures or talks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I plan for the future


8%

Prev Next


The University of  
Nottingham
Exit this survey

Questionnaire v1.3


Those questions were looking at ways in which you might behave impulsively. Impulsive behaviour is that which is not thoroughly thought through. Acting spontaneously can be very beneficial, with highly impulsive people often being creative, exciting and able to think on their feet. However, impulsivity is also considered to be an important factor in a wide variety of psychological disorders, including Attention-deficit/Hyperactivity Disorder and even a whole group of disorders known as 'Impulse Control Disorders'.



Next we would like to ask you some questions about feelings you may have experienced throughout your life. We will ask you if you have ever felt a particular emotion or set of emotions, and if you have, how often you feel this way and whether you have felt this emotion in the past four weeks. There will also be space for you to tell us anything else you might want to regarding the particular feeling. While we understand that some of these questions may be difficult to answer, please answer as honestly and accurately as you can.

9%

Prev Next


The University of  
Nottingham
Exit this survey

Questionnaire v1.3

**Have you at any point in your life felt any of the following feelings or emotions?:**


Felt depressed or down most of the day nearly every day?

☐ Yes ☐ No

11%

Prev Next



 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt depressed or down**

How often do you feel like this?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you felt like this at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us in relation to this feeling?

12%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life felt any of the following feelings or emotions?:**

Felt hopeless? *i.e. as if nothing would ever get better*

☐ Yes ☐ No

13%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt hopeless**

How often do you feel like this?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you felt like this at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us in relation to this feeling?

14%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life felt any of the following feelings or emotions?:**

Felt especially afraid of something? *e.g. flying, heights, seeing blood, closed places or certain kinds of animals or insects*

☐ Yes ☐ No

15%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt especially afraid of something**

How often do you feel like this?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you felt like this at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us in relation to this feeling?

16%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at *any point in your life* felt any of the following feelings or emotions?:**

Had flashbacks or intense anxiety regarding a prior traumatic experience?

☐ Yes ☐ No

17%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have had flashbacks or intense anxiety regarding a prior experience**

How often do you feel like this?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you felt like this at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us in relation to this feeling?

18%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at *any point in your life* felt any of the following feelings or emotions?:**

Felt more afraid than most people would to perform an activity in front of other people?  
*e.g. speaking, eating, writing*

☐ Yes ☐ No

19%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt afraid to perform an activity in front of others**

How often do you feel like this?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you felt like this at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us in relation to this feeling?

20%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**Have you at any point in your life felt any of the following feelings or emotions?:**

Had a panic or anxiety attack? *i.e. felt suddenly and intensely frightened, anxious or extremely uncomfortable*

☐ Yes ☐ No

21%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have had a panic or anxiety attack**

How often do you have panic or anxiety attacks?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Have you had a panic attack at any time over the past four weeks?

☐ Yes ☐ No

Is there anything you would like to tell us about your panic attacks?

22%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life felt any of the following feelings or emotions?:**

Felt particularly nervous and anxious in day to day life?

☐ Yes ☐ No

23%

Prev Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt nervous and anxious in day to day life**

How often do you feel like this?

☐ Rarely
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Have you felt like this at any time over the past four weeks?


☐ Yes
 ☐ No

Is there anything you would like to tell us in relation to this feeling?

24%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**Have you at *any point in your life* felt any of the following feelings or emotions?:**


Felt you had to do something over and over again and couldn't resist doing it? e.g.  
*washing your hands again and again or checking something several times to make sure you'd done it right*

☐ Yes
 ☐ No

25%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have felt you had to do something over and over again without being able to resist doing it**

How often do you experience the feeling of needing to do something repeatedly?

☐ Rarely
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Have you felt the need to do something repeatedly at any time over the past four weeks?


☐ Yes
 ☐ No

Is there anything you would like to tell us in relation to this feeling?

26%

Prev


Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3


Thank you for answering all those questions - we're about a third of the way through now! Those questions were looking at feelings which are really very common in the general population: around 13% of the population will indicate feeling down and depressed at any one time (*Hermans et al, 2004*), while about 30% of the population are seen to be suffering from some form of anxiety (*Cooper et al, 2007*).



Next we would like to ask you a set of questions about your tendency to engage in risky or dangerous situations. Answers are on a five point scale, simply indicate using this scale how like or un-like you the statement is.

27%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Below are some statements regarding how you might feel about taking risks. Please indicate, using the 5-point scale, the degree to which each of the following statements describes you.


	1 'like me'	2	3	4	5 'not like me'
While I don't deliberately seek out situations or activities that society disapproves of, I find that I often end up doing things that society disapproves of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often do things that I know my parents would disapprove of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that are illegal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not let the fact that something is considered immoral stop me from doing it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that I know my friends would disapprove of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often seek out situations or activities that society does not approve of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not let the fact that something is illegal stop me from doing it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that I know my parents would disapprove of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that I know society would disapprove of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that are considered immoral.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the feeling that comes with taking physical risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider myself a risk-taker.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Being afraid of doing something new often makes it more fun in the end.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The greater the risk the more fun the activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to do things that almost paralyze me with fear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the feeling that comes with taking psychological or social risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
While I don't deliberately seek out situations or activities that involve physical risk, I often end up doing things that involve physical risk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the feeling that comes from entering a new situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing activities that involve physical risk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about doing things that would arouse a great deal of fear or anxiety in me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28%


Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Those questions were looking at preference for risk taking, which is considered to be an important motivator for both exciting behaviours (like sky diving) and those behaviours which can have serious social consequences (such as drug taking).



Next we'd like to ask you another, slightly longer, set of questions about the ways in which you think and act. This set of questions will stretch across four pages. Once again, your honesty and accuracy is much appreciated!

29%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3


Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement.

	Agree strongly	Agree some	Disagree some	Disagree strongly
When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a reserved and cautious attitude toward life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble controlling my impulses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I generally seek new and exciting experiences and sensations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When overjoyed, I feel like I can't stop myself from going overboard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I generally like to see things through to the end.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thinking is usually careful and purposeful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble resisting my cravings (for food, cigarettes, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'll try anything once.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am really excited, I tend not to think of the consequences of my actions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to give up easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not one of those people who blurt out things without thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often get involved in things I later wish I could get out of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like sports and games in which you have to choose your next move very quickly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When I am in great mood, I tend to get into situations that could cause me problems.

31%

Prev
Next



The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement.


	Agree strongly	Agree some	Disagree some	Disagree strongly
When I am very happy, I tend to do things that may cause problems in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfinished tasks really bother me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to stop and think things over before I do them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel bad, I will often do things I later regret in order to make myself feel better now.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would enjoy water skiing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Once I get going on something I hate to stop.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't like to start a project until I know exactly how to proceed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am very happy, I feel like it is OK to give in to cravings or overindulge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I quite enjoy taking risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I concentrate easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would enjoy parachute jumping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I finish what I start.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to lose control when I am in a great mood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32%

Prev
Next



The University of  
Nottingham

Exit this survey


Questionnaire v1.3

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement.

	Agree strongly	Agree some	Disagree some	Disagree strongly
When I am really ecstatic, I tend to get out of control.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to value and follow a rational, "sensible" approach to things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am upset I often act without thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to pace myself so as to get things done on time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually make up my mind through careful reasoning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to act without thinking when I am really excited.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel rejected, I will often say things that I later regret.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like to learn to fly an airplane.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a person who always gets the job done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a cautious person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is hard for me to resist acting on my feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I sometimes like doing things that are a bit frightening.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others would say I make bad choices when I am extremely happy about something.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement.


	Agree strongly	Agree some	Disagree some	Disagree strongly
Others are shocked or worried about the things I do when I am feeling very excited.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I almost always finish projects that I start.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Before I get into a new situation I like to find out what to expect from it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often make matters worse because I act without thinking when I am upset.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would enjoy the sensation of skiing very fast down a high mountain slope.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes there are so many little things to be done that I just ignore them all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually think carefully before doing anything.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am surprised at the things I do while in a great mood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Before making up my mind, I consider all the advantages and disadvantages.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the heat of an argument, I will often say things that I later regret.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like to go scuba diving.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I always keep my feelings under control.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would enjoy fast driving.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I do impulsive things that I later regret.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When I get really happy about something, I tend to do things that can have bad consequences.

☐ ☐ ☐ ☐

34%

Prev Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Those questions were also asking about impulsivity, this time in a bit more detail...

**impulsive** adjective (ɪmˈpʊlsɪv)


1. Inclined to act on impulse rather than thought.  
2. Motivated by or resulting from impulse: such impulsive acts as hugging strangers; impulsive generosity.  
3. Having force or power to impel or incite: forceful.  
4. Physics Acting within brief time intervals. Used especially of a force.

Next there are some questions about behaviours or acts you may have committed in your lifetime. We would like to remind you that your responses are anonymous and ask you to be as honest as you can. This sections functions a lot like the questions about your feelings: we will ask if you have ever done a behaviour, and if you have then we will ask you a bit more about it. Again, there will be space to describe these behaviours if you would like to tell us any more about them, but do not feel obliged to. If you find any of the questions too distressing, please feel free to stop the questionnaire at any time or simply to take some time out before continuing. Rest assured that while some of the behaviours we ask about are quite serious, they are all much more common than you would expect and are in no way indicative of mental disorder. However, if you do feel concerned about yourself as regards these behaviours, contact details for relevant and helpful organisations are given at the beginning and the end of the questionnaire.

☐ ☐ ☐ ☐

35%

Prev Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**Have you at any point in your life committed any of the following acts or behaviours?:**

Shoplifted? i.e. taken an item from a shop without paying, specifically one that you did not need or want

☐ Yes ☐ No


Shoplifting is more common than you might expect, a large study by Blanco et al (2008) found that 11.3% of the American population regularly shoplift.

☐ ☐ ☐ ☐

36%

Prev Next



 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have shoplifted**

How often do you shoplift?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have shoplifted?

☐ Yes ☐ No

37%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that you have never shoplifted**


How often do you have the strong urge to shoplift?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

38%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life committed any of the following acts or behaviours?:**

Acted violently (*i.e. hit, kicked punched, bitten*) or aggressively (*i.e. shouted, been verbally or physically threatening or unpleasant*) towards another person?

☐ Yes ☐ No

39%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have acted violent or aggressively**

How often do you act violently or aggressively?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

40%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that you have never acted violently or aggressively**


How often do you have the strong urge to act violently or aggressively?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

41%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life committed any of the following acts or behaviours?:**

Attempted something financially risky? *i.e. starting up a business or making a financial investment*

☐ Yes ☐ No

42%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have attempted something financially risky**

How often do you attempt something financially risky?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

43%

Prev Next

 The University of Nottingham Exit this survey

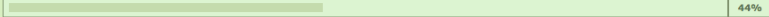
Questionnaire v1.3

**You indicated that you have never attempted something financially risky**


How often do you have the strong urge to attempt something financially risky?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

 44%

Prev Next

 The University of Nottingham Exit this survey

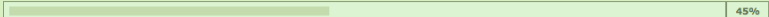
Questionnaire v1.3

**Have you at any point in your life committed any of the following acts or behaviours?:**


Attempted suicide? *i.e. wanted to end your life and taken action towards doing so*

☐ Yes ☐ No

*Suicide attempts might also be more common than you would expect. Kessler et al (1999) found that 13.5% of the population had seriously contemplated suicide and 4.6% of the population had attempted suicide. Although it may be common, most people experiencing these feelings find that with some support these feelings soon go away.*

 45%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have attempted suicide**

How many times have you attempted suicide?

☐ Once ☐ Twice ☐ Three times ☐ More than three times

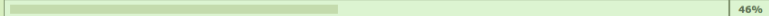
Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have attempted suicide?

☐ Yes ☐ No

 46%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that you have never attempted suicide**


How often do you have the strong urge to attempt suicide?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

47%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you *at any point in your life* committed any of the following acts or behaviours?:**

Gone away or travelled without telling anybody?

☐ Yes ☐ No

48%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have travelled without telling anybody**

How often do you travel without telling anybody?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

49%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that you have never travelled without telling anyone**


How often do you have the strong urge to travel without telling anyone?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

51%

Prev Next

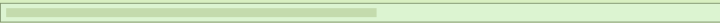
 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life committed any of the following acts or behaviours?:**

Purposely set something on fire that you weren't supposed to? *i.e. set fire to somewhere or something due to the pleasure it gave you*

☐ Yes ☐ No

 52%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have purposely set fire to something you weren't supposed to**

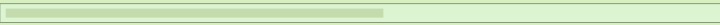
How often do you purposely set fire to something?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

 53%

Prev Next

 The University of Nottingham Exit this survey

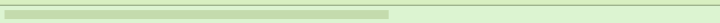
Questionnaire v1.3

**You indicated that you have never purposely set fire to something you weren't supposed to**


How often do you have the strong urge to set something on fire?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

 54%

Prev Next

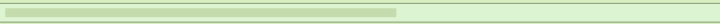
 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point in your life committed any of the following acts or behaviours?:**

Dramatically and suddenly changed your appearance? *i.e. had tattoos or piercings*

☐ Yes ☐ No

 55%

Prev Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in your life you have dramatically and suddenly changed your appearance**

How often do you dramatically and suddenly change your appearance?

☐ Rarely
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all
 ☐ I planned it to some extent
 ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

56%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that you have never dramatically and suddenly changed your appearance**


How often do you have the strong urge to dramatically and suddenly change your appearance?

☐ Rarely/Never
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Is there anything you would like to tell us in relation to this urge?

57%

Prev
Next


The University of  
Nottingham

Exit this survey


Questionnaire v1.3

Thank you for answering all those questions! We'd like to emphasise once again how common all these behaviours can be. However, if you are worried about your responses please contact any of the support organisations given at the end of the questionnaire. That isn't too far away now - we are about two thirds of the way through!

Next we would like to ask you some more questions about your feelings, this time in the form of a questionnaire stretching over two pages. All you need to do is indicate to what extent each statement is a true representation of how you have felt over the past month.

58%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Below are some statements about how you might have felt over the past month. Please indicate to what extent the statements are true representations of how you have felt over the past month.

I feel tense or 'wound up':

☐ Most of the time
 ☐ A lot of the time
 ☐ From time to time, occasionally
 ☐ Not at all

I still enjoy the things I used to enjoy:

☐ Definitely as much
 ☐ Not quite so much
 ☐ Only a little
 ☐ Hardly at all

I get a sort of frightened feeling as if something awful is about to happen:

☐ Very definitely and quite badly
 ☐ Yes, but not too badly
 ☐ A little, but it doesn't worry me
 ☐ Not at all

I can laugh and see the funny side of things:

☐ As much as I always could
 ☐ Not quite so much now
 ☐ Definitely not so much now
 ☐ Not at all

Worrying thoughts go through my mind:

☐ A great deal of the time
 ☐ A lot of the time
 ☐ From time to time, but not too often
 ☐ Only occasionally

I feel cheerful:


☐ Not at all
 ☐ Not often
 ☐ Sometimes
 ☐ Most of the time

I can sit at ease and feel relaxed:

☐ Definitely
 ☐ Usually
 ☐ Not Often
 ☐ Not at all

59%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Below are some statements about how you might have felt over the past month. Please indicate to what extent the statements are true representations of how you have felt over the past month.

I feel as if I am slowed down:

☐ Nearly all the time
 ☐ Very often
 ☐ Sometimes
 ☐ Not at all

I get a sort of frightened feeling like 'butterflies' in the stomach:

☐ Not at all
 ☐ Occasionally
 ☐ Quite Often
 ☐ Very Often

I have lost interest in my appearance:

☐ Definitely
 ☐ I don't take as much care as I should
 ☐ I may not take quite as much care
 ☐ I take just as much care as ever

I feel restless as if I have to be on the move:

☐ Very much indeed
 ☐ Quite a lot
 ☐ Not very much
 ☐ Not at all

I look forward with enjoyment to things:

☐ As much as I ever did
 ☐ Rather less than I used to
 ☐ Definitely less than I used to
 ☐ Hardly at all

I get sudden feelings of panic:


☐ Very often indeed
 ☐ Quite often
 ☐ Not very often
 ☐ Not at all

I can enjoy a good book or radio or TV program:

☐ Often
 ☐ Sometimes
 ☐ Not often
 ☐ Very seldom

60%


Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3


The previous set of questions make up a commonly used questionnaire which looks at feelings of anxiety and depression over the previous month. Experiments with this questionnaire have found up that around 18.5% of the population can be defined as depressed and up to 28.8% have problems with anxiety. (*Olsson et al, 2005*)



Next there is another short questionnaire, this time asking questions about how you feel about yourself. Indicate using the scale how strongly you agree with the statement.

61%

PrevNext


The University of  
Nottingham

Exit this survey


Questionnaire v1.3

Here are some statements relating to how you might feel about yourself. Please select whether or not you agree with each statement.

	Strongly agree	Agree	Disagree	Strongly disagree
On the whole, I am satisfied with myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At times, I think I am no good at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that I have a number of good qualities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to do things as well as most other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I do not have much to be proud of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I certainly feel useless at times.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that I'm a person of worth, at least on an equal plane with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I could have more respect for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All in all, I am inclined to feel that I am a failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take a positive attitude toward myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

62%


PrevNext


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

Thank you for answering those questions. That questionnaire was looking at self esteem. Salsali and Silverstone (2003) found that self esteem tended to be higher in men than in women and increased with increasing age, education and income!




Next we move on to the final section of the questionnaire! This section is much like the section you completed regarding your behaviours over your lifetime, except this time we are focusing purely on the past four weeks. If you have your diary to hand, please check over it to get a feel for the four week time frame.

Once again, while some of these questions can be personal, all your answers are anonymous so please be as honest as you can.

63%

PrevNext



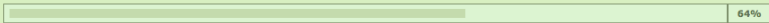
 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Thought that you drank too much?

☐ Yes ☐ No

 64%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you think you have drunk too much**

How often do you drink too much?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

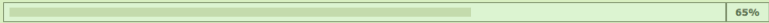
Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have drunk too much?

☐ Yes ☐ No

 65%

Prev Next

 The University of Nottingham Exit this survey

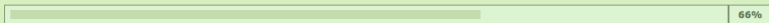
Questionnaire v1.3

**You indicated that in the past four weeks you do not think you have drunk too much**


How often do you have the strong urge to drink too much?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

 66%

Prev Next

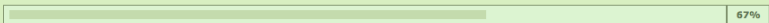
 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Binged on food? *i.e. eaten more food in one sitting than is considered normal or is necessary to be full*

☐ Yes ☐ No

 67%

Prev Next

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have binged on food**

How often do you binge on food?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have binged on food?

☐ Yes ☐ No

68%

PrevNext

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you do not think you have spent too much**


How often do you have the strong urge to spend too much?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

73%

PrevNext

The University of Nottingham

Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Taken recreational drugs? *i.e. taken illegal substances for non-medical reasons*

☐ Yes ☐ No

74%

PrevNext

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have taken recreational drugs**

How often do you take recreational drugs?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have taken recreational drugs?

☐ Yes ☐ No

75%

PrevNext

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not taken recreational drugs**


How often do you have the strong urge to take recreational drugs?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

76%

PrevNext

The University of Nottingham

Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Thought you used the internet or a computer game too much?

☐ Yes ☐ No

77%

PrevNext

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you think you have used a computer game or the internet too much**

How often do you use a computer game or the internet too much?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

78%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you do not think that you have used a computer game or the internet too much**


How often do you have the strong urge to use a computer game or the internet too much?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

79%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Driven recklessly? *i.e. broken the speed limit or run a red light*

☐ Yes ☐ No

80%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have driven recklessly**

How often do you drive recklessly?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

81%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not driven recklessly**


How often do you have the strong urge to drive recklessly?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

82%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3


**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Had a creative thought or a really good idea?

☐ Yes ☐ No

83%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have had a really good idea or a creative thought**

How often do you have really good ideas or creative thoughts?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all (*It was a spontaneous thought or idea*) ☐ I planned it to some extent (*I'd been thinking about the area or question a bit*) ☐ I definitely planned it (*I'd been thinking about the area or question at length*)


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have had a really good idea or a creative thought?

☐ Yes ☐ No

84%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**


Gambled? *i.e. bet on sports or played online poker*

☐ Yes ☐ No

*Gambling is especially common amongst students. LaBrie et al (2003) found that nearly a quarter of students gamble at least weekly.*

85%

Prev Next

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have gambled**

How often do you gamble?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often

Think about the last time you did this. To what extent did you plan doing it?


☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

86%

Prev

Next

The University of Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not gambled**

How often do you have the strong urge to gamble?


☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

87%

Prev

Next

The University of Nottingham

Exit this survey

Questionnaire v1.3

**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**


Been tactless or said something you later regretted?

☐ Yes ☐ No

88%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have been tactless or said something you later regretted**

How often are you tactless or say something you later regret?

☐ Rarely
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all
 ☐ I planned it to some extent
 ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

89%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not been tactless or said something you later regretted**

How often do you have the strong urge to be tactless or say something you would later regret?

☐ Rarely/Never
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Is there anything you would like to tell us in relation to this urge?

91%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**

Self harmed? *i.e. intentionally hurt yourself in some way*


☐ Yes
 ☐ No

*Klonsky et al (2003) found that 4% of the general population self harm on a regular basis.*

92%

Prev

Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have self harmed**

How often do you self harm?

☐ Rarely
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all
 ☐ I planned it to some extent
 ☐ I definitely planned it


Is there anything you would like to tell us in relation to this behaviour?

Would you be happy to talk more, at a later date, about a particular time when you have self harmed?

☐ Yes
 ☐ No

93%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not self harmed**


How often do you have the strong urge to self harm?

☐ Rarely/Never
 ☐ Occasionally
 ☐ Sometimes
 ☐ Often

Is there anything you would like to tell us in relation to this urge?

94%

Prev
Next


The University of  
Nottingham

Exit this survey

Questionnaire v1.3

**Have you at any point over the past four weeks committed any of the following acts or behaviours?:**


Engaged in sexual behaviour which could be considered risky?

☐ Yes
 ☐ No

95%

Prev
Next



 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that at some point in the past four weeks you have engaged in risky sexual behaviour**

How often do you engage in risky sexual behaviour?

☐ Rarely ☐ Occasionally ☐ Sometimes ☐ Often


Think about the last time you did this. To what extent did you plan doing it?

☐ I didn't plan it at all ☐ I planned it to some extent ☐ I definitely planned it

Is there anything you would like to tell us in relation to this behaviour?

96%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

**You indicated that in the past four weeks you have not engaged in risky sexual behaviour**


How often have you had the strong urge to engage in risky sexual behaviour?

☐ Rarely/Never ☐ Occasionally ☐ Sometimes ☐ Often

Is there anything you would like to tell us in relation to this urge?

97%

Prev Next


 The University of Nottingham Exit this survey

Questionnaire v1.3

Having completed this questionnaire, have any other things you might have done impulsively come to mind that you wouldn't mind telling us about?

98%

Prev Next

 The University of Nottingham Exit this survey

Questionnaire v1.3

Thank you for your help with this study!


We will be conducting another study based around the themes in this questionnaire. If you would be interested in taking part in a interview discussing the sort of things you have in this questionnaire - but only those you feel comfortable with - at further length, please leave a contact phone number or email address below. This information will only be connected to your earlier responses for the purpose of contacting you and will be stored seperately. If you do not wish to take part in this later study, do not feel pressured: your participation this far has been extremely helpful.

**Name:**

**Email Address or Phone Number:**

99%

Prev Next

The University of Nottingham

Exit this survey

Questionnaire v1.3

Many thanks for your participation in this study, it is much appreciated. Your responses will be used to help predict risk taking behaviour in patients with bipolar disorder.

We hope you enjoyed taking part in the study! However, if you feel distressed or simply wish to talk through anything the content of this questionnaire may have raised, please contact us ([mxcjf4@nottingham.ac.uk](mailto:mxcjf4@nottingham.ac.uk)) or a relevant support organisation:

**Samaritans** Website: <http://www.samaritans.org> Telephone: 08457 90 90 90 Email: [jo@samaritans.org](mailto:jo@samaritans.org)

**Nightline** Telephone: 0115 9514985 Email: [nightlineanon@sumail.nottingham.ac.uk](mailto:nightlineanon@sumail.nottingham.ac.uk)

Many thanks once again!

Jodie Burden, Rhiannon Corcoran and Richard Morriss

100%

Prev

Done

## Appendix 7: Study Two Ethics Approval

29 January 2010

Professor Richard Morriss  
Professor of Psychiatry  
Division of Psychiatry  
A Floor, South Block  
QMC Campus  
Nottingham University Hospitals  
Nottingham  
NG7 2UH

### Health Sciences

Medical School Research  
Committee  
Division of Therapeutic  
Molecular Medicine  
D Floor, South Block  
Queen's Medical Centre  
Nottingham  
NG7 2UH

Tel: +44 (0) 115 823 1234  
Fax: +44 (0) 115 823 1234

Dear Professor Morriss

**Ethics Reference No: H/12/2009 - Please quote this number on all correspondence**

**Study Title:** The experience of and processes behind impulsivity and impulsive behaviour in bipolar continuum individuals.

**Lead Investigator:** Professor Richard Morriss, Professor of Psychiatry

**Co Investigators:** Dr Rhiannon Corcoran, Associate Professor, Jodie Finlayson Burden, PhD Student, Division of Psychiatry

Thank you for your letter dated 5<sup>th</sup> January 2010 responding to the issues raised by the Committee and enclosing revised version of:

- Volunteer Information sheet version 4, dated 05/01/2010

These have been reviewed and are satisfactory and the study is approved.

Approval is given on the understanding that the Conditions of Approval set out below are followed.

### Conditions of Approval

You must follow the protocol agreed and any changes to the protocol will require prior Ethic's Committee approval.

This study is approved for the period of active recruitment requested. The Committee also provides a further 5 year approval for any necessary work to be performed on the study which may arise in the process of publication and peer review.

You promptly inform the Chairman of the Ethic's Committee of

- (i) Deviations from or changes to the protocol which are made to eliminate immediate hazards to the research subjects.
- (ii) Any changes that increase the risk to subjects and/or affect significantly the conduct of the research.

- (iii) All adverse drug reactions that are both serious and unexpected.
- (iv) New information that may affect adversely the safety of the subjects or the conduct of the study.
- (v) The attached End of Project Progress Report is completed and returned when the study has finished.

Yours sincerely

A handwritten signature in purple ink, appearing to read 'R C Spiller', is written in a cursive style.

**Professor R C Spiller**  
**Chairman, Nottingham University Medical School Research Ethics**  
**Committee**

## Appendix 8: Study Two Consent Form

University of Nottingham, School of Community Health Sciences,  
Division of Psychiatry



The University of  
Nottingham

**Title of Project:** The experience of and processes behind impulsivity and impulsive behaviour

**Name of Investigators:** Ms Jodie Burden, Dr Rhiannon Corcoran, Prof Richard Morriss

### *Healthy Volunteer's Consent Form*

Please read this form and sign it once the above named or their designated representative, has explained fully the aims and procedures of the study to you

- I voluntarily agree to take part in this study.
- I confirm that I have been given a full explanation by the above named and that I have read and understand the information sheet given to me which is attached.
- I have been given the opportunity to ask questions and discuss the study with one of the above investigators or their deputies on all aspects of the study and have understood the advice and information given as a result.
- I agree to comply with the reasonable instructions of the supervising investigator and will notify him immediately of any unexpected unusual symptoms or deterioration of health.
- I authorise the investigators to disclose the results of my participation in the study but not my name.
- I understand that information about me recorded during the study will be kept in a secure database. If data is transferred to others it will be made anonymous. Data will be kept for 7 years after the results of this study have been published.
- I understand that I can ask for further instructions or explanations at any time.
- I understand that I am free to withdraw from the study at any time, without having to give a reason for withdrawing.

- I confirm that I have disclosed relevant medical information before the study.
- I shall receive an inconvenience allowance of £10. If I withdraw from the study for medical reasons not associated with the study a payment will be made to me proportional to the length of the period of participation, but if I withdraw for any other reason, the payment to be made, if any, shall be at the discretion of the supervising investigator.

**Name:** .....

**Address:** .....

**Telephone number:** .....

**Signature:** ..... **Date:** .....

I confirm that I have fully explained the purpose of the study and what is involved to:

.....

I have given the above named a copy of this form together with the information sheet.

**Investigators Signature:** ..... **Date:** .....

**Investigators Name:**.....

**Study Volunteer Number:** .....

## Appendix 9: Study Two Debrief

*University of Nottingham, School of Community Health  
Sciences, Division of Psychiatry*



**The University of  
Nottingham**

*A Floor, South Block, Queen's Medical Centre*

*Insert Title of Project here: **The individual's experience of impulsivity and impulsive  
behaviour***

**Name of Investigators:** Ms Jodie Burden, Dr Rhiannon Corcoran, Prof Richard  
Morriss

### *Healthy Volunteer's Debriefing Sheet*

Thank you very much for taking part in this study. Your participation is really appreciated. We hope you have found participating in the study a positive experience and have enjoyed having the opportunity to discuss some events from your life and to contribute to research. We are looking to better understand why and how people with mood disorder behave impulsively, and your contribution to this is really valued.

We would like to take this chance to remind you that the behaviours we have been talking about today are really very common and don't indicate anything unusual at all about you or your mental health. In fact, research shows us that behaving impulsively can have many benefits, like being better able to think on your feet or being more creative.

Everything we have talked about today is entirely confidential. We will be analysing the things you have told us alongside those of other people who have participated in the study. If the data is published, it will not be possible to identify you. The recording of the interview will be destroyed as soon as possible after this point, and all other data relating to you will be kept in an anonymous form and in accordance with the Data Protection Act.

If you feel at all upset by the things we have talked about please let one of the researchers know. Please continue to feel free to contact us if you feel troubled or distressed in any way by impulsive acts at any time in the future. There is also a list of organisations that you may find helpful listed below.

**Relevant Contact Details:**

***University Counselling Service***

Office: Room A75, Ground Floor, Trent Building, University Park

Telephone: 0115 951 3695

Email: [counselling.service@nottingham.ac.uk](mailto:counselling.service@nottingham.ac.uk)

***Nightline***

Telephone: 0115 9514985

Email: [nightlineanon@sumail.nottingham.ac.uk](mailto:nightlineanon@sumail.nottingham.ac.uk)

***Samaritans***

Telephone: 0845 7909090

Email: [jo@samaritans.org](mailto:jo@samaritans.org)

***Research Team***

Telephone: 0115 8230525

Email: [mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk); [rhiannon.corcoran@nottingham.ac.uk](mailto:rhiannon.corcoran@nottingham.ac.uk);

[richard.morriss@nottingham.ac.uk](mailto:richard.morriss@nottingham.ac.uk)



## Appendix 10: Study Two Information Sheet

**University of Nottingham, School of Community Health Sciences,  
Division of Psychiatry**



**The University of  
Nottingham**

**A Floor, South Block, Queen's Medical Centre**

*Insert Title of Project here: **The individual's experience of impulsivity and impulsive behaviour***

**Name of Investigators:** Ms Jodie Burden, Dr Rhiannon Corcoran, Prof Richard Morriss

### *Healthy Volunteer's Information Sheet*

You have been invited to take part in a research study. Before you decide whether to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends and relatives if you wish to. Ask us if there is anything that is not clear or if you would like more information. Please take time to decide whether you wish to take part or not. If you decide to take part you may keep this leaflet.

Thank you for reading this.

### **Background**

Lots of research has shown that people who are impulsive – i.e. people who tend to make decisions or take actions without thinking through what the outcomes might be – are also more prone to certain types of behaviour. However, the process of how these behaviours come about and how they are experienced by individuals is less well understood. We are talking to a wide range of people who have behaved impulsively to better understand their viewpoints and experiences of their impulsive behaviour.

### **What does the study involve?**

The study consists of a confidential one-to-one interview with the researcher, which will last around one hour. During this time we will talk through specific instances of your own behaviour (only those you feel comfortable talking about) and how these experiences felt to you.

We will also ask you to fill in some of the questionnaires you will have seen in the original online survey again, but this should take no longer than twenty minutes. You will be reimbursed £10 for your time.

**Why have you been chosen?**

You indicated your interest in participating in further studies during an initial online study. Your selection to take part is purely due to this and your endorsement of one or more of the behaviours we are interested in, and does not reflect any diagnostic assessment on the part of the researchers.

**Do you have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.

**What are the possible disadvantages and risks of taking part?**

We understand that you may find it difficult or emotional to talk about certain events in your past. You are more than welcome to stop or pause the interview at any point, or to ask that we avoid talking about certain topics. The interviewer is trained in listening skills, and will be happy to talk to you after the interview has ended if you would find it helpful.

**What if something goes wrong?**

In case you have a complaint on your treatment by a member of staff or anything to do with the study, you can initially approach the lead investigator. If this achieves no satisfactory outcome, you should then contact the Ethics Committee Secretary, Mrs Louise Sabir (Division of Therapeutics and Molecular Medicine, D Floor, South Block, Queen's Medical Centre, Nottingham, NG7 2UH. Telephone 0115 8231063. E-mail [louise.sabir@nottingham.ac.uk](mailto:louise.sabir@nottingham.ac.uk).)

**Will my taking part in this study be kept confidential?**

All information which is collected about you during the course of the research will be kept on a password protected database and is strictly confidential. Any information about you which leaves the research unit will be entirely anonymous, and it will not be possible to identify you from it. However, please be aware that should you disclose information indicating there is a risk of serious harm to yourself or someone else, the researcher has a duty to inform the relevant emergency service.

**What will happen to the results of the research study?**

The results of the study will hopefully be published in an appropriate journal. If this is the case, you will not be alerted. Your personal responses will not be identifiable.

**Who has reviewed the study?**

This study has been reviewed and approved by the University of Nottingham Medical School Ethics Committee.

**Contact for Further Information**

Jodie Finlayson-Burden  
Division of Psychiatry  
A Floor, South Block  
Queen's Medical Centre

Nottingham  
Telephone: 01158230525  
Email: [mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk)

Thank you for your consideration of this study!

**Appendix 11: Study Two Invitation Email**

Hello <name>,

You may remember that a while ago you participated in an online survey asking you about your personality and behaviour, during which you indicated that you would be happy to be contacted about further studies on related topics. We are now progressing to the second study in this research programme and would like to invite you to take part.

The study consists of an hour long interview with the researcher, during which you would be asked to describe certain instances of your behaviour. You would also be asked to fill in some of the scales you completed during the online questionnaire, which takes no longer than twenty minutes. You would be reimbursed £10 for your time. The attached information sheet has some more information on the study.

Don't worry if you are not interested in taking part, we really appreciate your contribution to the research so far. However, if you are still interested in taking part, please contact me at this email address ([mcxjf4@nottingham.ac.uk](mailto:mcxjf4@nottingham.ac.uk)) to arrange a time for you to come in to the department.

Many thanks and best wishes,

Jodie Burden

## Appendix 12: Study Two Interview Schedule

For any given behaviour x:

*“Today we would like to discuss certain behaviours you have already indicated that you have done. You do not have to talk about anything you do not feel comfortable discussing, so please feel free to let me know if you would like to skip a topic or if you would just like to pause the interview. Does this sound alright to you?”*

*Think about the most memorable time you x (i.e. first time, most recent time, etc.).*

Was this time typical of when you x?

*Before x: We would like to know more about the events leading up to x.*

*It would be most helpful if you could imagine yourself back in the situation. Think about where you were, who you were with, how you were feeling.*

What was going on generally in your life at the time?

**P** Where were you living? What were you doing? Had anything big happened to you?

Could you please talk me through the <72hrs preceding the last time you x?

**P** Where were you?

**P** Who were you with?

**P** What were you doing?

**P** Had you been drinking/taking drugs?

**P** How were you feeling?

In the 24/48/72hrs preceding x had you committed any other unusual behaviours e.g. drunk alcohol or taken drugs, slept worse than usual, binge eaten, engage in illegal behaviours

Was the initiation of x deliberate, accidental or in between?

Did you plan to x or was it an impulsive act? How long did you plan it for?

**P** When was the last point before x at which you weren't considering it?

**P** What changed to make you consider it?

Did you tell anybody what you were doing/planning on doing?

If you had to pick one thing that triggered or prompted x, what would you pick?

*During x: We would like to understand exactly what it was you did.*

Could you please describe the last time you x?

**P** Where were you?

**P** Who were you with?

**P** What exactly did you do?

**P** Had you been drinking/taking drugs?

**P** How did you feel during x?

What outcome did you intend?

What outcome did you expect?

**P** What do you feel your reasons for doing x were? i.e. did you want to elicit a certain feeling, punish or hurt somebody, escape, get help, prolong a feeling or emotion?

Did you consider it to be x at the time?

**P** Do you now?

*After x: We would like to understand better the consequences of x.*

What did you do following x?

How did you feel after x?

**P** Why do you think that the event had such a big effect on you?

Did x have any consequences for you? E.g. in work/studies, relationships, financial situation

What events/experiences took place after x? e.g. felt better/worse

Could you imagine doing x again?

**P** What would stop you?

**P** What would prompt you?

How does this example of x differ from other times you have x?

### Appendix 13: Study Two Memo Exerts

26/02/10

I have been noticing as the participants talk how compulsive these 'impulsive' behaviours sound: building of tension/anxiety/emotion, instant desire to act out the behaviour (as if from 'outside source') and dream like state during action following by calming after behaviour completed. Will be interested to see if this holds through analysis.

26/03/10

The dream like state individuals find themselves in excuses them from recognising that this situation is real and likely to have consequences. The external prompt and dazed sensation allows individuals to 'go along' with events without deeper analysis, explaining why they are often so confused or surprised by the eventual consequences these actions bring. It is not necessary to anticipate consequences or change behaviour to avoid such consequences as the behaviour itself does not feel real and therefore has no consequences tied to it.

Social support is necessary but it is also vital that individuals feel able to use the social support available to them. i.e. P2 contacted her friend after the SH had taken place. The support was in fact there and was employed, but only at the point at which her own emotional state had been mitigated by the behaviour itself. This might provide evidence for the fact that emotion is clouding decision making to the point where sensible and pro-active decisions are not taken. When the emotional state is more bearable, these alternative options become available and are taken up and appreciated by the individual. See also P4, when interrupted during self harm she is usually upset, but if the interruption is prolonged to the point that her emotional state dissipates, she does not need to re-engage with the behaviour once alone again.

Emotion and decision-making literature. What separates impulsivity and decision making? Emotional decision making literature tied in with theories of reward. What is rewarding about these behaviours to individuals? Is it instead that the behaviours are negatively reinforced by the absence of painful emotion?

15/04/10

All individuals need the resources available to engage in their behaviour – i.e. meds for suicide, money to take financial risk. Behaviour, impulsive or otherwise, is dependent on having the methods needed to perform behaviour available. Relates to recent measures to control suicidal behaviour by controlling availability of e.g. paracetamol. Seems that this is not exclusive to impulsive but may be different in that availability acts as a stimulus? – but cf. P1's coming into money prompted him to take a financial risk. Also can be compared to P3's behaviour in which the stimulus is not actually available and the prompt is in essence the outcome (i.e. wants new belongings but does not have the financial means to easily afford). However, P3 did state that if he really didn't have the money then his behaviour would be stopped and the behaviour was worsened by availability of student loan (as compared to being at home where he suffered through when he wasn't able to buy something he wanted).

29/07/10

Negative urgency is a really interesting concept, and one which is coming out clearly in the data. Participants are aware of their internal states and many have

coping strategies in place to deal with these states. However, there appears to be a threshold point at which decision making is so impaired by negative affect that these habitual patterns of frequently destructive behaviour are reverted to e.g. feeling moderately sad: able to recognise state and go for walk/contact friend/etc; feeling desperately sad: aware that need to perform distracters but unable to and engage in BE, SH, suicide attempt. Mood level is a continuum that differentially impacts upon behav as it is increased.

All participants cite 'loosing control' as either an experience (e.g. hyp) or a fear (e.g. P1). The experience of imp to the individual is best captured by this statement?

16/08/10

Coping styles theory relevant (Knowles et al 2005). BD inds don't just have neg coping styles to deal with neg emotion but also pos e.g. RT to inc pos mood/excitement. RT and distraction fit v well with S2 data.

04/04/11

Relating to advice seeking (possibly) the idea that seeing others experience the concs is deeply reinforcing: only warning which is valid (see P8 and P15)

'Let's see what happens': concs do not matter, anything is ok.

Self-enforced and decided upon rules. Something to do with controlling one's own urges?



## Appendix 15: Study Two Coded Interview Exerts

H: Yeah, no I've got really really close to it, um, well just that it was getting really overwhelming cause I was just really not very well before Christmas and that I felt like I was going to loose control and I'd started, like I'd got things in to do it with, that I sort of, and I was, and it was just sort of building and building but I never actually reached that point. So yeah, it's not like something that's going away, but then again I don't think it will. I don't know, it's kind of like, do you think like if you were ever short of money and you actually let yourself steal something that ever stealing it again, it would never be such a big thing would it? Cause you'd already broken that barrier, that I kind of feel that maybe it's like that.

**J: Ok. So do you feel aware that there's not that barrier stopping you any more? Does that make you feel anxious, or is it just kind of a 'I need to be careful not to because-'**

H: No, it does make me anxious because sort of, you know, I've got myself in really bad situations because of it and like I went through, when I was in my second year at uni, I just completely lost control of sort of everything, um, and sort of it wasn't just the self harm but I dropped out of uni and I split up with my boyfriend and I lost loads of friends and, you know, there's kind of still that fear that I'll loose everything again.

*Being close to doing behaviour and resisting*

*Overwhelming*

*Prodrome to loss of control*

*Preparing for SH: tools*

*Building to point at which behaviour is inevitable*

*SH not something which ever goes away*

*Increasing likelihood of behaviour*

*Breaking barrier to engage in behaviour*

*Fatalistic?*

*Anxiety over behaviour*

*Behaviour may return - control?*

*Bad experience*

*Anxiety over loosing control*

*Loss of support*

*Fear of behaviours repeating*

**Appendix 16: Study Two Initial Themes**

ANTECEDENTS	BEHAVIOUR	CONSEQUENCES
<p>1. Emotional state <i>Behaviours are preceded by intense emotional states, both positive and negative. Negative states are cited as limiting ability to control behaviour</i></p> <p>2. Internal focus <i>Individuals have strong internal focus to the extent that aspects of the external world are not registered/taken into account during decision making while internal factors are weighed heavily</i></p> <p>3. Orientation within the present, not future <i>Individuals are focused on present states (emotional) and needs to the extent the future is not considered in the decision making process</i></p> <p>4. Life events <i>Behaviours are preceded by large life events</i></p> <p>5. Contextual triggers <i>Certain settings act as triggers and are likely to lead to behaviours</i></p> <p>6. Access <i>Access to tangible elements (e.g. money, medication) is required to engage in behaviour</i></p> <p>7. Urges to behave</p>	<p>25. Behaviour cannot be stopped once started <i>Behaviour, once begun, cannot be stopped and will instead run its full course.</i></p> <p>26. Feelings of loss of control <i>Individuals describe an absence of control over themselves and their behaviour while behaviour is taking place</i></p> <p>27. Fugue state <i>Behaviour occurs during a fugue or dissociative state during which individuals are not aware of themselves or their actions</i></p> <p>28. Coping with emotion <i>Behaviour is experienced as a tool to cope with and control emotional states</i></p> <p>29. Is bad or wrong <i>Behaviour is constructed as being against the rules, as wrong, as socially undesirable</i></p> <p>30. Habit/ritual; patterns of action <i>Behaviour occurs in defined patterns of action and is constructed by the individual as a habit</i></p> <p>31. Modelling behaviour on others <i>Behaviour is constructed in response to other's</i></p>	<p>32. External focus <i>Behaviour allows the individual to loosen their focus on the internal and return their attention externally</i></p> <p>33. Reflection – learning experience <i>Degree to which actions are reflected upon and whether behaviour is constructed as positive, learning experience</i></p> <p>34. Regret <i>Individuals endorse regretting their actions as they are displeased at its consequences</i></p> <p>35. Impact on future behaviour <i>Behaviour has influence on future behaviour and future intentions</i></p> <p>36. Coping with emotion <i>Behaviour has allowed the individual to cope with and manage their emotion</i></p> <p>37. Release of emotion <i>Behaviour has allowed a release of emotion such that is has dissipated</i></p> <p>38. Rewarding/reinforcing <i>Behaviour is reinforcing (both pos and neg) or</i></p>

<p><i>Individuals experience a strong desire/temptation to engage in behaviours – these are either resisted or accepted</i></p> <p>8. Intentions</p> <p><i>Individuals endorse a range of beliefs about the intentions of their actions, particularly whether intentions are singular and defined, multiple or unclear</i></p> <p>9. Anticipated consequences</p> <p><i>Individuals anticipate and predict the outcomes of their actions, which either reinforces or negates the decision to engage in behaviour</i></p> <p>10. Lack of planning</p> <p><i>Extent to which individuals talk about directly planning their behaviour</i></p> <p>11. Long term pre-planning</p> <p><i>Pre-existing and long term ideation about engaging in behaviour without directly planning a single occasion of behaviour</i></p> <p>12. Considering other options</p> <p><i>Extent to which individuals look at other potential routes of action</i></p> <p>13. Distorted thinking/sudden changes in thinking</p> <p><i>Endorsing a form of thinking which is in some way different or changed from everyday thought</i></p> <p>14. Sudden decision making</p> <p><i>An instantaneous change in thought at which point</i></p>	<p><i>experience. If others are seen to engage in behaviour with positive outcomes it is seen to be appropriate for the individual, if outcomes for others are seen to be negative the likelihood of the individual engaging in behaviour is decreased</i></p>	<p><i>rewarding such that future occurrences of the behaviour are made increasingly likely</i></p> <p>39. Impact on others</p> <p><i>Behaviour has a direct influence on those around the individual, often in a way which was not predicted before behaviour took place</i></p> <p>40. Responses of others</p> <p><i>Others respond to the action and to the individual, often negatively</i></p> <p>41. Disclosure</p> <p><i>Individuals endorse telling others about the behaviour</i></p> <p>42. Worth of behaviour</p> <p><i>Behaviour is reflected upon in terms of its worth: behaviour is either worthwhile or otherwise</i></p> <p>43. Dealing with consequences: practically</p> <p><i>Consequences are dealt with pragmatically and immediately</i></p> <p>44. Dealing with consequences: compensating</p> <p><i>Behaviour is 'undone' in the form of behaviour which looks to compensate for original action</i></p>
--	--	--

<p><i>the behaviour is decided upon</i></p> <p>15. Distraction <i>The use of behaviours to take the individual's focus away from intending behaviour</i></p> <p>16. Preventing/postponing behaviour <i>Intentional desire to put off the behaviour until a later point</i></p> <p>17. Prodromes to behaviour <i>Behaviour has notable prodrome during which the individual is clear that the behaviour will soon occur: 'winding up to something'</i></p> <p>18. Inevitability <i>Behaviour is presented with a sense of inevitability: once decided upon the individual has no choice but to engage in behaviour</i></p> <p>19. Coping with emotion <i>Behaviours and alternate distracting behaviours are presented as a tool to enable the individual to deal with extremes of emotion</i></p> <p>20. Sensation seeking <i>The individual specifically engages in behaviour in the pursuit of sensation and the negation of boredom</i></p> <p>21. Social support vs. isolation <i>Behaviour is preceded by isolation/loneliness on part of individual, who endorses that social support would have protected against behaviour</i></p>		
--	--	--

22. Weighing up risk and/or cost <i>Risk is measured against predicted outcomes to identify worth of the behaviour</i> 23. Social acceptance <i>Degree to which behaviour is socially endorsed/acceptable</i> 24. Trusting self to engage in behaviour <i>Individuals evaluate the degree to which they feel they can engage in behaviour without losing control</i>		
---	--	--

## Appendix 17: Study Two Revised Themes

ANTECEDENTS	BEHAVIOUR & IMMEDIATE CONSEQUENCES	LONGER TERM CONSEQUENCES
<p>1. Social Support <i>Behaviour is preceded by isolation/loneliness on part of individual</i></p> <p>2. Emotion state <i>Behaviours are preceded by intense emotional states (pos &amp; neg). Negative states are cited as limiting ability to control behaviour. Triggered by <b>life events</b></i></p> <p>3. Coping with emotion <i>Behaviours are presented as a tool to enable the individual to deal with extremes of emotion</i></p> <p>4. Representing others experience <i>Individuals model their own actions according to the advice of and perceived consequences to others. Social acceptance of behaviour is noted.</i></p> <p>5. Environmental triggers to access <i>Particular settings act as triggers, and availability of tools for behaviour required</i></p> <p>6. Dissociation prodrome <i>Distorted cognitive state which includes <b>internal focus, present orientation (i.e. not past or future)</b> and <b>changed thinking</b></i></p> <p>7. Anticipating outcomes</p>	<p>13. Altered state of consciousness <i>Dissociated state/ altered state of consciousness, during which individual feels <b>unable to stop behaviour</b>, has <b>feelings of loss of control</b> and <b>sense of fugue state</b>.</i></p> <p>14. Act is a habit <i>Behaviour is described as a habit which is stripped of conscious awareness</i></p> <p>15. Behaviour is ritualised <i>Behaviour is ritualised and occurs in set patterns with associated paraphernalia</i></p> <p>16. Coping with/ releasing emotion <i>Behaviour allows the individual to manage and release emotion such that immediately succeeding behaviour their mood is calmed/ improved</i></p> <p>17. Reward <i>Behaviour is rewarding (either pos or neg)</i></p> <p>18. Return to consciousness <i>Dissociative state ends and individual returns to an external focus and increased awareness.</i></p> <p>19. Dealing with immediate consequences <i>Individuals deal with practical and immediate</i></p>	<p>20. Regret <i>Actions are regretted, with individuals displeased at consequences. Individual must work to 'undo' their impact. Includes <b>guilt and undoing</b></i></p> <p>21. Anticipating act in future <i>Event is reflected upon (in terms of worth) and used as learning experience for the future. Individuals anticipate future acts, in terms of behaviour being reinforced or prevented. Includes <b>reinforcing, learning experience and impact on future</b></i></p> <p>22. Consequences for others <i>Behaviour is seen to have an impact on others, both directly and understood by their responses. Individuals may consequently restrict disclosure. Includes <b>impact on others, responses of others and disclosure</b>.</i></p>

<p><i>Extent to which behaviour is targeted towards defined and realistic outcomes, which are predicted by the individual. Behaviour's worth identified on basis of predicted outcomes.</i></p> <p>8. Lack of planning</p> <p><i>Degree to which behaviour is planned (both chronic and acute) and whether alternate options for action are considered. Includes <b>long term pre-planning, considering other options</b> and <b>weighing up risk</b></i></p> <p>9. Impulsive thought</p> <p><i>Decision to engage in behaviour is instantaneous and explicit.</i></p> <p>10. Compulsion to act</p> <p><i>Behaviour feels inevitable with strong desire to engage. Individual explicitly clear that behaviour will occur, and that they have no choice in this. Includes <b>urges to behaviour, prodromes</b> and <b>inevitability</b></i></p> <p>11. Resisting behaviour</p> <p><i>Individual attempts to postpone or stop behaviour by engaging in distracting behaviours. Includes <b>distraction</b> and <b>preventing/postponing behav.</b></i></p> <p>12. Sensation seeking</p> <p><i>Individual decided to engage in behaviour on basis of positive sensations obtained.</i></p>	<p><i>consequences of act.</i></p>	
---	------------------------------------	--

## Appendix 18: Study Two Final Themes and Code Book

<i>Label</i>	<b>Preparatory set</b>
<i>Definition of what the theme concerns</i>	Individuals prepare for the behaviour over extended time period. They modify both their own expectations and the external environment to enable themselves to engage in behaviour.
<i>Included sub-themes</i>	<p><i>Engineering environment</i></p> <p>Individuals modify the environment and obtain tools required to engage in behaviour.</p> <p><i>Consideration of behaviour</i></p> <p>Individual refers to having considered and prepared for their actions over extended period of time.</p> <p><i>Anticipating outcomes</i></p> <p>Individuals predict and plan for the consequences of their actions</p>
<i>How to know when the theme occurs</i>	Look for reference to planning or preparation in specific terms i.e. describing what individual did or how they went about it. Particularly relevant are references to thinking about the act over extended time period or taking physical steps in preparation.
<i>Description of any qualifications or exclusions to theme</i>	Direct references to absence of planning negate coding, as do references to sudden decisions: these are better coded as reflexive action.
<i>Example of positive coding</i>	"I'd decided that when I had the opportunity to do so I'd take it. So I'd been thinking about it a lot."
<i>Example of negative coding</i>	"I didn't really pre-plan it; it was more of a spur of the moment thing."
<i>Label</i>	<b>Influence of the environment/others</b>
<i>Definition of what the theme concerns</i>	The external environment – both physical and social - influences the individuals' decision and ability to engage in behaviour.



<i>Included sub-themes</i>	<p><i>Ability to access help</i></p> <p>Degree to which individual feels help and support is available to them, and to which they feel they can appropriately access and use this support.</p> <p><i>Immediate physical trigger</i></p> <p>Tangible objects in the external environment stimulate the individual to take action.</p> <p><i>Seeking out external sources of information</i></p> <p>Individuals seek advice or information from external sources such as friends, family or media. Social norms are referred to.</p> <p><i>Life events</i></p> <p>Events external to the individual impact their own feelings and decision making process such that the behaviour is made more likely.</p>
<i>How to know when the theme occurs</i>	Look for description of environmental factors that the individual describes as relevant to their decision. These factors are likely to be both animate and inanimate.
<i>Description of any qualifications or exclusions to theme</i>	Internal factors are not relevant here, except where the individual is describing their own response to specifically referenced external events.
<i>Example of positive coding</i>	“Before I’d moved I’d thrown out tools that I’d had to try and remove temptation, but then seeing the lighter there.. The lighter being there did have an effect.”
<i>Example of negative coding</i>	“When I am upset I do tend to eat a lot, because as I said I comfort eat. And boredom as well.”
<i>Label</i>	<b>Intense emotional state</b>
<i>Definition of what the theme concerns</i>	Individuals refer to the experience of intense affect (particularly negative) which is described as having an impact on decision to engage in behaviour and on the behaviour itself.
<i>Included sub-themes</i>	<p><i>Altered state of consciousness</i></p> <p>Individuals describe experiencing a state of consciousness</p>

	<p>which is different to their normal consciousness. This may be to extent that they may lose awareness i.e. a dream state.</p> <p><i>Extreme internal focus</i></p> <p>Individual is focused internally (on their own experience and affective state) to the exclusion of external factors i.e. time, location, others.</p> <p><i>High arousal/cognitive load</i></p> <p>Intense emotional state places large cognitive burden on the individual so they do not feel able to think freely.</p> <p><i>Moderating affective state</i></p> <p>Behaviour is engaged with as tool to increase positive/decrease negative emotion, which is routinely achieved. Once affective state is moderated individual is able to return their focus externally.</p>
<i>How to know when the theme occurs</i>	Look for the individual's description of their emotional state - particularly in terms of emotion words e.g. 'upset', 'sad', 'angry', 'euphoric' - where this is related to their decision to engage in the behaviour or linked to the behaviour itself.
<i>Description of any qualifications or exclusions to theme</i>	General moods across a wider time frame or at mild/moderate levels of emotion would not meet criteria for this code.
<i>Example of positive coding</i>	"Cause yeah it is just, I dunno, it's almost like everything in my head's really loud when I'm really upset and anxious."
<i>Example of negative coding</i>	"I just think I was mostly just, um, it was just kind of boredom. Like I wasn't particularly happy or particularly sad, I was just, like everything was kind of 'uh'."
<i>Label</i>	<b>Agency (lack of)</b>
<i>Definition of what the theme concerns</i>	The individuals' sense of self as an independent agent free to and capable of making and enacting choices is comprised.
<i>Included sub-</i>	<i>Intrusive thought</i>

<i>themes</i>	<p>Individual experiences thoughts which they do not feel able to control or stop</p> <p><i>Sense of self</i></p> <p>The individual loses their sense of a discrete self with individual intentions, experiences and emotions.</p> <p><i>Agency (lack of)</i></p> <p>Individual does not feel as though they can act of their own volition. This exists in the lead up to, during and after behaviour, and prevents future ability to control behaviour.</p> <p><i>Absence of choice</i></p> <p>The individual describes feeling as though there are no alternative choices or options.</p>
<i>How to know when the theme occurs</i>	Look for references to not being in 'control' of self, or regarding as absence of alternative options or choices.
<i>Description of any qualifications or exclusions to theme</i>	Where the individual describes a clear decision making process during which they are described as able to make choices and exert control this code would not be relevant
<i>Example of positive coding</i>	"Even if I can't be bothered to go to the shop, it's like someone else is there, making me do it. I have not control over it."
<i>Example of negative coding</i>	"It was definitely something that I wanted to do."
<i>Label</i>	<b>Premonitory urge</b>
<i>Definition of what the theme concerns</i>	Behaviour and lead up to behaviour has compulsive element, in which the individual feels driven to act. Attempts may be made to resist behaviour, but they are unsuccessful.
<i>Included sub-themes</i>	<p><i>Distracting/resisting</i></p> <p>Individuals take steps to prevent behaviour, and may use defined behaviour to distract themselves from the action. Resistance is effortful.</p> <p><i>Intense drive to complete act</i></p> <p>Individuals experience a strong and powerful urge to</p>

	engage in behaviour.
<i>How to know when the theme occurs</i>	Look for references to 'resisting' or 'distracting' from behaviour, at the same time as feeling 'compelled' or 'pushed' towards action.
<i>Description of any qualifications or exclusions to theme</i>	Non-effortful resistance does not meet criteria for the code. Likewise, a simple desire to engage in the act without a powerful driving force to would not be coded.
<i>Example of positive coding</i>	"I'd sort of built up a list of 'Before I try and kill myself I must do the following.', Which was, had become quite a good way of stalling it."
<i>Example of negative coding</i>	"It's just if there happens to be something that I like and the fact that I haven't spent money for a while then I will be happy to spend it. I would only ever buy something I wanted."
<b>Label</b>	<b>Reflexive action</b>
<i>Definition of what the theme concerns</i>	Decision to engage in action is sudden and instantaneous, with behaviour also happening in quick succession.
<i>Included sub-themes</i>	<p><i>Impulsive thought</i></p> <p>Decision is instant, with no conscious precursors. No attempt is made to refute the decision.</p> <p><i>Consideration of alternatives/risk (lack of)</i></p> <p>Little or no consideration is given to the alternative options for action or to the potential consequences of action.</p> <p><i>Reinforced and habitual behaviour</i></p> <p>Behaviour appears to have been reinforced over successive incidents of action, such that the behaviour occurs as a simple conditioned response or 'habit'.</p>
<i>How to know when the theme occurs</i>	Look for references to 'sudden' or 'instantaneous' decision and actions
<i>Description of any qualifications or</i>	To qualify for coding, the transcript should not reference extended consideration of the behaviour or alternative

<i>exclusions to theme</i>	options, this would be coded as preparatory set.
<i>Example of positive coding</i>	"Yeah, it just popped in to my head and I cut straight away."
<i>Example of negative coding</i>	"We knew we were going out at the end of the month so it was one of those events that like, it's planned."

<i>Label</i>	<b>Sensation seeking</b>
<i>Definition of what the theme concerns</i>	Behaviour is engaged in with strong anticipation of sensation and/or thrill.
<i>Included sub-themes</i>	<p><i>Anticipation of sensation</i></p> <p>Individual is focused upon the positive or exciting experience the behaviour will afford them.</p> <p><i>Singular focus</i></p> <p>Individuals focus on the positive consequences of their behaviour to the extent that little attention is afforded to other potential outcomes or options.</p>
<i>How to know when the theme occurs</i>	Individual emphasises the positive aspects of behaviour as being their motivation to engage e.g. makes reference to 'fun', 'reward' or 'enjoyment'
<i>Description of any qualifications or exclusions to theme</i>	Alleviation of negative emotions would not meet criteria for coding i.e. individual is not looking simply to 'feel better' but to consciously and explicitly increase positive affect in terms of sensation and excitement.
<i>Example of positive coding</i>	"Like this is gonna be amazing, whatever it costs me doesn't really matter because it's, it's gonna be a once in a lifetime sort of thing."
<i>Example of negative coding</i>	"You were just so worked up there was no way you could release that tension without going mad."