

IMPULSIVITY AND SELF-HARM IN ADOLESCENCE

JOANNA LOCKWOOD

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ABSTRACT

This thesis explores the relationship between dimensions of trait impulsivity and self-harm outcomes in school and college-based young people, drawing on a multi-method approach. Adolescence, and in particular early to mid-adolescence, is a vulnerable time for developing self-harm and this vulnerability may be amplified by levels of impulsivity and emotional reactivity which are also elevated during this period. Impulsivity is a broad, multi-faceted construct, the various dimensions of which have historically included the failure to analyse and reflect before engaging in behaviour, or to adequately think through the consequences of action. Recently, emotion-based dispositions towards rash action (Negative and Positive Urgency) have been differentiated from other non-emotion-based forms of impulsivity. Considerable empirical and theoretical work has implicated impulsivity across a range of problem behaviours in youth, yet the relevance of the construct in understanding and identifying behaviour engagement has been hampered by a failure to adequately specify which dimension of impulsivity is associated with the outcome of interest. Research is starting to specify with greater precision how impulsivity relates to self-harm behaviour in youth. This work is facilitated in large part by the delineation of unidimensional impulsivity traits within the UPPS-P (Urgency-Premeditation-Perseverance-Sensation-Seeking) Impulsivity model (Lynam, Whiteside, Smith, & Cyders, 2006; Whiteside & Lynam, 2001). The present thesis aims to contribute to this emerging body of work by empirically examining how unidimensional impulsivity traits are implicated in adolescent self-harm across different developmental stages and within cross-sectional, prospective and qualitative designs. As such, the work aims to deliver a body of evidence to guide future intervention and prevention work in this field. Ethical reflexivity should be central to any research endeavour and is particularly pertinent within the field of mental health. Additionally therefore, the thesis has engaged with the ethical impact of this body of work on the young people involved.

The thesis begins by providing an overview of approaches to defining and measuring impulsivity in Chapter 1 and introduces the UPPS-P Impulsivity model. This chapter also explores emotion-based impulsivity in more detail and the potential mechanisms which underlie its importance.

Chapter 2 examines self-harm and the relevance of this behaviour in adolescents. Key explanatory models of self-harm are described in this chapter and theorised links with impulsivity are discussed. Chapter 3 brings the preceding chapters together within a systematic review of the literature as it relates to self-harm and impulsivity in adolescents aged 11-24 years.

Chapters 4 and 5 present research from the SHIP-SHAPE (Self-Harm and ImPulsivity in ScHool Aged young People) school study in which students aged 13-15 years completed a self-report questionnaire at two time points three months apart. The research sought to clarify concurrent (Study 1.1 within Chapter 4) and predictive (Study 1.2 within Chapter 5) relationships between dimensions of impulsivity and distinct categories of self-harm thoughts and behaviours. Logistic regression analyses in Chapter 4 confirmed that young people with a history of self-harm were impulsive, and this impulsivity related chiefly to emotional response. Negative Urgency also distinguished those who had self-harmed, from those who had thought about self-harm but not acted on their thoughts. However, more recent and frequent patterns of self-harm were better characterised by deficits in conscientiousness, or sensation-seeking. Analyses in Chapter 5 revealed that those who maintained their behaviour over the course of the study tended to respond impulsively to emotion, but first onset of behaviour during the study period was predicted by rash but not emotion-driven risk-taking. Chapter 6 presents additional findings from the SHIP-SHAPE school data (Study 2), which revealed the impact of participation via multi-methods analysis of mood-change scores, survey ratings, and open comments. Overall findings suggested that most young people valued participation and cited important benefits, but impact variations according to gender, self-harm status, and time of assessment were revealed.

Chapters 7 and 8 present research from two Further Education College-based studies with adolescents aged 16-22 years. Each drew on separate methods to consider the interplay between dimensions of impulsivity and the broader cognitive context. Analyses in Chapter 7 using self-report survey data confirmed the concurrent relationship between self-harm and Negative Urgency (Study 3.1). Evidence also indicated an important transactional relationship, finding that low self-control and Negative Urgency, increased the risk of more frequent self-harm. Chapter 8

presents findings from Study 3.2, a qualitative study which examined the ways in which a multidimensional account of impulsivity, alongside other affective and cognitive factors, was meaningful to individual understandings and experiences of self-harm. Data was captured by exploratory card-sort tasks and face-to-face interviews. Dynamic processes associated with rash reactivity to emotion, inadequate deliberation, anger and low control were recognised as proximal and distal risk factors for self-harm.

Together the studies support the utility of unidimensional facets of impulsivity in distinguishing distinct components of self-harm thoughts and behaviours across early and mid-to-late stages of adolescence. In particular, evidence supports the central role of emotion-based impulsivity in heightening risk for self-harm across adolescence. However, cognitive deficits may have a crucial role to play in exacerbating risk once self-harm behaviours are established. Moreover, multi-method data suggests that affect-driven responses and inadequate or over-taxed cognitive systems are likely to produce heightened risk profiles. The findings have implications for the delivery of research and interventions, primarily by demonstrating the utility of a short and relatively burden free impulsivity tool, which may be effective in specifying treatment and intervention targets in adolescents. Additionally, the work has ethical implications for conducting of self-harm research in schools and for facilitating the involvement of young people in research.

A note on terminology used in this thesis

The terms ‘adolescence’ and ‘young people’ are used interchangeably throughout the thesis and refer to those aged 11-24 years, as psychologists and neuroscientists suggest this span of age corresponds best to the social, psychological, neurodevelopmental, and biological growth undertaken between childhood and adulthood (Sawyer, Azzopardi, Wickremarathne, & Patton, 2018). Given that this age span is a broad frame of reference, I refer to three specific developmental stages within adolescence: early-adolescence (11-15 years), mid-adolescence (16-18 years) and late-adolescence (19-24 years).

Abbreviations

ADHD – Attention Deficit Hyperactivity Disorder
AFFN – Alternative Five Factor Model
ANOVA – ANalysis Of VAriance
AP – Acquired Preparedness Theory
ARBA – Aids Risk related Behaviour among Adolescents
BIS-II – Barratt Impulsiveness Scale
BOS – Bristol Online Survey
BSCS – Brief Self-Control Scale
BSSS – Brief Sensation-Seeking Scale
BTEC – Business and Technology Education Council
CASE – Child and Adolescent Self-Harm in Europe study
CaTS – Card Sort Task for Self-Harm
CEM-NSSI – Cognitive-Emotional Model of Non-Suicidal Self-Injury
CI – Confidence Interval
DBT – Dialectal Behaviour Therapy
DBT-A Dialectal Behaviour Therapy – modified version for adolescents
DERS – Difficulties in Emotion Regulation Scale
DERS-SF – Difficulties in Emotion Regulation Scale – Short Form
DLPFC – Dorsolateral Prefrontal Cortex
DSHI – Deliberate Self-Harm Inventory
DSM-V Diagnostic and Statistical Manual of Mental Disorders – 5th Edition
DTS – Distress Tolerance Scale
DvC/C - Disinhibition vs. Constraint/Consciousness
E/PE - Extraversion/Positive Emotionality
EAM – Experiential Avoidance Model
EASI – Emotionality, Activity, Sociability and Impulsivity Personality Questionnaire
ECM – Emotional Cascade Model
FASM – Functional Assessment of Self-Mutilation
FFM – Five Factor Model
GABA – Gamma-aminobutyric acid
GCSE – General Certificate of Secondary Education
GIF – Graphics Interchange Format
HADS – Hospital Anxiety and Depression Scale
IMH – Institute of Mental Health (University of Nottingham)
IMV – Integrated Motivational Volitional model
IPT – Interpersonal Psychological Theory of Suicide
IQR – Interquartile Range
ISAS – Inventory of Statements About Self-Injury
JTCl – Junior Temperament and Character Inventory
KW – Kruskal-Wallis test
LCQ – Lifestyle and Coping Questionnaire
LGBT – Lesbian, Gay, Bisexual, Transsexual
LPM – (lack of) Premeditation
LPS – (lack of) Perseverance
MCAR – Missing Completely at Random
MPQ – Multidimensional Personality Questionnaire
MRI – Magnetic Resonance Imaging
MWU – Mann Whitney U test
N/NE - Neuroticism/Negative Emotionality
NA – Negative Affect
NEO-PI-R Neuroticism, Extraversion, Openness Personality Inventory - Revised
NEQ – Non-Suicidal Self-Injury Expectancy Questionnaire
NICE – National Institute for Health and Care Excellence
NSSI – Non-suicidal Self Injury

NUR – Negative Urgency
 OFSTED – Office for Standards in Education, Children's Services and Skills
 OR – Odds ratio
 OSI-F – Ottawa Self-Injury Inventory - Functions
 PA – Positive Affect
 PANAS-SF – Positive and Negative Affect Schedule – Short Form
 PFC – Prefrontal Cortex
 PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-Analyses
 PSHE – Personal Social and Health Education
 PUR – Positive Urgency
 RIM – Reflexive-Impulsive Model of behaviour
 RR – Risk Ratio
 RRI – Rapid Response Impulsivity
 SD –Standard Deviation
 SE – Standard Error
 SES – Socioeconomic Status
 SH – Self-Harm
 SHIP-SHAPE – Self-Harm and ImPulsivity in ScHool Aged young PEOple
 SIB – Self-injurious behaviour
 SIQ-TR – Self-Injury Questionnaire Treatment Related
 SNAP – Schedule for Non-Adaptive and Adaptive Personality
 SOSI – Signs of Self-Injury programme
 SS – Sensation-Seeking
 SSI – Suicidal Self Injury
 SSPT – Sensation-Seeking Personality Type scale
 SSS – Sensation-Seeking Scale
 SST – Stop Signal Task
 SUPPS-P – Short Form (UPPS-P)
 TCI – Temperament and Character Inventory
 UPPS – Urgency-Premeditation-Perseverance-Sensation-Seeking-Positive Urgency Impulsivity scale
 UPPS-P – Urgency-Premeditation-Perseverance-Sensation-Seeking-Positive Urgency Impulsivity scale
 VAS – Visual Analogue Scale
 VIF – Variance Inflation Factor

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Chapter 1: The personality underpinnings of impulsive behaviour

1.1 Overview

This chapter aims firstly to provide a brief overview of theoretical approaches to defining and measuring impulsivity from a personality perspective in order to illustrate the complex and multidimensional nature of this construct. Secondly, it describes an integrative model of impulsivity (UPPS/UPPS-P; (Lynam et al., 2006; Whiteside & Lynam, 2001) which has consolidated conceptual understanding of impulsivity into five pathways to impulsive action. The relevance of this organisational framework for establishing external correlates of behaviour is considered. The UPPS-P will form the basis of empirical investigations within this thesis and, as such, early clarification of the development and utility of this organisational structure is essential. Thirdly, the chapter examines in greater detail one pathway to impulsive action (trait urgency – or emotion-based rash behaviour). This emphasis is important, given that emotion-based impulsivity has been less consistently defined within models of impulsivity to date. Moreover, growing empirical findings suggest this pathway to impulsive behaviour may be particularly relevant to understanding psychopathology. Discussion of the putative mechanisms underpinning urgency is provided.

1.2 Introduction to the construct of impulsivity – problems of definition

The research community has struggled to reach consensus about how to conceptualise impulsivity, but there has been broad recognition in the literature that the term does not reflect a unitary construct, but rather encompasses a heterogeneous collection of traits and psychological constructs (Evenden, 1999). The complicated nature of attempting to capture the characteristic features of impulsivity is reflected in multi-component descriptions. For example, Depue and Collins describe impulsivity as a “heterogeneous cluster of lower-order traits that includes terms such as impulsivity, Sensation-Seeking, risk-taking, novelty seeking, boldness, adventuresomeness, boredom susceptibility, unreliability and disorderliness” (Depue & Collins, 1999, p. 495). It is widely documented that “impulsivity” is subject to much terminological as well as conceptual heterogeneity, and as such is prone to both ‘jingle’ and ‘jangle’ fallacies (Berg,

Latzman, Bliwise, & Lilienfeld, 2015; Sharma, Markon, & Clark, 2014; Whiteside & Lynam, 2001).

That is to say, personality researchers have applied the label of “impulsivity” to impulsive tendencies representing disparate constructs - a ‘jingle’ effect; while constructs which are conceptually comparable have been described using different labels - a ‘jangle’ effect (Block, 1995).

Despite the heterogeneity, impulsivity is a psychological construct of undeniable clinical and practical importance. Impulsivity is a common diagnostic criterion for a number of psychiatric disorders including Borderline Personality Disorder, Bipolar Disorder, and Attention Deficit Hyperactivity Disorder (ADHD). It is also the basis for a range of impulse control disorders (e.g. kleptomania, pyromania, trichotillomania). Increasingly, evidence suggests that impulsivity is a feature of diverse problem behaviours including alcohol and drug abuse, eating dysregulation aggression and antisocial behaviour, compulsive buying, or risky sexual behaviour (Berg et al., 2015; Billieux, Rochat, Rebetez, & Van der Linden, 2008; de Wit, 2009; Fischer, Anderson, & Smith, 2004; Hoyle, Fejfar, & Miller, 2000; Miller, Flory, Lynam, & Leukefeld, 2003; Sharma et al., 2014; Zanolski, Cyders, & Smith, 2009). It is perhaps surprising given the pervasive nature of impulsivity that there is little research consensus about what it actually means to be impulsive or to act impulsively. A brief review of the literature quickly establishes that researchers have approached the conceptualisation, definition, and assessment of impulsivity from varied theoretical perspectives and measurement approaches, a trend which has no doubt contributed to difficulties in establishing a satisfactory and succinct definition.

The following section briefly reviews general personality theories which include an impulsivity component and key models of impulsivity from a self-report and behavioural focus, before describing a recent model – the UPPS/UPPS-P Impulsive Behaviour Scale (Cyders & Smith, 2008; Whiteside & Lynam, 2001), which has sought to coalesce commonly identified impulsivity traits within one organisational framework. The discussion aims to provide important context for the approach to examining impulsivity adopted throughout the empirical chapters of this thesis.

1.3 Impulsivity within general personality theories and impulsivity models

To some extent, theoretical models of impulsivity have hinged on a distinction between a general concept of “impulsiveness” and one that describes action in pursuit of stimulation. Deficits in planning and acting without regard to the consequences of action are typically a core component of the former; a notion of thrill and novelty-seeking, and taking risks in pursuit of such experience, typically compose the latter. This differentiation is reflected notably in Eysenck’s two part model of impulsivity, measured with the I7 Eysenck Impulsivity Scale (Eysenck & Eysenck, 1978). The model differentiates *Impulsiveness*, a construct relating to acting without thinking, from *Venturesomeness*, which relates to openness to new and exciting or risky experiences. Eysenck suggests each construct reflects components of a separate primary facet of personality. Impulsiveness, it is argued, is a component of Psychoticism - broadly the tendency towards egocentric, hostile and anti-social behaviours. Venturesomeness, by contrast, is a facet of *Extraversion* - which reflects active, assertive and sociable traits. Eysenck suggests that these impulsive traits pivot on a central idea of risk-awareness. Thus, individuals high in Impulsiveness may take risks without considering the consequences involved, those high in Venturesomeness are aware of the risks involved in an action, but will act nonetheless (Eysenck, 1993).

Other major models of personality are aligned with Eysenck’s theory. Zuckerman and colleagues include *Impulsive Sensation-Seeking* as one of five primary factors in the Alternative Five-Factor Model of personality (AFFM; Zuckerman, Kuhlman, Thornquist & Kiers, 1991). This factor distinguishes acting on impulse without forethought (Impulsivity) from action that results from the need for varied, novel, and complex sensations and experiences (Sensation-Seeking). As with Venturesomeness, Zuckerman suggests that Sensation-Seeking incorporates a willingness to take physical and social risks for the sake of new and thrilling experience (Zuckerman, Eysenck, & Eysenck, 1978). There is also a juxtaposition of spontaneous non-deliberative action and the pursuit of novel and exciting stimuli in the Novelty-Seeking dimension of Cloninger’s multidimensional Temperament Model (Cloninger, Przybeck, & Svrakic, 1991). Interestingly, the crux of Dickman’s theory of personality (Dickman, 1990) also aligns with the differentiation between acting without reflection and Sensation-Seeking. Dickman differentiates between

impulsive unplanned acts when such a response style is optimal (Functional impulsivity) and impulsive unplanned acts when such a response style will be disadvantageous (Dysfunctional impulsivity). The theory suggests that individuals with dysfunctional impulsivity characteristics will make rapid, error-prone decisions as a result of a tendency to ignore hard facts and adequately deliberate before acting. Individuals with functional impulsivity characteristics are willing to make rapid or rash decisions where a rapid non-deliberative information processing style can be beneficial, and this response style will compensate for error-proneness or risk. Claes reported significant correlations between Dysfunctional impulsivity and Eysenck's Impulsiveness, and between Functional impulsivity and Eysenck's Venturesomeness/and the risk-taking and thrill and adventure seeking subscales of Zuckerman's Sensation-Seeking Scale (Claes, Vertommen, & Braspenning, 2000).

There is debate in the literature as to whether the wedding together of impulsiveness and Sensation-Seeking as separate but related facets of an underlying impulsivity trait is theoretically sound. Some theorists have suggested that by incorporating an evaluation of potential risks in its definition, Venturesomeness by its very nature cannot be considered impulsive (Deyoung, 2010). That said, empirical tests of the I7 have suggested that Impulsiveness and Venturesomeness are correlated factors (Luengo, Carrillo-De-La-Peña, & Otero, 1991). Kirby and Finch (2010) used hierarchical component analysis to examine the structure of self-reported impulsivity items from commonly cited impulsivity scales in a large college sample. They identified a two-component split, which differentiated themes relating to being Prepared/Spontaneous versus those relating to Sensation-Seeking (Kirby & Finch, 2010). Other theorists have argued that impulsiveness and Sensation-Seeking represent largely distinct albeit related constructs. In the developmental literature, Steinberg suggests that impulsivity and Sensation-Seeking follow individual developmental trajectories and probably reflect distinct neurodevelopmental processes (Steinberg, Albert, Cauffman, Banich, Graham, & Woolard, 2008). This position is the central tenet of a dual systems risk model in which it is suggested that increased risk-taking in adolescence is the product of heightened arousal of the socio-emotional system and a relatively

weaker and functionally immature cognitive control system (Steinberg, 2008). By this account, impulsiveness is a normative component of adolescent development.

Other core components of impulsivity commonly reflected in personality theories have included the tendency towards action on the spur of the moment and persistence in the face of boredom or distraction. For example, both are components of the Emotionality-Activity-Sociability-Impulsivity (EASI) temperament model (Buss & Plomin, 1975). Impulsivity has also been described in terms of individual differences in constraint (Tellegen, 1982). In the Multidimensional Personality Questionnaire (MPQ; Tellegen 1982) constraint is distinguished in terms of Impulsiveness versus Control. Individuals low in Control tend to act on impulse, take risks, be spontaneous, and ignore conventional restrictions. By contrast, those high in Control are reflective, planful, and rational. Impulsivity has also been described in terms of reward sensitivity in Gray's model of personality (Gray, 1987). In this model, impulsive individuals are theorised to be driven by an appetitive motivation, sensitive to cues of reward and escape from punishment, which produces exploratory goal-driven behaviour.

An important multi conceptual account of the personality basis of impulsivity is comprehensively described in Five Factor Model of personality (FFM; Costa & McCrae, 1992). Costa and McCrae suggest that impulsivity is reflected by four impulsivity-related facets across three FFM domains, as assessed using the Revised Neuroticism, Extraversion, and Openness Personality Inventory. Two facets reflect low self-control: Impulsiveness, which refers to immoderation and the inability to resist urges, is positioned within Neuroticism thus explicitly tying the construct of impulsivity to emotional instability. The orientation of someone scoring highly on the Impulsiveness facet will therefore be toward short-term reward over any longer-term consequence. Other researchers (Barratt, 1959) have discounted any link between emotionality and impulsivity. Yet, notably, Aluja, and colleagues found correlations between NEO-PI-R Neuroticism and other impulsivity scales (e.g. Zuckerman's Impulsive Sensation-Seeking) suggesting broader overlap between impulsivity-constructs and emotionality (Aluja, García, & García, 2004). Self-control is also tapped by the Self-Discipline facet of the Conscientiousness domain and here refers to the

ability to see tasks through to completion despite boredom or distraction. The facet of Deliberation within Conscientiousness reflects the tendency to think before acting and to weigh up the consequences of behaviour and has corollaries in Eysenck's Impulsiveness. Finally, Excitement-Seeking within the Extraversion trait refers to adventurousness and thrill in taking risks and aligns with Eysenck's Venturesomeness. Individuals high in this facet are easily bored and seek stimulation.

In the widely-adopted Barratt Impulsiveness Scale (Barratt, 1959; Patton, Stanford, & Barratt, 1995) Barratt and colleagues aimed specifically to unpack the multidimensional nature of impulsivity and produce a multifaceted measure of the trait. In the latest version of the scale (BIS-11, Patton et al., 1995) which sampled undergraduate students, psychiatry patients and inmates, they identified six first order facets (*attention* - focusing on current tasks; *cognitive instability* - experiencing intruding thoughts; *motor impulsiveness* – acting quickly; *perseverance* – remaining on task; *cognitive complexity* – enjoying mental challenges; and *self-control* – planning and deliberative thinking). Principal components analysis revealed a three-factor solution. (1) Motor impulsivity refers to the tendency to act without thinking or on the spur of the moment; (2) Non-planning impulsivity refers to the tendency to act without forethought or future planning; (3) Attention impulsivity refers to the tendency towards difficulties concentrating and focusing attention. Notably, while a widely utilised scale, the factorial structure of the BIS-11 has not received strong validation outside of Barratt's research group and the structural representation of impulsivity in the BIS has been questioned. A recent systematic review (Vasconcelos, Malloy-Diniz, & Correa, 2012) found that the majority of studies examining the psychometric properties of the BIS-11 did not replicate the three-factor interpretation. Theorists have proposed an alternative two-factor solution for the BIS reflecting individual differences in cognition (e.g. attentional control/deliberate thinking/planning) versus a construct which reflects behavioural disinhibition and impulse control (Ireland & Archer, 2008; Reise, Moore, Sabb, Brown, & London, 2013).

1.4 Theoretical advancement – the UPPS-P model

In an attempt to bring terminological and conceptual clarity to research in the field of impulsivity Whiteside & Lynam (2001) conducted a comprehensive factor analysis using many of the established impulsivity inventories reviewed above. They sought to incorporate all the relevant conceptualisations of impulsivity embedded in the literature into one unifying organisational structure – the UPPS Impulsivity Model. Specifically, the approach utilised the framework of the Five Factor Model (Costa & McCrae, 1992) testing whether the four aspects of impulsivity identified in the FFM mapped onto wider conceptualisations of impulsivity in the literature. The UPPS model was developed with recognition of the trans-diagnostic importance of impulsivity and the necessity of obtaining more precise specifications for its component features. It was recognised that failure to adequately specify which component of impulsivity is being operationalised limits the ability to empirically examine the relationship between “impulsivity” and any criterion of interest. Thus, clarifying the unidimensional lower-order facets of impulsivity would serve to drive more precise empirical tests of the influence of this multifactorial construct in various psychopathological behaviours (Smith, Fischer, Cyders, Annus, Spillane, & McCarthy, 2007). Thus, an ultimate aim of the UPPS model was to establish the behavioural correlates of impulsive behaviour.

Whiteside & Lynam (2001) uncovered a four-factor solution, which explained 66% of the variance from the 20 impulsivity scales and additional measures included in their factor analysis. They proposed that these four dispositions represented diverse underlying *pathways* that predispose individuals to different manifestations of rash or impulsive behaviour. Subsequently, identification of a fifth pathway to impulsive behaviour (Cyders, Smith, Spillane, Fischer, Annus, & Peterson, 2007) resulted in a revision of the original UPPS model to form the renamed UPPS-P scale (Lynam et al., 2006). UPPS-P pathways have been shown to have high internal consistency and studies have confirmed the factorial structure and construct validity of the scale (Kämpfe-hargrave & Mitte, 2009; Smith et al., 2007; Van der Linden, dAcremont, Zermatten, Jermann, Larøi, Willems et al., 2006). See Table 1.1 for an overview of the organisational structure of the UPPS-P model and links to previous models of impulsivity.

1.4.1 (*Lack of*) *Premeditation* – (*LPM*)

LPM is defined as the “tendency to delay action in favour of careful thinking and planning” (Whiteside & Lynam, 2001, p.677) and is characterised by the Deliberation facet of Conscientiousness in the NEO-PI-R (Costa & McCrae, 1992). A construct relating to the absence of planning, careful consideration, or forward reflection is represented in a number of the models reviewed earlier including facets within Barratt’s BIS-11; Buss and Plomin’s four factor model; items included in Eysenck’s construct of Impulsiveness; Tellegen’s Constraint factor; the Impulsivity facet of Zuckerman’s Impulsive-Sensation-Seeking scale; and Dickman’s Functional/Dysfunctional theoretical construction of impulsivity. As such impulsive behaviour which results from a lack of premeditation reflects cognitive deficits relating to decision-making and reflection, low self-control, and a failure to anticipate (or a disregard for) the outcomes of risk-taking and thrill-seeking (Berg et al., 2015). Consistent with the theoretical position that the UPPS pathways would enable the identification of external correlates of behaviour, evidence has shown that LPM independently predicts psychopathological outcomes including alcohol and substance abuse, binge eating and hyperactivity and anti-social behaviour (Fischer et al., 2004; Magid & Colder, 2007; Miller et al., 2003).

1.4.2 (*Lack of*) *Perseverance* – (*LPS*)

LPS is defined as the “(in)ability to remain focused on a task that may be boring or difficult” (Whiteside & Lynam, 2001, p.685) and is characterised by low *Self-Discipline* in the Conscientiousness domain of the NEO-PI-R. This pathway to impulsive behaviour reflects constructs present in the models of Barratt, Eysenck and Buss and Plomin, and suggests impulsivity reflects cognitive difficulties with persistence, distractibility and low will-power. In addition, this pathway may relate to a low sense of responsibility resulting in maladaptive behavioural choices. For example, Zapolski and colleagues (2009) found that low Perseverance predicted increases in risky sex among college students (i.e. inconsistent use of condoms). Low Perseverance scores have also been implicated in problematic alcohol and substance use (Dick, Smith, Olausson, Mitchell, Leeman, O'Malley et al., 2010) and the inattentive subtype of ADHD (Miller, Derefinko, Lynam, Milich, & Fillmore, 2010).

Confirmatory factor analysis conducted by Smith and colleagues (2007) indicated a strong correlation ($r=.82$) between LPM and LPS and it is suggested that these two pathways are best represented as distinct facets of a broad trait reflecting low conscientiousness. According to de Young (2010) the distinction between the two facets broadly represents the difference between impulsivity with and without deliberation. In their meta-analysis of the psychopathological correlates of UPPS-P facets, Berg and colleagues (2015) revealed a similar correlational pattern across outcomes for both constructs, which could indicate a shared aetiology and limited discriminability in clinical outcomes.

1.4.3 Sensation-Seeking – (SS)

SS is defined as a “tendency to enjoy and pursue activities that are exciting” and “an openness to trying new experiences that may or may not be dangerous” (Whiteside & Lynam, 2001, p.686). Sensation-Seeking is characterised by the NEO-PI-R *Excitement-Seeking Facet* of Extraversion, and as described above is a core feature of the personality models of Cloninger, Buss and Plomin, Eysenck, Zuckerman and Dickman. It is argued that those high in SS have a strong sensitivity to the possibility of reward and hence are more likely to act impulsively in response to strong reward seeking urges (de Young, 2010). The SS facet of UPPS/UPPS-P has been shown to correlate with other UPPS-P facets (Miller et al., 2003; Whiteside, Lynam, Miller, & Reynolds, 2005), suggesting that it is a related but independent pathway toward impulsive action. The utility of this pathway in clinical outcomes has also been demonstrated with correlations between SS and increased engagement in behaviours such as substance and alcohol use (Magid & Colder, 2007) bulimia (Fischer, et al 2008), as well as a negative association with generalised anxiety disorder (Miller et al 2003). Using an experience sampling methodology (daily diary method) with a non-clinical sample of young adults, Sperry and colleagues examined the correlations between facets of impulsivity and thoughts and feelings within an everyday naturalistic setting (Sperry, Lynam, Walsh, Horton, & Kwapil, 2016). They reported correlations between SS and energetic enthusiasm but not troublesome behaviour. They surmised that in a non-clinical population SS may represent an unproblematic appetitive personality trait rather than a pathological pursuit of stimulation. Relatedly, Cyders and Smith argue that while SS may

increase the probability of engagement in a risky behaviour, the trait is not necessarily associated with problematic outcomes from that engagement (Cyders & Smith, 2008). In fact, Fischer and Smith (2004) found in a sample of college students that a combination of high SS and low Premeditation increased the likelihood that risk-taking would have negative outcomes. Hence the ability to predict problematic behaviour engagement may be enhanced when examining both facets in interaction.

1.4.4 Urgency pathways

Negative Urgency (NUR) reflects the “tendency to experience strong impulses, frequently under conditions of negative affect” (Whiteside & Lynam, 2001, p685). NUR is characterised by the Neuroticism facet of the NEO-PI-R, which describes impulsiveness as “acting without thinking when upset”. NUR is theorised to relate to negative reinforcement processes. As such, behaviours driven by this trait are based on a strong and immediate need to alleviate heightened negative arousal. This component of affect-driven impulsive behaviour is less consistently defined elsewhere in the literature. Indeed, links between emotionality and impulsivity are directly rejected by some theorists (e.g. Patton et al 1995). Recently, Sharma and colleagues argued that emotion as a primary motivator of behaviour, is “implicated in many if not most forms of impulsive behaviour” (Sharma et al, 2014, p.382). They conducted a meta-analysis of common impulsivity measures to examine the factor structure of self-report and performance-based measurement approaches to impulsivity. They derived a three-factor solution labelled (1) Neuroticism/Negative Emotionality (N/NE) – associated with UPPS NUR; (2) Extraversion/Positive Emotionality (E/PE) – associated with UPPS SS, and (3) Disinhibition vs. Constraint/Consciousness (DvC/C) – associated with UPPS LPM. They reported strong correlations between the N/NE and DvC/C factors, and found that affect-related dimensions such as Eysenck’s Neuroticism factor and the EASI Emotionality factor, loaded strongly onto the DvC/C factor. They argue that individual differences in DvC/C may serve to index the “preparedness” of an individual to respond to emotion-related circumstances. Hence an individual high in NUR and high in disinhibition would be more likely to have a strong response to heightened negative affect than one high in NUR and low in disinhibition.

NUR has demonstrated a strong association with psychopathological outcomes in studies to date including problematic alcohol use, risky sexual behaviour, gambling and disordered eating (Anestis, Selby, & Joiner, 2007; Fischer, Smith, & Cyders, 2008; Magid & Colder, 2007; Miller et al., 2003; Pearson, Combs, Zapolski, & Smith, 2012; Stojek, Fischer, Murphy, & MacKillop, 2014). NUR is also highly predictive of aggressive behaviour in clinical (Bousardt, Hoogendoorn, Noorthoorn, Hummelen, & Nijman, 2016) and community samples (Bousardt et al., 2017). Unlike SS, which has been shown to predict more frequent engagement in risky behaviours, NUR appears to relate more to problematic levels of engagement in behaviour (Cyders et al., 2008). NUR also appears to be the most relevant pathway to rash behaviour among the UPPS-P scales. In their meta-analysis of the psychopathological correlates of the UPPS-P facets from studies involving more than 40,000 participants, Berg and colleagues (2015) found that NUR displayed the largest effect size among UPPS-P facets across every category of psychopathology (suicidality, aggression, anxiety, depression, borderline personality traits, disordered eating) except alcohol and substance use.

The Positive Urgency (PUR) component of impulsivity, which is not captured by extant impulsivity scales, is theorised to relate to positive reinforcement processes and reflects the need to engage in immediate, highly rewarding behaviours, but which increase the risk of harm. Evidence has supported the psychometric properties of PUR (Cyders & Smith, 2007a) and suggests that it explains unique variance in a number of risky behavioural outcomes. For example, PUR prospectively predicts pathological gambling (Cyders & Smith, 2007a), risky sexual behaviour and illegal drug use (Zapolski et al., 2009), onset and increase in binge eating behaviour (Pearson et al., 2012) and nicotine dependence (Spillane, Combs, Kahler, & Smith, 2013) over and above the influence of other UPPS-P traits, including NUR. In their meta-analysis of the psychopathological correlates of the UPPS-P facets, Berg and colleagues (2015) found that PUR demonstrated the strongest correlation with alcohol/substance abuse among the UPPS-P facets.

Research has clarified that although urgency and emotionality are conceptually related (e.g. both influence the ability to maintain self-control and make rational decisions) they have separable

effects on maladaptive behaviour. Studies have shown that NUR remains a significant predictor of substance abuse among college students over and above negative affect and distress tolerance (Kaiser, Milich, Lynam, & Charnigo, 2012). Interestingly, Cyders & Coskunpinar (2010) also reported an interaction effect such that the frequency/intensity of negatively-valenced emotions predicted a greater increase in maladaptive behaviour in individuals high in NUR (Cyders & Coskunpinar, 2010). Nonetheless, meta-analysis has revealed a comparable correlational pattern for each Urgency subscale across categories of psychopathology (Berg et al., 2015). It has been proposed that the two urgency facets may be better described as two facets of a broader emotion-salient impulsivity trait (Cyders & Smith, 2008; Sperry et al., 2017).

Notably, some theorists (e.g. de Young, 2010) have suggested that the UPPS-P model is limited by its failure to adequately reflect the Agreeableness and Openness traits of the FFM (Costa & McCrae, 1992). The model does not characterise, for example, potentially relevant impulsivity-related constructs such as the restraint of aggression, which is a feature of Agreeableness and may be implicated in impulsive behaviour. Nonetheless, the precise trait definition provided by the UPPS-P model has demonstrated utility in clarifying the relationship between impulsivity related traits and a range of psychopathological outcomes.

Table 1.1. Pathways to impulsivity

Overarching model	Unidimensional component	Example behavioural correlates with UPPS-P dimension
Deficits in Conscientiousness	Non-planning models of impulsivity	
	<i>Impulsivity relating to a lack of deliberation and future planning</i>	Risky drug use (Miller et al 2003)
	(lack of) Premeditation (UPPS/UPPS-P)	Bulimia (Fischer & Smith, 2004)
	Deliberation scale (NEO-PI-R)	
	Impulsiveness v Control scale (MPQ)	
	Eysenck's Impulsivity scale (I ₇)	
	Cloninger's Impulsiveness scale (TCI)	
	Decision-time scale, (EASI)	
	Planning Impulsivity (BIS)	
	Motor Impulsivity (BIS)	
	Dysfunctional impulsivity (Dickman)	
	Zuckerman Impulsivity scale (SS)	
	Perseverance models of impulsivity	
	<i>Impulsivity relating to difficulties concentrating or paying attention</i>	
	(lack of) Perseverance (UPPS/UPPS-P)	Risky sex (Zapolski et al 2009)
	Self-discipline scale (NEO-PI-R)	Problematic substance use (Billieux, 2008)
	Disinhibition and Boredom Susceptibility Zuckerman (SSS)	
	Persistence scale (EASI)	
Sensation-Seeking	Sensation-Seeking models of impulsivity	
	<i>Impulsivity relating to the pursuit of excitement and a willingness to take risks</i>	
	Sensation-Seeking (UPPS/UPPS-P)	Frequency of risky sex (Zapolski et al 2009)
	Excitement-Seeking scale (NEO-PI-R)	Frequency of alcohol use (Cyders & Smith, 2007)
	Eysenck's Venturesomeness	Bulimia (Fischer et al 2008)
Emotion-based Impulsivity	Negative Urgency	
	<i>Impulsivity relating to action in response to intense negatively-valenced emotion</i>	Pathological gambling (Whiteside, 2005)
	Negative Urgency (UPPS/UPPS-P)	Dysregulated drinking (Stojek et al, 2014)
	Impulsiveness scale (NEO-PI-R)	Binge eating (Pearson et al 2012)
	Positive Urgency	
	<i>Impulsivity relating to action in response to intense positively-valenced emotion</i>	Nicotine dependence (Spillane et al 2010)
	Positive Urgency (UPPS-P)	Risky sex and illegal drug use (Zapolski et al 2009)
		Onset of binge eating (Pearson et al 2012)

Notes: UPPS/UPPS-P (Whiteside & Lynam, 2001; Cyders & Smith, 2008); NEO-PI-R (Neuroticism, Extraversion, Psychoticism Personality Inventory-Revised; Costa & McCrae, 1992); MPQ (Multidimensional Personality Questionnaire; Tellegen, 1982-1985); I₇ Eysenck Impulsiveness Questionnaire (Eysenck et al, 1985); TCI (Temperament and Character Inventory; Cloninger, 1987); EASI (Emotion, Action, Sociability, Impulsivity) Personality Questionnaire (Buss and Plomin, 1975); BIS (Barratt Impulsivity Scale, Patton et al, 1995); ISS (impulsive-Sensation-Seeking scale; Zuckerman et al 1991); SSS (Sensation-Seeking Scale; Zuckerman et al 1991); Functional and Dysfunctional Impulsivity (Dickman, 1990).

1.5 Performance-based measures of impulsivity

Researchers have employed a wide variety of performance-based lab-tasks to measure impulsive behaviour. These tasks assess the variability in cognitive processes that contribute to an impulsive behaviour at the time of measurement (Dick et al., 2010), but in so doing purport to be influenced by stable personality characteristics. Arguably, therefore, some commonality between self-report and performance-based tasks might be expected. Moreover, adopting a multiple method approach to construct measurement (such as through the employment of self-report surveys and performance-based lab-tasks) is recognised as an important component in establishing the validity of a psychological construct (Campbell & Fiske, 1959). Recently, performance-based impulsivity has been conceptualised as broadly involving impulsive choice i.e. the cognitive preference for immediate smaller rewards over delayed larger rewards; versus involving impulsive action i.e. difficulties preventing the initiation of behaviour, or stopping a behaviour that has already been initiated (Liu, Trout, Hernandez, Cheek, & Gerlus, 2017). In fact, meta-analytic evidence has suggested that while certain lab tasks do demonstrate significant overlap with self-report measures, particularly in the domain of response inhibition, on the whole there may be little conceptual convergence between behavioural and self-report measurement approaches in terms of representing underlying impulsivity-related constructs (Cyders & Coskunpinar, 2011). In addition, meta-analytic evidence suggests that there are varying and often poor levels of correspondence among performance-based approaches to measuring underlying components of impulsivity (Sharma et al., 2014). Moreover, behavioural tasks have not been subjected to the same level of psychometric testing as self-report measures, which has led to questions about the reliability and stability of these measures (Sharma et al 2014). As such, while theoretically reflecting an underlying and enduring personality trait, performance tasks may offer a more reliable indication of transitory (state) rather than trait impulsivity. Collectively, these findings underscore the importance of focusing assessment on the unidimensional components of impulsive behaviour (be they self-report or performance based) which underlie broader “impulsivity” tendencies (Cyders & Coskunpinar, 2011).

Performance-based approaches offer a useful behavioural “snap-shot” of actual rather than purported behaviour (Cyders & Coskunpinar, 2011, p.967) and enable a quantifying of momentary fluctuations in impulsivity. In addition, they do not rely on individual insight into thoughts, feelings and behaviours as is the case with self-report tools, and, as such, may be more suitable for populations (e.g. children) who may lack the capacity for abstraction. In addition, they may be less subject to response or social desirability biases (Demetriou, Ozer, & Essau, 2015). Yet, behavioural tasks are difficult to assess in naturalistic settings and as such may lack ecological validity. More significantly, lab tasks may lack specificity e.g. tapping multiple processes such as memory and attention alongside impulsivity (Dougherty, Marsh, & Mathias, 2002). By contrast, self-report methods are quick and inexpensive to administer, can easily be applied to large samples, and are useful in establishing general tendencies in behaviour. They are also vital in research (such as self-harm) where it may be challenging to examine tendencies using alternative methods. For these practical and theoretical reasons, the empirical work in this thesis will focus on self-report impulsivity.

Key points thus far

1. Impulsivity is a complex and multidimensional construct relevant to understanding psychopathology and problem behaviour.
2. Conceptual and terminological heterogeneity mask distinctions and commonalities between constructs and risks hampering scientific advancement. There is little correspondence between self-report and performance-based measures of impulsivity. Hence, research should focus at the unidimensional, lower-order level of constructs.
3. The UPPS-P model of pathways to impulsive behaviour has brought clarity to the field and allowed a more precise examination of personality/psychopathological outcomes.
4. Evidence suggests these dispositions have different external correlates of behaviour and explain different aspects of impulsive behaviour.

1.6 A closer look at affect and impulsivity - Urgency Theory

A growing body of evidence suggests that individual differences in emotion-driven facets of impulsivity (urgency) are risk factors for problematic behaviour under conditions of intense affect. This section provides further clarification of the concept of urgency and its proposed neurobiological underpinnings and relevance for adolescence. Of note, the terms affect and emotion are often used interchangeably in the literature. When distinguished, emotion is sometimes regarded as a specific, action-oriented response, while affect may more generally cover a range of feelings which encompass both the experience of emotion and a less-defined mood (Davidson, 2003). Given their common exchange these terms are used interchangeably in this thesis.

Theorists have suggested that the experience of strong emotion relates to impulsive behaviour by heightening focus on the immediate situation and current need without regard to long-term consequences (Cyders & Smith, 2008; Davidson, 2003; Tice, Bratslavsky, & Baumeister, 2001). Urgency Theory, (Cyders & Smith, 2008) suggests that the experience of intense positive or negative emotions, interfere with cognitive and attentional processing and rational decision-making (Bechara, 2004), leading to a narrowed focus on the immediate situation. As such short-term needs are satisfied at the expense of long-term goals. Those high in urgency, the theory suggests, may be more likely to adopt maladaptive behaviours as a result of reduced inhibitory capacity or depleted cognitive resources, or because such actions provide a quick, short-term method of regulating this emotional arousal. Reinforcement of the maladaptive behaviour creates, in addition, a missed opportunity to reinforce an alternative and more adaptive behaviour (Cyders & Smith, 2008; Zapolski et al., 2009).

1.7 The systems underlying urgency

Research has considered the ways in which variation in the development of brain systems may facilitate the emergence of urgency (Cyders & Smith, 2008). How an individual reacts to emotion and subsequently behaves is thought to result from connections between brain systems involved in the experience and modulation of emotion. Research suggests that the amygdala is involved in

the experience of emotion, specifically in directing attention to affectively salient stimuli (particularly ambiguous and negatively-valenced stimuli) and then recruiting higher level cortical processing ('bottom-up processing') by sending signals to prefrontal areas of the brain. These prefrontal areas evaluate the relevance of the stimuli and initiate an appropriate and goal-directed response based on anticipated consequences. Signals are then sent back to the amygdala ('top-down processing') to regulate emotional reactivity appropriately (Davidson, 2003; Cyders & Smith, 2008). Hence affective-circuitry serves to signal important stimuli that require a response, and inhibit emotion-based behaviour that is in conflict with long-term interests. Disruptions in top-down processing, or hyperactivity in bottom-up processing, may result in increased urgency i.e. a heightened focus on the immediate reward of satiating needs under conditions of arousal, and a failure to consider long-term benefit.

The theorised relationship between negative emotion-based rash action and brain regions has received some early empirical support. For example, using fMRI, Albein-Urios and colleagues showed that increased NUR was associated with increased amygdala activation in those with substance dependence compared to controls (Albein-Urios, Verdejo-Roman, Soriano-Mas, Asensio, Martinez-Gonzalez, & Verdejo-Garcia, 2013). In non-clinical participants, structural evidence showed that individuals reporting higher levels of NUR had smaller grey matter volumes in regions of the dorsomedial pre frontal cortex (dmPFC) and ventral striatum, which may signal reduced capacity to engage in the necessary modulation of affective reactivity (Muhler & Lawrence, 2015). Importantly, this study controlled for levels of other impulsive traits and levels of negative emotionality, indicating a unique association with urgency. Other examinations have considered if variability in neurotransmitters such as serotonin and dopamine contribute to the expression of urgency. Research indicates that serotonin may be important in processing information and affect-guided planning, with low levels of this neurotransmitter associated with greater levels of negative and positive affect and greater rates of affect-driven risky behaviours (Davidson, 2003; Depue & Collins, 1999). Dopamine is associated with the initiation of action and response to rewarding stimuli and incentive. A dysfunctional interaction between these neurotransmitters within the affective circuitry may be important in maladaptive behavioural

outcomes (Seo, Patrick, & Kennealy, 2008). Specifically, the role of serotonin in the modulation of dopamine may mean that low levels of serotonin result in dopamine hyper function, and therefore a failure to adequately check dopamine-driven impulses to behaviour. There is some evidence that specific gene polymorphisms related to serotonin may predict urgency (Carver, Johnson, Joormann, Kim, & Nam, 2011). Other findings have shown that variability in concentrations of gamma-aminobutyric acid (GABA), a neurotransmitter associated with the regulation of self-control, specifically examined in the dorsolateral prefrontal cortex (DLPFC), correlates with urgency scores. As such, those with low levels of GABA in the DLPFC may be predisposed to difficulties remaining focused on goal-driven behaviour (Boy, Evans, Edden, Lawrence, Singh, Husain et al., 2011). In sum there is evidence of a neurological basis to Urgency Theory. Overall this relationship is likely to be complex and findings though promising are currently limited.

1.8 The developmental context

Adolescence through to early adulthood represents a period of rapid change in biological, social and psychological functioning. Differences in the developmental trajectories of key neurobiological systems have been theorised to underlie the greater emotional volatility experienced by adolescents than children or adults (Casey, Getz, & Galvan, 2008; Spear, 2000; Steinberg, 2007, 2008). The brain's socio-emotional system (which includes the amygdala and ventral striatum) develops early in adolescence, influenced by hormonal changes in puberty, and is involved in the processing of affective information and incentive (Casey et al., 2008). By contrast, the cognitive-control system (which includes outer regions of the brain including the prefrontal cortex), which regulates and controls behaviour and emotion, follows a later developmental path. MRI studies of the structural maturation of the human brain have shown that the PFC matures at around 20 years of age, with increases in cortical matter in regions associated with the control of behavioural and emotional impulses peaking at around this time (Casey et al., 2008). Perhaps crucially, limited integration across brain systems is also evident in adolescence. This pattern means that younger adolescents may be highly attuned to emotional states, but under conditions of emotional arousal have limited cognitive control of them. Thus,

the ability to make logical decisions or think through the long-term consequences of actions when under conditions of emotional arousal may be compromised (Casey et al., 2008; Cyders & Smith, 2008; Steinberg, 2007, 2008). Under conditions of heightened arousal the normative competitive interaction between socio-emotional and cognitive-control systems may be finely balanced in adulthood, but in adolescence, emotion-based systems are more likely to be dominant (Steinberg, 2010). As such, difficulties inhibiting impulses, considering consequences, and acting in accordance with long-term goals when under conditions of heightened affect may be a particular and normative vulnerability for adolescents.

Empirical findings have underscored that urgency may be a key trait in adolescence with studies showing that urgency prospectively predicts the onset of behaviours across early and late adolescence such as problematic drinking, binge eating, smoking, drug taking risky sexual behaviour and self-harm (Pearson, Combs, Zapolski, & Smith, 2012; Settles, Zapolski, & Smith, 2014; Smith & Cyders, 2016; Zapolski et al., 2009). Recent evidence (Littlefield, Stevens, Ellingson, King, & Jackson, 2016) has confirmed the developmental trajectory of both Positive and NUR across adolescence with mean rates of urgency increasing sharply around puberty at age 11-13 years and then levelling off from age 13-16. Gender effects, such that boys had lower mean levels of urgency at age 13 than girls, and which may reflect a typical later onset of puberty in boys, underscores that urgency may relate to broader pubertal developmental trajectories.

KEY POINTS from this chapter

1. Precise trait definition provided by the UPPS-P model has the potential to clarify the relationship between impulsivity dimensions and a range of psychopathological outcomes.
2. Individual differences in the propensity to engage in rash and impulsive behaviour when experiencing strong emotions are reflected in the trait of urgency. Research suggests this UPPS-P dimension has particular trans-diagnostic relevance. Neurological and developmental evidence indicate it may also be particularly important in adolescence, facilitated by differences in the maturational trajectory of emotion and cognition processes.

Questions for subsequent chapters

1. What impact does the conceptual and measurement approach to operationalising impulsivity have on its association with an outcome such as self-harm? (Chapter 3)

Next steps

Chapter 2 will introduce the concept of self-harm and examine the extent of the behaviour in adolescence. It will outline theoretical models which have sought to understand self-harm behaviour in young people and which specifically consider the contribution of impulsivity to the progression of self-harm.

Chapter 2: Self-harm in young people and theoretical links with impulsivity

2.1 Overview

This chapter aims firstly to explore the concept of self-harm and its consequence as a behaviour in young people. It begins by considering the debate surrounding the definition of self-harm, before considering prevalence rates in adolescence and examining associated risk factors.

Secondly, the chapter considers how explanatory models have sought to clarify the development of self-harm behaviour. In particular, models are described which have proposed a role for impulsivity in the development of self-harm.

2.2 What is self-harm?

For the purposes of this thesis self-harm refers to an act of intentional self-injury or self-poisoning, irrespective of motivation or intent, which is the definition adopted in National Institute for Clinical Excellence guidelines ((NICE), 2004). The term 'self-harm' (and the associated intent-free definition) is commonly used by researchers and clinicians in the UK but sits in contrast to the approach adopted by some experts (predominantly in the USA) who favour a categorical distinction between non-suicidal self-injury (NSSI) and attempted suicide or suicidal self-injury (SSI) which is engaged in with the intent to die. The presence of suicidal intent, but also severity of self-injurious behaviour and number of self-injurious methods employed, have been suggested as useful means of distinguishing categories of suicidal self-injury and non-suicidal self-injury (e.g. Csorba, Dinya, Plener, Nagy, & Pali, 2009; Muehlenkamp, 2005; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). However, some researchers have disputed the logic and accuracy of this dichotomous separation (Kapur, Cooper, O'Connor, & Hawton, 2013). For example, the reported ambivalence of individuals regarding suicidal intent when engaging in self-injury, and the recognition that behaviours often involve multiple and changing motivations, questions the utility of a categorical distinction (Brunner, Parzer, Haffner, Steen, Roos, Klett et al., 2007; Hawton, Harriss, & Rodham, 2010). In addition, considerable evidence points to an overlap between NSSI and suicide thoughts and behaviour, and that NSSI may act as

a pre-cursor to subsequent suicidality (Andover, Morris, Wren, & Bruzzese, 2012; Hawton, Bergen, Kapur, Cooper, Steeg, Ness et al., 2012; Klonsky, May, & Glenn, 2013; Maciejewski, Creemers, Lynskey, Madden, Heath, Statham et al., 2014; Mars, Heron, Crane, Hawton, Lewis, Macleod et al., 2014; Whitlock, Muehlenkamp, Eckenrode, Purington, Baral Abrams, Barreira et al., 2013) suggesting there is no clear cut categorical distinction. In fact, evidence suggests that suicidal intent is more accurately described as dimensional (Orlando, Broman-Fulks, Whitlock, Curtin, & Michael, 2015). Orlando and colleagues examined the latent structure of self-injurious behaviour to determine whether suicidal self-injury (SSI) and non-suicidal self-injury (NSSI) reflect categorically distinct types of SIB or dimensional variations of the same construct in a community sample of n=1525 female undergraduates. Using multiple taxometric procedures they identified a continuous latent structure (and not a bimodal distribution as might be expected with a categorical distinction). Thus individuals who engaged in suicidal self-injury and NSSI were seen as differing in degree rather than kind. Within the context of this debate, the current thesis will adopt the term 'self-harm' which is seen as a better encapsulation of the dynamic and often varied nature of self-harm intentions. Discussion throughout this chapter and the wider thesis will incorporate reference to theoretical positions and studies which focus on non-suicidal self-injury and suicidal behaviours given recognition that these are likely to occur on a continuum. Where possible the terminology adopted by individual authors will be employed.

Self-harm presents in a number of forms which include initiated behaviours such as cutting, carving, scratching or burning the skin, inserting objects into the skin, hitting oneself or an object (e.g. wall), or jumping from heights; ingesting substances in excess of a prescribed or recognised therapeutic dose, or ingesting recreational/illicit drugs as an act of self-harm; and ingesting non-ingestible substances or objects. This classification structure is based on criteria adopted by the Child and Adolescent Self-Harm in Europe (CASE) study (Madge, Hewitt, Hawton, de Wilde, Corcoran, Fekete et al., 2008) which conducted a large-scale self-report survey of adolescent self-harm in six countries across Europe (Belgium, England, Hungary, Ireland, the Netherlands and Norway) and Australia. Around 30,000 young people aged 14-17 years took part in the research. Findings indicated over half of reported incidents in the previous year (55.9%) involved self-

cutting, 22.3% reported overdose, and 10.7% indicated multiple-methods of self-harm. Other studies have similarly reported high levels of self-cutting in community samples, but indicate that self-poisoning is the most common method used in hospital-based presentations of self-harm (Geulayov, Casey, McDonald, Foster, Pritchard, Wells et al., 2017; Madge et al., 2008). CASE study evidence revealed gender differences in the choice of self-harm method, with females more likely to endorse self-cutting only and overdose only than males. However, this is not always the pattern of findings. Hawton and colleagues reported that similar proportions of boys and girls were involved in self-cutting in a large (6000+) study of adolescents aged 14-16 years (Hawton et al., 2010). In addition, boys and girls who cut and those who self-poison were shown to be similar in psychopathology (i.e. there was no gender distinction for each method in terms of depression, anxiety, impulsivity, self-esteem or coping behaviour).

2.3 The extent of the issue in adolescence

2.3.1 Rates of self-harm in adolescence

Self-harm is a prevalent behaviour among young people. Multi-national comparative studies of community-based self-harm have reported lifetime rates of behaviour in adolescents of around 16-18% (Muehlenkamp, Claes, Havertape, & Plener, 2012; Swannell, Martin, Page, Hasking, & St John, 2014) with findings comparable for both self-harm and NSSI classification of behaviour (Muehlenkamp, et al., 2012). School-based studies focused predominantly on youth within the UK have reported similar prevalence rates of around 15% (e.g. Hawton, Rodham, Evans, & Weatherall, 2002; O'Connor, Rasmussen, Miles, & Hawton, 2009) although notably rates as high as 28% or even 65.9% have been reported in adolescents aged 13-16 years elsewhere (Brunner et al., 2014; Lundh, 2007).

Consistently, survey-based studies conducted on adolescent samples have found that self-harm is more common in girls than boys (Hawton et al., 2002; Moran, Coffey, Romaniuk, Olsson, Borschmann, Carlin et al., 2012; O'Connor, Rasmussen, & Hawton, 2014; O'Connor, Rasmussen, Miles, et al., 2009; Stallard, Spears, Montgomery, Phillips, & Sayal, 2013). For example Geulayov and colleagues (2017) found that the incidence of self-harm was around three times higher in

girls compared to boys using self-report data from 5520 adolescents aged 14-17 years in the UK. They found that these gender ratios were maintained in those aged 14-15 and those aged 16-17 years. A similar pattern of findings is found by Moran and colleagues (2012) who collected data on self-harm in a single cohort of 1802 participants over seven waves, commencing at age 15.9 up to age 29.0 years. Overall across the study, more girls than boys reported self-harm (Risk Ratio = 1.6, 95% CI 1.2-2.2). Indeed, a higher proportion of girls than boys reported self-harm at each wave, with particularly large differences found at wave six (mean age 17.4 years); Risk Ratio = RR 8.4, 95% CI 2.0-36). By adulthood the authors found little evidence of a difference between the genders in prevalence of self-harm (Risk Ratio 1.7, 95% CI 0.91-3.0). A similar pattern of response is found with hospital presenting data (Hawton & Harriss, 2008) where girls outnumber boys at younger stages of development: 8:1 (10-14 year olds); 3.1:1 (15-19 year olds); 1.6:1 (20-24 year olds).

In their multi-wave study, Moran and colleagues (2012) found that prevalence rates of self-harm at around 8% in those aged 15 years, reduced to around 3% by young adulthood suggesting that most self-harm spontaneously resolves. Notably however, the authors found that reporting self-harm during adolescence was a significant risk factor for self-harm in adulthood for girls (OR 9.2, 95% Confidence Interval 4.2-20), but not boys. Hence, girls may be at heightened long-term risk. Adolescence is therefore a critical period for the study of self-harm given that this developmental stage typically incorporates the years of self-harm onset (12-14 years), peak (15-17 years) and remittance (Jacobson & Gould, 2007; Moran et al., 2012; Morey, 2016; Nock, 2009).

2.3.2 Are rates of self-harm increasing in adolescence?

A number of epidemiological studies have suggested an upward trend in rates of self-harm in adolescent groups in recent years. For example, drawing on hospital presentation data, Morthorst and colleagues reported a three-fold increase in females in Denmark aged 10-19 years in the period from 1994-2011 (Morthorst, Soegaard, Nordentoft, & Erlangsen, 2016). Recently, Morgan and colleagues examined the incidence of self-harm in the UK among children and adolescents aged 10-19 years using clinical practice records which detail GP presentations

(Morgan, Webb, Carr, Kontopantelis, Green, Chew-Graham et al., 2017). This is important given that rates of self-harm are typically drawn from secondary care data. They found a 68% increase in rates of self-harm between 2011 and 2014 among girls aged 13-16 years, suggesting that early to mid-adolescence has lately become a period of particular concern in adolescent self-harm, particularly for girls. It is plausible that reported increases in rates self-harm in recent years may relate to greater awareness among frontline staff about self-harm – particularly in girls – and hence greater watchfulness for the behaviour. Early adolescent girls may also be more likely to seek help than boys. However, help-seeking is nonetheless rare in community-based self-harm. Ystgaard and colleagues considered levels of help-seeking following an episode of self-harm in 30,532 adolescents aged 14-17 across 7 countries and found that less than one fifth (18.8%) had received help from a healthcare setting (Ystgaard, Arensman, Hawton, Madge, van Heeringen, Hewitt et al., 2009). Caution should be exercised when comparing rates of behaviour between hospital based and community-based populations given evidence that each is associated with distinct patterns of behaviour (Geulayov et al., 2017). For example, hospital presentation following self-harm is associated with self-poisoning and with broader disclosure and help-seeking (Hawton, Rodham, Evans, & Harriss, 2009). Importantly, most young people who self-harm do not seek clinical support. Community-based cases of self-harm in adolescents far outnumber hospital presentations (Geulayov et al., 2017) and this is especially so in younger groups (aged 12-14 years) for whom self-harm at a community level is 20 times more likely. Community-based studies are thus a vital component of understanding self-harm behaviour in youth.

2.4 Factors associated with adolescent self-harm

2.4.1 Suicide

Self-harm is a strong risk factor for future suicide in youth. In a multi-agency study of suicide in young people aged 10-19 years in England, (Rodway, Tham, Ibrahim, Turnbull, Windfuhr, Shaw et al., 2016) it was found that over half of adolescents who died by suicide had a history of self-harm. A number of large cohort studies have reported on the risk of suicide in the first year following self-harm. In the UK, Hawton, Zhal and Weatherall reported that suicide risk for

adolescents aged 10-24 years reporting to hospital was 35 times (95% CI 16-79) the population risk in males, and 75 times (95% CI 35-157) the population risk in females (Hawton et al., 2010). The risk of suicide was found to be 32.1 times (95% CI 23.6- 43.6) greater in adolescents reporting a past year history of self-harm than in matched controls in a large Canadian study sampling 20,471 adolescents (Finkelstein, Macdonald, Hollands, Hutson, Sivilotti, Mamdani et al., 2015) and 26.7 times (95% CI 19.9-35.1) higher than in matched controls in a large US study sampling 32,395 adolescents (Olson, Wall, Wang, Crystal, Bridge, Liu et al., 2018). In fact, self-harm behaviour has been shown to be a close antecedent of suicide in youth. Rodway and colleagues (2016) found that around 10% of adolescents who completed suicide had self-harmed in the week before death. Notably, in their large national cohort study, Olson and colleagues (2018) found an age-related difference in the immediate risk of suicide following self-harm. Comparing two groups of adolescents aged 12-17 years and 18-24 years, the authors found that older adolescents had the highest cumulative probability of suicide over the year after self-harm, but that younger adolescents had a particularly high risk of suicide during the first few weeks after self-harm. Hence, the period immediately following self-harm is a critical intervention period for early- to-mid adolescent groups. Elsewhere, long-term risk of suicide following self-harm has been shown to be low (1.1%) in early adolescent groups aged 12-14 years (Hawton & Harriss, 2008).

2.4.2 Repetition of self-harm

Self-harm in adolescence is often a repeated behaviour. Hawton and colleagues found that in a large sample of 5205 young people aged 10-18 years and below who presented to hospital with self-harm, 27.3% went on to repeat the behaviour (Hawton, Bergen, Waters, Ness, Cooper, Steeg et al., 2012). More than half of participants in a large multi-national community-based survey of adolescents aged mainly 15-16 years who endorsed self-harm in the previous year reported multiple episodes of self-harm (Madge et al., 2008). Endorsing non-suicidal self-harm at 16 years of age has been shown to increase the odds of recurring behaviour in later years by almost five times (Mars et al., 2014). High rates of repeat self-harm within a year have been shown in adolescents who report to General Practice (21.5%) or to hospital (17.7%) in the UK (Keith

Hawton et al., 2012; Morgan et al., 2017). In their large cohort study (described in section 2.4.1.), Olfson and colleagues (2018) found similar findings. They reported a 17.1% endorsement of repeat self-harm during a follow-up year, and demonstrated a pattern of response in which risk for repeated behaviour rose sharply in the first few days after an initial act, with a gradual rise in risk for repetition thereafter. This pattern was consistent in those aged 12-17 years and those aged 18-24 years. They also found that risk of repetition was significantly higher for those adolescents with personality or anxiety disorders than in those with depressive disorders. Being female was a stronger risk factor for repeat self-harm in those aged 12-17 than in those aged 18-24 years. Hence early-to-mid adolescence is a period of particular risk for repeat behaviour, particularly in girls. Importantly, there appears to be heterogeneity in how often self-harm is repeated across adolescent groups. In a large longitudinal study, which looked at the characteristics of self-harm in a community sample of Swedish adolescents aged 13-15 years, the majority of those endorsing NSSI indicated a low frequency of behaviour (1-2 incidences) with few additional psychological difficulties (Bjarehed, Wangby-Lundh, & Lundh, 2012). This finding is consistent with other sub-group analyses of self-harm in those aged 18+ (Klonsky & Olino, 2008) although, by contrast, other studies have found that a high frequency of self-harm (more than 11 incidences in the past year) was the most commonly endorsed frequency range reported by adolescents aged 15-17 years (Zetterqvist, Lundh, Dahlstrom, & Svedin, 2013). Theorists have suggested that adolescents who endorse a low frequency of self-harm could be considered as experimenting with NSSI and may be qualitatively different from those who endorse more frequent repetition (Klonsky & Olino, 2008). Distinguishing between those with high and low frequency of behaviour may therefore be theoretically and clinically important in assessing risk for self-harm.

2.4.3 Depression and anxiety

A number of studies have found associations between self-harm in young people and clinical or subthreshold levels of depression or anxiety. In a UK national survey, levels of self-harm in adolescence of around 1.2% were shown to increase to 9.4% in those with anxiety disorder and 18.8% in those with depression (Murphy & Fonagy, 2012). In longitudinal analyses, self-harm in

adolescence was related to future difficulties with mood and anxiety. Mars and colleagues (2014) in a birth cohort study found that self-harm at age 16 was strongly associated with later depression and anxiety disorder by the age of 18 years. Outcomes were not attenuated after adjusting for earlier symptoms of depression at age 13. Moreover, while self-harm behaviour most often declines in early adulthood, persistence of behaviour into adulthood is associated with symptoms of depression and anxiety in adolescence i.e. those who had additional affective difficulties in adolescence are at greater long-term risk for self-harm (Moran et al., 2012). Hence understanding the relationship between self-harm and affective disorders is important to understanding both current and long-term risk for self-harm in young people.

2.5 Key explanatory models and theories of self-harm

As a complex behaviour, self-harm is likely to be associated with multiple and simultaneous determinants (Suyemoto, 1998). In a recent narrative review, which examined self-reported reasons for self-harm in published studies, Edmondson and colleagues found that affect regulation/management of distress was the most frequently referenced reason for self-harm e.g. to “take the pain away from my heart and put it elsewhere”), or to “calm myself when I’m incredibly emotional/upset” (Edmondson, Brennan, & House, 2016p112). Additional motives included: exerting interpersonal influence (such as help-seeking or communicating distress), self-punishment or self-directed anger, to induce or terminate a dissociative state (such as to feel numb, or to feel something), to generate excitement and sensation-seeking, or to avert suicide. This functional account aligns with previous findings (Klonsky, 2007, 2009; Nock & Prinstein, 2004; Suyemoto, 1998). In fact, converging evidence, including from adolescent samples, suggests that the functions of self-harm can be robustly organised into a two-factor structure with one factor representing interpersonal (or social) functions and the other representing intrapersonal (or automatic) functions, such as affect-regulation and dissociation (Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Nock & Prinstein, 2004). Theoretical models which have sought to explain the development of self-harm have in large part focused on the management, regulation, escape from or avoidance of emotional state as a central tenet in explaining self-harm behaviour (Chapman, Gratz, & Brown, 2006; Hasking, Whitlock, Voon, & Rose, 2017; Selby,

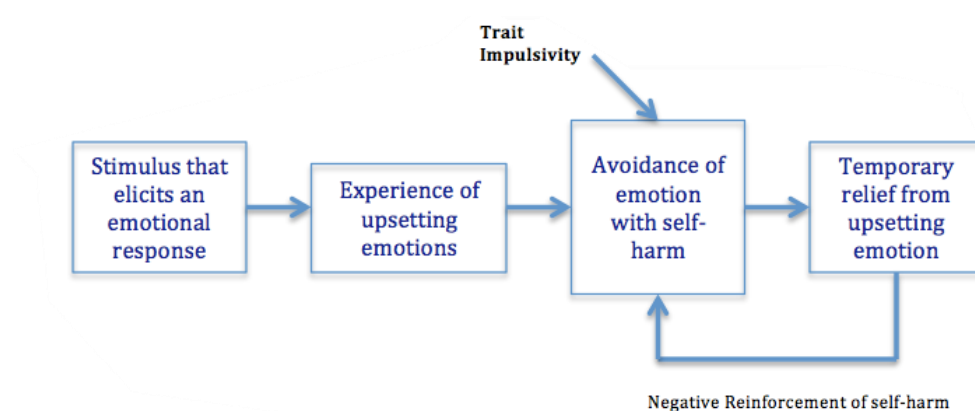
Anestis, & Joiner, 2008). A recent meta-analysis, which investigated the prevalence of the most commonly endorsed functions of self-harm (Taylor, Jomar, Dhingra, Forrester, Shahmalak, & Dickson, 2018) concluded that intrapersonal functions and particularly the regulation of distressing emotional states is a causal factor for self-harm for many individuals, thus lending support to this theoretical focus. Nonetheless, it should be recognised that many individuals who self-harm report endorsing multiple functions (Klonsky et al., 2015). Of note, the theories and models discussed within this chapter reference NSSI and suicidal behaviours and for the purposes of discussion are included within a broad context of self-harm-related behaviour given that these are likely to exist on a continuum (see section 2.2).

2.5.1 Emotion-regulation models of self-harm

The Experiential Avoidance Model (EAM; Chapman et al., 2006) proposes that individuals engage in self-harm under conditions of emotional arousal. The model suggests that a response tendency towards experiential avoidance (the drive to escape or avoid distress) may predispose some individuals to engage in behaviours that serve this avoidance need. This response tendency is theorised to be dominant in those who self-harm. The model argues that by providing short-term relief from undesired arousal, self-harm becomes negatively reinforced over time, and an automatic conditioned response to distress. Impulsivity is proposed as a contributory mechanism in experiential avoidance. Difficulties in planning and thinking ahead and response disinhibition consistent with LPM models of impulsivity (see Chapter 1, section 1.4.1) may bias the selection of quick, easily executable strategies. Inadequate reflection on the consequences of behaviour and a tendency to focus on the short-term reward of relief may mean therefore that individuals are less likely to think through alternative adaptive strategies that may take longer to relieve distress (See Figure 2.1). The EAM model has echoes in Baumeister's **Escape theory of suicide** (Baumeister, 1990) which suggests that individuals choose suicide in order to escape from aversive self-awareness, and therefore escape from awareness of distress. Escape is attained during a state of cognitive deconstruction, which is characterised by a focus on the present as opposed to long-term goals and results in diminished ability to inhibit immediate impulses. This increases the likelihood of unrestrained suicidal behaviour (Selby, Joiner Jr, & Ribeiro,

2014). These approaches underscore a proximal role for impulsivity (conceptualised as acting without forethought) within affect-regulation processes across a broad conception of self-harm. An important distinction, is that escape models as applied to self-harm could suggest a decrease in negative emotions prior to an act of self-harm (rather than following self-harm), as it is escape from self-awareness that is the functional mechanism underpinning this model. Support for the model has been provided in community-based samples (Howe-Martin, Murrell, & Guarnaccia, 2012). It is important to note that the EAM is based on a no-intent model of self-harm. However, evidence has shown that it does apply to community-based cases where intent has been shown (Nielsen, Townsend and Sayal, 2017).

Figure 2.1. Graphic depiction of the role of impulsivity within the Experiential Avoidance Model (EAM: Chapman, Gratz and Brown 2006)

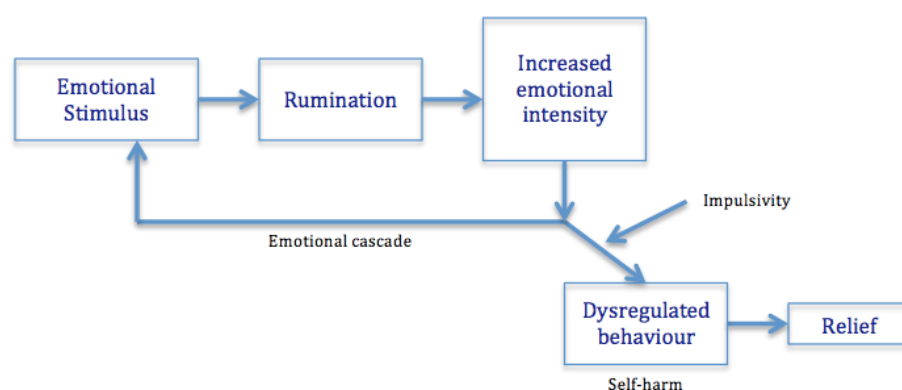


Notes: Impulsivity (conceptualised as a general tendency towards acting without forethought and consideration of the consequences) exerts a proximal influence. Self-harm is negatively reinforced by reduction in the intensity or escape from unwanted emotional arousal.

A second prominent affect-regulation theory of self-harm is the **Emotional Cascade Model** (ECM; Selby, et al., 2008) which suggests that a potential function of self-harm may be as a distraction from negative affect. The model suggests that rumination on negative emotional stimuli serves to increase negative affect, which in turn produces increased rumination on negative emotional stimuli. If uninterrupted, negative affect and rumination progressively increase in a repetitive cycle – or emotional cascade. Adaptive emotion regulation strategies (such as cognitive

reappraisal) are at this point insufficient to disrupt this process, perhaps because ruminative attention has overly taxed the necessary cognitive resources. Focus is shifted therefore onto a dysregulated behaviour (such as self-harm) and this shift is sufficient to break the positive feedback loop and disrupt the cascade. It is argued that the relationship between rumination and negative affect is compounded by tendencies towards impulsive behaviour in the face of emotional distress consistent with trait urgency (see Chapter 1, section 1.4.4). Thus individuals high in urgency may be more likely to engage in maladaptive behaviour as a result of emotion dysregulation. Research has confirmed that the relationship between negative affect and NSSI is moderated by rumination (e.g. Selby, Franklin, Carson-Wong, & Rizvi, 2013). In a short-term prospective study of undergraduates Nicolai and colleagues found that those high in negative affect were at increased risk of NSSI when possessing rumination strategies (Nicolai, Wielgus, & Mezulis, 2016).

Figure 2.2. Graphic depiction of the role of impulsivity within the Emotional Cascade Model of Dysregulated Behaviour (ECM; Selby et al., 2008)



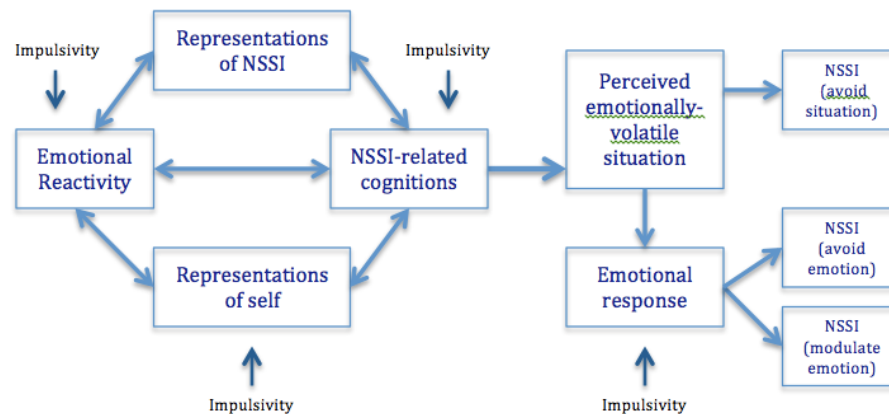
Notes: Impulsivity (conceptualised as NUR) exerts a proximal influence increasing the likelihood of adopting a dysregulated behaviour as a means of coping with aversive emotional state. Self-harm functions as a distraction from rumination, diverting attention away from the emotional stimulus.

2.5.2 Integrated theoretical models

Neither the ECM nor the EAM models account for why self-harm is the strategy chosen by individuals to regulate affective experience. A recent explanatory model has sought to delineate the conditions that may lead to the adoption of self-harm over another maladaptive behaviour.

The **Cognitive-Emotional Model of Non-Suicidal Self-Injury** (CEM-NSSI; Hasking et al., 2017) proposes that the likelihood an individual will use self-harm to regulate or avoid an aversive emotional state, may be governed in part by the thoughts and beliefs an individual holds about self-harm and about their own ability to carry it out. The model thus draws on social-cognitive theory (Bandura, 1986, 1997) which suggests that outcome expectancies and self-efficacy expectancies govern volitional behaviour (see figure 2.3). The CEM-NSSI proposes that when faced with an emotionally aversive situation, interpersonal vulnerabilities (such as individual propensity to react to emotional stimuli) in concert with personal and behaviour-specific cognitions (such as the function and sequelae of self-harm) differentially increase the risk that an individual will choose to self-harm at any given point in time. Importantly, although interpersonal vulnerabilities may relate to relatively stable albeit context-related predispositions (such as trait impulsivity), cognitions may be updated. Hence the model helps to account for inter-individual variability in the use of self-harm, or alternative dysregulated behaviours. Early evidence has provided support for the model's predictive utility (Hasking & Rose, 2016). Trait impulsivity may play a distal and proximal role in this model. Individual differences in the propensity to react impulsively to emotional stimuli may influence the formation of self-schemas and self-harm cognitions over time, which underpin subsequent response tendencies. At the same time tendencies towards acting without forethought may inflate risk of behaviour at the moment of emotional distress. Hence impulsivity may exert influence on both individuals who self-harm and on the act of self-harm itself.

Figure 2.3. Graphic depiction of the proposed role of impulsivity within the Cognitive-Emotional Model of Non-Suicidal Self-Injury (CEM-NSSI; Hasking et al., 2017).



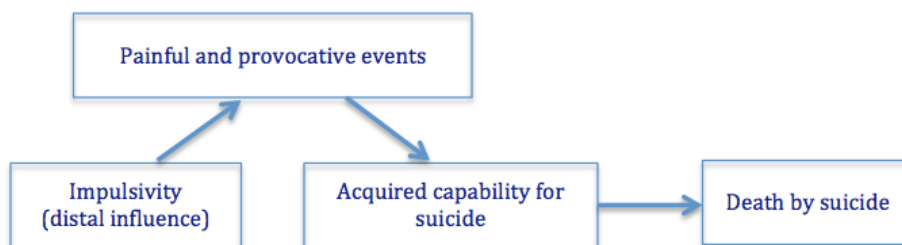
Notes: Impulsivity exerts a distal influence on the formation of self-schemas and NSSI/self-harm cognitions, as well as a proximal influence increasing the likelihood of adopting NSSI/self-harm behaviour as a means of coping with a perceived emotionally-volatile situation or aversive emotional state.

Distal and proximal roles for impulsivity have been proposed in related suicide models. Anestis and Joiner tested the role of impulsivity within the framework of the **Interpersonal-Psychological Theory of suicide** (IPT; Joiner, 2005) (Anestis & Joiner, 2011). The IPT proposes that individuals must have both the desire and the capability for suicide in order to enact the behaviour. Desire derives from an interaction between ‘perceived burdensomeness’ and ‘thwarted belongingness’. Capability results from repeated exposure to painful and provocative experiences. Over time these experiences result in habituation to physiological pain and to the fear of death which presents as an ‘acquired capability’ for suicide. Anestis and Joiner found that for individuals with increased levels of NUR the interaction between the desire and capability components of the model and suicide-related outcomes was amplified. They suggest that in the face of aversive emotional situation an individual with high NUR (who has both the desire and the capability) may be more quickly motivated to consider drastic solutions than a non-impulsive individual.

At the same time, it has been argued that trait impulsivity (conceptualised predominantly as a lack of planning and disinhibition) is likely to exert an indirect influence on suicidal outcomes, as

specified by the IPT, by increasing the likelihood that an individual is exposed to painful and provocative experiences, and over time increasing their 'acquired capability' for suicide (Anestis, Soberay, Gutierrez, Hernandez, & Joiner, 2014). Bender and colleagues (2011) tested this theory in a sample of undergraduates using the BIS and found that impulsivity indirectly predicted acquired capability for suicide mediated by frequency of painful and provocative experiences (see Figure 2.4). Further clarification is required of the complex picture of distal and proximal influence of impulsivity in self-harm and suicide-related outcomes.

Figure 2.4. Graphic depiction of the proposed role of impulsivity within the Interpersonal-Psychological Model of Suicide (IPT; Joiner, 2005)

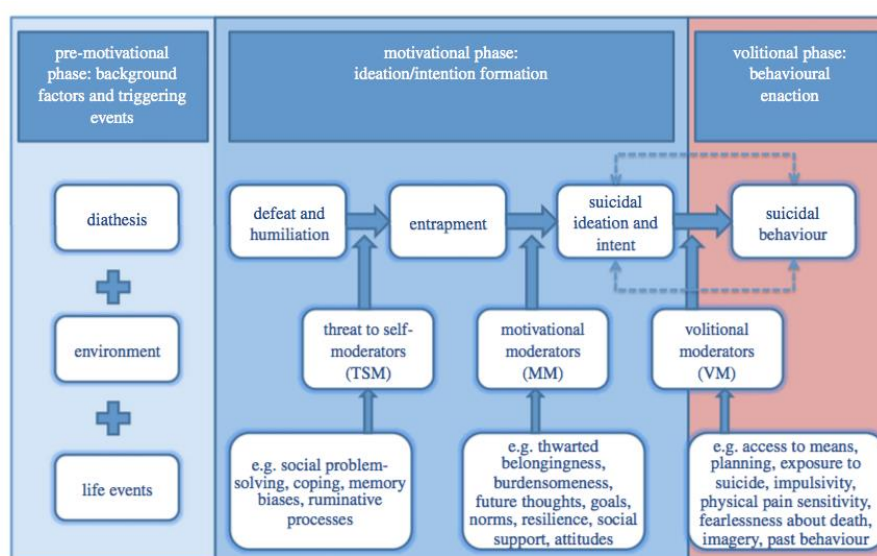


Notes: Adapted figure (Bender, Gordon, Bresin, & Joiner, 2011). Impulsivity (conceptualised as a general tendency towards acting without forethought and consideration of consequences) exerts a distal influence via painful and provocative events.

An important integrated theoretical model of self-harm that explicitly proposes a role for impulsivity is the **Integrated Motivational Volitional** model of suicidal behaviour (IMV; O'Connor, 2011; O'Connor & Kirtley, 2018). Although the IMV was originally designed as a model of suicidal behaviour, it is considered equally applicable to understanding self-harm (O'Connor, Rasmussen, & Hawton, 2012). As with the IPT (Joiner, 2005) the IMV explanatory model describes distal and proximal factors (here biological, psychological and social) that govern suicidal ideation and behavioural enactment (attempting or dying by suicide). Clarifying the role of risk-factors in the translation of thoughts to behaviour has been identified as a critical focus in the field of suicidology (Glenn & Nock, 2014; Klonsky & May, 2014). A recent meta-analysis of risk factors for suicide found that of the many factors that identified risk for suicide ideation and suicide behaviour, relatively few distinguished between these outcomes (May & Klonsky, 2016). These

findings, which suggest that thinking and doing should be viewed as separate phenomena with distinct explanations and predictors, have important implications for self-harm research, given that more adolescents report thinking about self-harm than go on to enact the behaviour. Importantly, by outlining distinct factors associated with the development of suicidal/self-harm thinking and with the translation of suicide/self-harm thoughts into behavioural enactment, the IMV model offers testable hypotheses consistent with the ideation-to-enaction framework (Klonsky and May, 2014). The basic principles of the IMV as it relates to suicide and to self-harm have received early empirical support (Dhingra, Boduszek, & O'Connor, 2016; O'Connor et al., 2012). However, more work is now needed to strengthen this evidence base.

Figure 2.5. Integrated Motivational Volitional model of self-harm/suicidal behaviour (IMV; O'Connor, 2011).



Notes: Impulsivity (conceptualised in terms of disinhibition and acting on the spur of the moment) is included as a volitional moderator in phase three of the model.

According to the IMV model self-harm emerges and progresses through three phases (see Figure 2.5). Factors associated with the pre-motivational and motivational phases determine the development of self-harm ideation and intent. Specifically, in phase one, biological, genetic or cognitive predispositions, combined with stressful life events, are theorised to confer a background vulnerability, which may increase sensitivity to feelings of defeat and humiliation. In phase two, these feelings of defeat and humiliation are further exacerbated by threat-to-self

moderators such as rumination, poor problem solving and memory biases, which can trigger a sense of entrapment. The likelihood that entrapment results in self-harm is determined by motivational moderators. Protective moderators, such as a sense of connectedness or adaptive goal pursuit, may buffer an individual from thoughts of self-harm. However, factors such as depleted resilience or a lack of social support, may increase the likelihood that self-harm is seen as a salient solution. The translation from self-harm thought to self-harm act is governed by volitional moderators within the third phase of the model. Impulsivity - operationalised as the tendency to act on the spur of the moment - is specified as a volitional moderator (alongside psychological, social and physiological factors including for example acquired capability, and having access to the means to self-harm). As such, and in line with previous approaches (EAM; Chapman et al., 2006) the model suggests that having a propensity toward quick and unplanned action without adequate reflection increases the likelihood that an individual will self-harm. Interestingly the rationale for the IMV draws on a number of established theoretical perspectives including the stress-diathesis model which suggests that a behavioural outcome involves an individual vulnerability (diathesis) which will predispose an individual to that behaviour in interaction with a stressor (Schotte & Clum, 1987). In their **stress-diathesis model** of suicide, Mann and colleagues (Mann, Waternaux, Haas, & Malone, 1999) propose that trait impulsivity is one such diathesis and suggest that an underlying disposition towards disinhibition and acting without forethought increases vulnerability for suicidal acts in the presence of life events and psychiatric states. Hence, it could be argued, in line with arguments proposed for the role of impulsivity in the IPT (Anestis et al., 2014) that impulsivity has a distal, diathesis role to play within the IMV model.

2.6 Evidence of a role for impulsivity in self-harm

Evidence from the models discussed above suggests that impulsivity is important in self-harm behaviour. In fact, a recent review and meta-analysis of 27 studies found greater levels of self-reported impulsivity in those who engaged in NSSI compared to those who did not, and that these differences were most pronounced for measures of NUR (Hamza, Willoughby, & Heffer, 2015). Theoretical evidence reviewed in Chapter 1 clarified that individuals who are impulsive

may be motivated to act rashly in the context of negative emotion. Theoretically, it is proposed that impulsive individuals may be more likely to act rashly in response to intense emotions due to a focus on short-term immediate benefit over long-term goals (Cyders & Smith, 2008; Davidson, 2003; Tice et al., 2001). Impulsive individuals may be at increased risk of engaging in self-harm therefore because it provides a quick, immediately reinforced form of relief from heightened arousal for individuals who are less likely to consider the long-term negative impact. Hence affect-based impulsivity and the affect regulation function of self-harm are closely related.

Relatedly, Nock (2010) has proposed in his **pragmatic hypothesis**, that self-harm may serve this affect regulation behaviour for impulsive youth, because it is readily accessible, requires little planning or preparation, and doesn't necessarily require access to wider resources as is the case with, for example, drinking and drug use. **Urgency Theory** as described in Chapter 1 has strong parallels with emotion-regulation models of self-harm, given that in each case the goal of relief from negative affect is the primary motivation. Relatedly, researchers have examined the overlaps between emotion-regulation and impulsivity in terms of regulatory control, and again suggest that this is a pertinent focus in understanding adolescent behaviour. For example, Tice and colleagues (2001) argue that goal-directed behaviour requires control of impulses and a delay in gratification which may not be fully developed until adulthood, thus youth may be more likely to engage in immediately reinforcing behaviours that are maladaptive in the long term. Theorists have suggested that the experience of intense emotions is heightened in youth and impairs the ability to engage in self-control and rational decision-making (Tice, Bratslavsky & Baumeister, 2001). Proneness to entering into maladaptive behaviour under conditions of intense emotions and negative affect (urgency) will therefore exacerbate this risk, and the effort involved in trying to regulate emotions may further deplete self-control (Baumeister, Vohs, & Tice, 2007; Bechara, 2004; Bechara & Van Der Linden, 2005; Tice et al., 2001).

While the review of Hamza and colleagues (2015) referenced above is informative, it nonetheless focused on a narrowed conception of self-harm as non-suicidal (NSSI). As such it may have missed important information from studies which reject the categorical dichotomising of self-

harm. In addition, the review included clinical and non-clinical populations across adult and adolescent age groups. Given evidence presented in this chapter which underlines the importance of self-harm in adolescence, a focused examination of the influence of impulsivity on self-harm in this developmental stage is important.

KEY POINTS from this chapter

1. Self-harm is a common and often repeated behaviour among community-based young people and is associated with increased risk of suicide and other psychological dysfunction.
2. Research has suggested that self-harm often functions as a form of emotion regulation. A number of explanatory models have sought to describe the processes involved in the progression of self-harm via emotion regulation. Parallels between Urgency Theory and affect-regulation functions of self-harm establish a theoretical basis for affect-driven impulsivity in self-harm behaviours, but more evidence is required to establish this association, in adolescence.
3. Impulsivity has been identified as a contributory mechanism in models of self-harm (e.g. EAM; Chapman et al 2006 IMV; O'Connor, 2011). These models have largely operationalised impulsivity in terms of disinhibition and a lack of planning. Recently it is proposed that this tendency may be involved in the transition of self-harm thought to act. However, supporting evidence is currently lacking. The distal or proximal relevance of impulsivity in self-harm pathways is unclear.

Questions for subsequent chapters

What is currently known about the relationship between self-harm behaviour in adolescence and measures of impulsivity? Is there empirical support for the role of impulsivity in models of self-harm? (Chapter 3)

Next steps

Chapter 3 undertakes a comprehensive review of the literature relating to self-harm and impulsivity.

Chapter 3: Impulsivity and self-harm in adolescence: A systematic review

3.1 Overview

Research presented in this chapter aims to clarify the relationship between impulsivity and self-harm in adolescence by providing a comprehensive review of the literature as it relates specifically to community-based populations of young people aged 11-25 years. The chapter begins by summarising key points from Chapters 1 and 2, which have informed the present approach. In particular it is recognised that conceptual and methodological heterogeneity across studies regarding the constructs of impulsivity and self-harm have complicated understanding of their association to date. As such, the review aims to clarify the current state of understanding within the context of these conceptual and methodological discrepancies and variations in measurement precision. The chapter describes a systematic review of articles published up to July 2015 of which 28 met inclusion criteria. The chapter is a revised version of a published paper¹. Finally, building on the reviewed evidence presented in Chapters 1-3, the chapter outlines how subsequent research presented in this thesis will seek to advance understanding of the relationship between self-harm and impulsivity in adolescents.

3.2 Introduction

3.2.1 Rationale for the present review

Reviewed evidence in Chapters 2 revealed that self-harm is a significant problem affecting high numbers of youth across adolescence, here recognised as the broad developmental period spanning 11-25 years (Morey et al., 2016; Madge et al., 2008; Muehlenkamp et al., 2012). A consistent peak in the incidence of self-harm at around 14-17 years (Whitlock, 2012), typical onset of behaviour in early adolescence (Nock, 2010) and evidence of an upward trend in rates of self-harm in adolescent groups (Morthorst et al 2016; Morgan et al 2014) underscore the scale of the problem in young people.

¹ Lockwood, J; Daley, D; Townsend, E; Sayal, K (2017) Impulsivity and self-harm in adolescence: a systematic review, *Eur Child Adolsc Psychiatry*, 26: 387-402. (See Appendix: F1)

Impulsivity has been linked to self-harm behaviour (Herpertz, 1995; Simeon, Stanley, Frances, Mann, Winchel, & Stanley, 1992). Yet the relationship between impulsivity and self-harm is not always evidenced or demonstrates an inconsistent pattern of association (Hawton et al., 2002; Janis & Nock, 2009). This may be explained in part by variation in the conception and assessment of 'impulsivity' across studies. The same term is used variously, but not exhaustively, to depict trait-based conceptions of personality captured via self-report questionnaires; alongside state-based behavioural conceptions which result from the inability to inhibit behaviours (response inhibition) captured through lab-tasks that capture speed and success in inhibiting a response (see Chapter 1). Meaningful interpretation of the relationship between impulsivity and an outcome such as self-harm necessitates adequate specification of which component of impulsivity is under scrutiny, not least because separate impulsivity-related constructs may vary in the magnitude of relationship with outcomes (Whiteside & Lynam, 2001; Smith & Cyders, 2008; Lynam et al., 2011) and thus their clinical utility in predicting self-harm. The heterogeneity underpinning trait impulsivity has been disaggregated within the UPPS-P model of impulsive behaviour as described fully in Chapter 1. The specificity offered by the UPPS-P model allows increased predictive utility when examining impulsivity as a risk factor for self-harm (Lynam & Miller, 2011).

As outlined in Chapter 2, impulsivity has been proposed as theoretically important in pathways to self-harm. The primary function of self-harm appears to be affect-regulation i.e. young people self-harm to regulate their emotions, most often to decrease negative emotional states (e.g. Edmondson et al., 2016. See discussion in Section 2.5.1). In parallel, Urgency Theory suggests that some individuals, in the presence of heightened negative affect, are more likely to act rashly (Cyders & Smith, 2008). The goal of relief from negative affect may drive impulsive behaviour for short-term gain over long-term objectives (Tice, et al., 2001). Accumulating evidence of a strong association between NUR and NSSI (Hamza et al., 2015) supports the theoretical credibility of rash reactivity to negative affect in explicating self-harm. Other models of self-harm have proposed a role for impulsivity as a proximal risk factor (e.g. the Integrated Motivational-Volitional (IMV) model (O'Connor et al., 2011) or a distal risk factor (e.g. the EAM; Chapman et al

2006; the IPT; Joiner, 2005) in self-harm or suicide models. Summarising the support for these models of self-harm within the present review will inform theoretical understanding.

There are important gaps in our understanding of the wider context within which impulsivity relates to self-harm. Results from studies that have taken into account the influence of correlates, such as depression, are inconsistent (Glenn & Klonsky, 2010; O'Connor, Rasmussen, Miles, et al., 2009) and limited focus has been given to moderation or mediation designs that may delineate alternative pathways of influence (Peterson, Davis-Becker, & Fischer, 2014). Moreover, few studies have examined associations beyond cross-sectional inquiry (Glenn & Klonsky, 2011) which makes any causal influence of impulsivity hard to establish.

3.2.2 Goals of the present review

Review findings (Hamza et al., 2015) across a broad sampling frame suggest that impulsive individuals may be at increased risk of NSSI, but concede that distinctions in the conceptualisation and measurement of these constructs hamper conclusions. The present study aims to extend this understanding with some distinctions in approach. (1) Evidence is examined for an association between impulsivity and *self-harm* or *NSSI*. This broad focus is important given that disentangling suicidal intent and self-injury is complicated. (2) Associations are examined in adolescent community-based populations given the high prevalence and onset of self-harm in young people. (3) Particular attention is given to the impact of conceptual and methodological heterogeneity, the specificity of constructs, and the comprehensive context of examination.

3.3 Methods

3.3.1 Identification of relevant studies

A literature search covering articles published up to 6th July 2015 was conducted with the assistance of an information specialist using the following databases: EMBASE, MEDLINE, and PsycINFO via OVID, CINAHL via EBSCOhost, PubMed, and The Cochrane Library via Wiley Online Library. Search keywords, collected through literature review, experts' opinion and controlled vocabulary, comprised combinations of (1) variants of *impulsivity*, or *impulsiveness* or *impulsive*

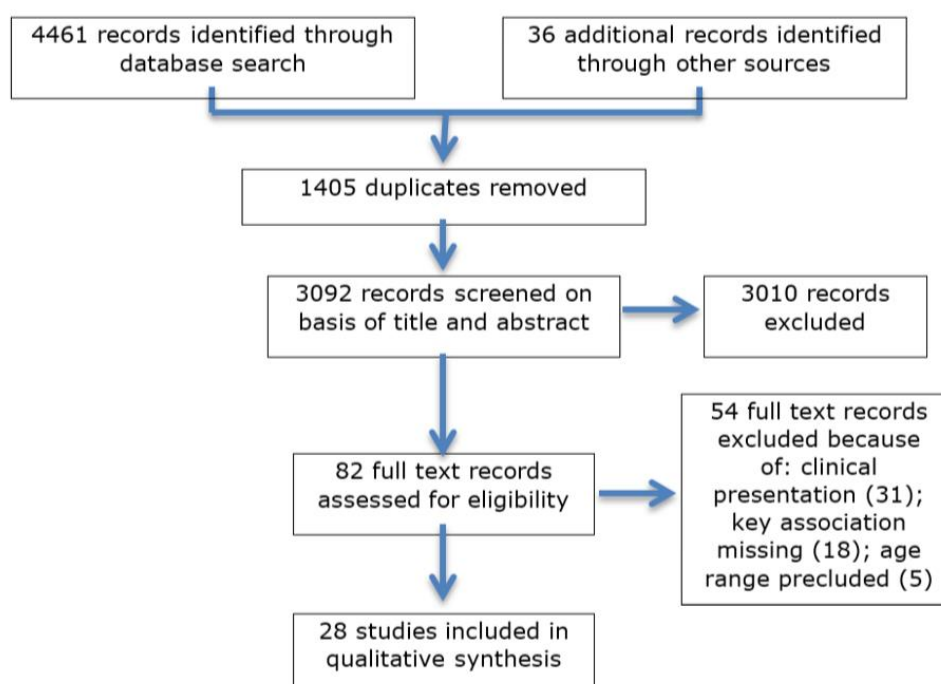
behaviour AND (2) a self-harm term including variants of *self-harm*, or *self-injury*, or *deliberate self-harm*, or *self-destructive behaviour*, or *self-mutilation*, or *self-poisoning*, or *parasuicide*, or *self-inflicted injury* (See Appendix A-1). Studies were also identified through a hand search of the reference lists of included studies and related reviews. Articles were screened by JL initially on the basis of titles and abstracts and then by JL and an additional researcher through a full text assessment according to the following set criteria. Peer reviewed studies written in English were included which reported a psychometrically validated measure of impulsivity and indicated self-harm behaviour in community-based samples aged 11-25. Self-harm behaviours and ideation were included irrespective of suicidal intent. Studies were required to examine the relationship between self-harm and impulsivity. All empirical study designs were included with the exception of case studies and single case designs given their limited generalisability and high potential bias. Disagreements were resolved by discussion between raters and input from an independent third party was not necessary.

3.4 Results

A total of 4,496 articles were identified. Exclusion of duplicates and non-relevant abstracts provided 82 full text records assessed for eligibility. Fifty-four records were excluded on the basis of clinical presentation (31 records); missing key association (18 records), or precluded age range (five records). The remaining 28 studies were subject to descriptive synthesis. Given the variety of study designs and variation in methods of assessment a meta-analysis was not feasible. A PRISMA flowchart recording each stage of the search process is provided in Figure 3.1. In a number of cases same source studies were included given differentiation in design or outcome measure: in four cases authors published follow up studies utilising the same sample (Peterson & Fischer, 2012; Taylor, Peterson & Fischer, 2012; O'Connor, Rasmussen & Hawton, 2009; O'Connor, Rasmussen, Miles et al., 2009), or a subset of an earlier cohort (Di Pierro, Sarno, Gallucci, & Madeddu, 2014; Glenn & Klonsky, 2011) with the subsequent analysis focused on a different research outcome. Five included studies derived from one international survey dataset (Madge et al., 2008): four analysed separate country-based subsets (De Leo & Heller, 2004; Hawton et al., 2002; McMahon, Reulbach, Corcoran, Keeley, Perry, & Arensman, 2010; Portzky,

De Wilde, & van Heeringen, 2008); the remaining study provided analysis across the complete dataset, but pursued a different research question (Madge, Hawton, McMahon, Corcoran, De Leo, de Wilde et al., 2011). An additional study (O'Connor et al., 2012) drew on the combined dataset of two included studies (O'Connor et al., 2014; O'Connor, Rasmussen, Miles, et al., 2009) but again focused on a separate research question. Table 3.1 lists included studies and reports population details, measures, and key results. (Following the completion of the Systematic Review search (up to July 2015) four new papers were published. See section 3.7 below).

Figure 3.1. PRISMA diagram showing study selection process



Indicators of study quality: Given a shortage of available quality rating systems, a new rating system was developed in line with criteria recommended for non-clinical study assessment (Sanderson, Tatt, & Higgins, 2007). A four-point quality scale included: (1) representativeness of a general population (0-2 points), (2) use of standardised measures of impulsivity (0-2 points), (3) robust criteria specified for indicators of self-harm (0-2 points), (4) attempts to deal with confounds (0-2 points). Ratings ranged from good (6-8 points), moderate (3-5 points) to low (0-3 points) depending on level of criteria met or the robustness of the study's conclusions. The

average quality score was 5.9 (mean) or 7 (mode) with 19 studies receiving a good quality rating (Table 3.1.) Study quality in a random sample of studies (n=10) was independently assessed by JL and an additional researcher (DD) with 100% agreement.

Study characteristics: Excluding repeated datasets, a total of 47,055 young people were sampled of which 4114 (8.7%) endorsed self-harm. Of those, 3021 (73.4%) were school-based with mean ages ranging from 13.92-17.03 years; 1023 (24.7%) were university-based with mean ages ranging from 18.8-23.6 years; and 70 (1.69%) were derived from online community samples with mean ages ranging from 14.4-23 years.

3.4.1 General findings and study synthesis:

In line with recent findings (Hamza et al., 2015) an association between broadly specified impulsivity and a self-harm outcome of interest was found in 24/28 studies. All exceptions were longitudinal examinations (Glenn & Klonsky, 2011; Liu & Mustanski, 2012; O'Connor, Rasmussen, & Hawton, 2009; Peterson & Fischer, 2012). Following methodological and conceptual scrutiny three overarching themes were identified and endorsed through consensus agreement between JL and supervisors: (1) *Conceptual and operational heterogeneity and reliability* (2) *Precision of measurement* (3) *Influence of more complex study design*.

3.4.2 Conceptual and operational heterogeneity and reliability – self-harm

The majority of studies (18 out of 28 or 64%) conceptualised self-harm as *non-suicidal self-injury (NSSI)*. All but two (Arens, Gaher, & Simons, 2012; Liu & Mustanski, 2012) conferred status via self-report in which the absence of suicidal intent was clearly specified to respondents (Arens et al., 2012; Bresin, Carter, & Gordon, 2013; Claes & Muehlenkamp, 2013; Di Pierro et al., 2014; Di Pierro, Sarno, Perego, Gallucci, & Madeddu, 2012; Dir, Karyadi, & Cyders, 2013; Fikke, Melinder, & Landro, 2011; Glenn & Klonsky, 2010, 2011; Liang, Yan, Zhang, Zhu, Situ, Du et al., 2014; Mullins-Sweatt, Lengel, & Grant, 2013; Ogle & Clements, 2008; Peterson et al., 2014; Peterson & Fischer, 2012; Rodav, Levy, & Hamdan, 2014; Taylor, Peterson, & Fischer, 2012). Assessment of NSSI behaviour was broadly comparable across these 18 studies in terms of inclusion behaviours

and operationalisation (See Table 3.1. for instrument details.) Fifteen out of the 16 studies (excepting Liang et al., 2014) that specified the absence of suicidal intent used commonly employed instruments in which the psychometric properties have been validated in adolescent samples and which detailed a range of behaviours against which respondents could identify their own self-injurious behaviour. Listed behaviours across these 16 studies consistently endorsed cutting, burning and hitting behaviours. For three measures (DSHI, ISAS, OSI-F) items relating to ingesting substances were also indicated (n=11 cases). One study (Fikke et al., 2011) provided a further categorisation of severity of injury (as degree of tissue damage). Where measures allowed open response categories (DSHI, FASM, OSI-F) no indication was provided of how responses were evaluated (n=10 cases). Two studies established self-injury on the basis of single questions that did not specify the absence of intent (Allen & Hooley, 2015; Liu & Mustanski, 2012).

When analysing the relationship between impulsivity and NSSI, nine studies operationalised self-injury as the presence or absence of one or more *lifetime* NSSI behaviours (Allen & Hooley, 2015; Arens et al., 2012; Claes & Muehlenkamp, 2013; Di Pierro et al., 2012; Dir et al., 2013; Liang et al., 2014; Mullins-Sweatt et al., 2013; Ogle & Clements, 2008; Peterson & Fischer, 2012) four cases compared *lifetime* to a more recent indication of self-injury (Glenn & Klonsky, 2010, 2011; Peterson et al., 2014). Four studies required at least one (Di Pierro et al., 2014; Rodav et al., 2014) or two (Fikke et al., 2011) incidents of self-injury in the *past year*, or one or more incident of cutting in the past *6 months* (Liu et al., 2012). Five out of 18 NSSI studies (27%) analysed self-injury severity or frequency (Glenn & Klonsky, 2011; Di Pierro et al., 2014; Dir et al., 2013; Fikke et al., 2011). One study (Bresin et al., 2013) analysed a daily indication of urge to self-injure. The remaining 10 studies adopted a *self-harm* conceptualisation with highly comparable approaches to assessment and operationalisation. Nine studies employed the “Lifestyle and Coping Questionnaire” developed in clinical and community adolescent populations for the CASE study (Madge et al., 2008). This provided a consistent definition of ‘self-harm’ as a deliberate act of self-injury or self-poisoning irrespective of motivation or suicidal intent (Hawton et al., 2002; O’Connor et al., 2008; 2009; 2012; 2014; McMahon et al., 2010; De Leo & Heller, 2004; Portzky et

al., 2008; Madge et al., 2011). Five CASE studies (Hawton et al., 2002; McMahon et al., 2010; De Leo & Heller, 2004; Portzky et al., 2008; Madge et al., 2011) adhered to a rigorous methodology in which those identified as self-harming on the basis of one or more self-reported incidents of *past-year* self-harm were asked to provide a description of their most recent act for classification as self-harm by three independent raters against standardised criteria. Participants failing to provide this description were excluded from subsequent analysis. An additional grouping of studies followed a modified version of this methodology in which rated descriptions were not required for inclusion (O'Connor et al., 2008; 2009; 2012; 2014). These studies examined the association between impulsivity and *lifetime* self-harm, excepting a six-month prospective study (O'Connor et al., 2009). In two out of nine *self-harm* studies (22%) an examination of ideation or repetition was included (O'Connor et al., 2012; Madge et al., 2011). One study employed a single item question to ascertain presence of *past month* self-harm (Rawlings, Shevlin, Corcoran, Morriss, & Taylor, 2015).

3.4.3 Conceptual and operational heterogeneity and reliability - impulsivity

The UPPS scale was the most commonly endorsed assessment tool measuring trait impulsivity in 12 examinations. Six cases adopted the 45-item UPPS (Ogle & Clements, 2008; Peterson et al 2012; 2014; Taylor et al., 2012; Arens et al., 2012; Mullins-Sweatt et al., 2013); three utilised the 59-item UPPS-P (Dir et al., 2013; Fikke et al., 2011; Rawlings et al., 2015). Both scales have good reliability and validity (Whiteside & Lynam, 2001; Cyders et al., 2007). In two cases (Glenn et al., 2010; 2011) a 16 item short-form was employed which has demonstrated comparable psychometric properties to the long-form (Cyders, Littlefield, Coffey, & Karyadi, 2014). One study (Bresin et al., 2013) focused on a single UPPS subscale (NUR). All nine concurrent full scale UPPS examinations found a significant association between at least one impulsivity subscale and a self-harm outcome, and these were maintained in all multivariate examinations (n=6) underlining a broad instrument-level consistent utility in this assessment tool. Urgency subscales were the most consistently associated impulsivity facets associated with the presence of *lifetime* self-injury in full scale UPPS and UPPS-P examinations, and signalled exclusively in four cases (Ogle & Clements, 2008; Peterson et al., 2012; Claes & Muehlenkamp, 2013; Rawlings et al., 2015). In all cases

except one (Rawlings et al., 2015) studies adopting UPPS scales endorsed a conceptualisation of NSSI rather than self-harm. Less consistent results were found from studies utilising trait-based instruments that reflect non-mood based cognitive conceptions of impulsivity as a predominantly rash action with little planning or forethought. Of the four studies utilising the Barratt Impulsivity Scale (Patton et al., 1995) two found no relationship between impulsivity and either NSSI (Liu & Mustanski, 2012) or self-harm (Rawlings et al., 2015); two studies demonstrated associations with NSSI (Liang et al., 2014; Rodav et al., 2014), but in the latter case this association no longer held when controlling for age, depression and suicidal ideation. Null findings resulted from the single examination (Allen & Hooley, 2015) using the SNAP Impulsivity scale (Clark, Simms, Wu, & Casillas, 2008). Utilising the Youth Questionnaire (Brook, Brook, Gordon, Whiteman, & Cohen, 1990) Di Pierro and colleagues (2014) demonstrated a significant association between *lifetime* NSSI and impulsivity that held in the context of other psychological correlates (anxiety and depression). However, the study employed a non-validated Italian version, and internal validity in the sample was poor. A mixed pattern of findings resulted from examinations (n=9) using the Plutchik Impulsivity Scale (Plutchik & Van Praag, 1989). Across the full international CASE study sample (n=30,477) an overall significant but small univariate association between impulsivity and *past-year* self-harm was evidenced (Madge et al., 2011). But examining findings by CASE country, although univariate associations between impulsivity and self-harm were demonstrated (Hawton et al., 2002; McMahon et al., 2010; De Leo & Heller, 2004; Portzky et al., 2008) these associations were no longer significant in multivariate analysis (De Leo et al., 2004; Portzky et al., 2008) or retained significance for only a subset of girls (Hawton et al., 2002; or conversely boys (O'Connor et al., 2014). Similarly, O'Connor and colleagues found that significant associations between *lifetime* self-harm and impulsivity were negated completely (O'Connor et al., 2008; O'Connor et al., 2012) or retained only for boys (O'Connor et al., 2014) and were not demonstrated in longitudinal examinations (O'Connor et al., 2009). Only one UPPS-based study (Glenn & Klonsky, 2010) found evidence of an association between SS and self-injury, not held in multivariate analysis. SS was associated with an increased risk of cutting in an LGBT sample (Liu et al., 2012).

A state-based conceptualisation of impulsivity (as response inhibition) was examined by three studies (Glenn & Klonsky, 2010; Fikke et al., 2011; Rodav et al., 2014) – in each case assessed by the Stop Signal Task (SST; Logan & Cowan, 1984). For Glenn & Klonsky (2010) the SST did not distinguish students with *lifetime* self-injury from controls, they were however distinguished by UPPS measures of impulsivity, suggesting a distinction between being impulsive and performing an impulsive act. Fikke et al. (2011) similarly found that compared to controls impaired inhibitory control was not evident in students whose self-injury endorsed ‘high severity’ behaviours (characterised by severe cutting and burning). However, those endorsing ‘low severity’ behaviours (such as biting and bruising) did make more inhibitory control errors. In both cases these studies examined behavioural impulsivity using neutral stimuli. When the SST task was manipulated to include stimuli to specifically evoke unpleasant emotional reactions, Allen & Hooley (2015) demonstrated that compared to controls individuals who self-injured exhibited poorer inhibitory control over negative images but did not differ in response to neutral stimuli. Notably this study did not find that non-affective trait impulsivity (SNAP) was associated with self-injury. Further, where stimuli specifically related to NSSI (images of cutting), those who self-injured demonstrated *enhanced* inhibitory control compared to controls, responding similarly when presented with positively-valenced images and cutting images.

3.4.4 Precision of measurement

The second focus of synthesis examines the extent to which the relationship between impulsivity and self-harm varies according to the level of precision at which each is operationalised. Two studies examined if UPPS facets were differentially implicated across current versus past NSSI. Glenn and Klonsky (2010) found that NUR and to a lesser extent LPM, but *not* LPS, differentiated undergraduates with a *lifetime* history of self-injury from those without. Conversely, only LPS, and not NUR or LPM, differentiated those with *current* (past year) versus *historical* NSSI. Taylor et al. (2012) similarly found that undergraduates who self-injured differed from controls on NUR, LPM and, to a lesser extent, LPS, but conversely demonstrated no difference in these variables amongst those endorsing *current* versus *historical* self-injury, albeit with a more stringent definition of current self-injury (past month). Nonetheless Taylor and colleagues conclude that

impulsivity may be implicated in the initiation but not the maintenance of self-injurious behaviours. Longitudinal examinations provide potential support. Peterson & Fischer (2012) demonstrated that though associated at baseline, NUR provided no incremental validity over and above the initial expression of self-injury at an eight-month follow-up. Nor were UPPS based impulsivity facets found by Glenn & Klonsky to predict the course of self-injury over one year (2011). Only two further studies examined the influence of impulsivity facets on presentations of self-harm behaviour over time (O'Connor et al., 2009; Liu & Mustanski, 2012). In neither case was an association found between cognitive impulsivity and self-harm at baseline or six month follow-up, although indicated cases were small ($n=18$) for the former; and samples were focused on a specialist and potentially non-generalisable group for the latter. Interestingly O'Connor and colleagues (2009) found that those who failed to complete measures at follow-up had significantly higher levels of cognitive impulsivity (but not other psychological variables) than those retained in follow-up analysis, which may have influenced the null findings. For present purposes trait impulsivity reveals limited prospective utility.

Two studies demonstrated that non-affect-based impulsivity (Plutchik) discriminated between self-harm ideation and enactment. Madge and colleagues (2011) revealed that impulsivity (but no other psychological correlate) differentiated between self-harm thoughts and past-year single episodes (i.e. those thinking about self-harm reported significantly lower impulsivity than those acting on their thoughts), suggesting an explanatory role for impulsivity in the initiation of self-harm acts. Similarly, O'Connor and colleagues (2012) demonstrated that, relative to those thinking about self-harm, those acting on thoughts reported significantly higher impulsivity, albeit with a small effect-size and reliance on just two scale items. These findings were not retained in multivariate analysis. A number of studies considered how impulsivity interacts with more precise assessments of the frequency and severity of self-harm (Glenn & Klonsky, 2010; Di Pierro et al., 2012; Madge et al., 2011; Fikke et al., 2011). A differential mechanism of influence for cognitive versus affective facets of impulsivity was demonstrated by the finding that UPPS-based LPS and LPM (but not NUR) predicted the 'frequency' of self-injury among undergraduates i.e. an inability to think through consequences of behaviours or remain focused was positively

related to the total number of behaviours endorsed (Glenn & Klonsky, 2010). Relatedly, Madge et al. (2011) demonstrated a dose-response effect, with increased severity of past year self-harm (no behaviour, ideation, single episode, multiple episodes) associated with increased cognitive impulsivity. However, Dir et al. (2013) found that only the NUR subscale related to frequency of self-harm, and other studies suggest a negatively graded association exists between severity of self-harm and impulsivity. Di Pierro et al. (2012) found that though positively associated with *lifetime* presence of self-injury, lack of premeditation was *negatively* associated with a past year summation of behaviour i.e. less frequent incidents of self-injury were more likely to be impulsive.

3.4.5 Influence of more complex design

The final focus considers the impact of more complex study design and analytic approaches on key findings. A mixed pattern of results was found for studies in which covariates were considered in the analysis. The impulsivity-self-harm relationship was retained in the presence of depression or anxiety (Glenn & Klonsky, 2010; 2011; Di Pierro et al., 2012; Madge et al., 2011) affective lability and self-control (Dir et al., 2013); gender, negative affect and child maltreatment (Arens et al., 2012); and self-esteem (Madge et al., 2011). Elsewhere the inclusion of covariates appeared to dampen or negate any independent association between impulsivity and self-harm. Notably studies adopting the Lifestyle and Coping Questionnaire, which included a range of social, psychological and stressful life event factors, resulted in attenuation in strengths of association in multivariate analysis for partial subsets (Hawton et al., 2002; O'Connor et al., 2008; 2014; McMahon et al., 2010) or complete samples (De Leo & Heller, 2004; Portzky et al., 2008). In non-CASE studies adjustment for depression and anxiety (Rawlings et al., 2015) and age, depression and suicidal ideation (Rodav et al., 2014) also negated findings. Rawlings and colleagues further demonstrated that depression and anxiety mediated the relationship between UPPS dimensions (NUR and PUR) and self-harm. Other mediation analysis found that NUR (but not other UPPS facets) mediated the relationship between child maltreatment and NSSI (Arens et al., 2012). In analysis of the moderating influence of distinct impulsivity constructs on self-harm outcomes, Di Pierro et al., (2014) demonstrated that the successful regulation of affect following

NSSI alters as a function of lack of premeditation in a sample of students endorsing past year self-injury. They found that when negative high-arousal affect states (nervous, anxious, angry) pre-NSSI increased, those with higher levels of impulsivity had a greater increase in negative-high arousal affect and less of an improvement in positive affect state (relief) post-NSSI, relative to those low in impulsivity i.e. those less able to evaluate the consequences of their actions had greater difficulty regulating their negative affect. Impulsivity then may be implicated where affect-regulation is not successful. By comparison Bresin et al., (2013) used a daily diary study design to examine the influence of impulsivity (high or low NUR) on general and specific facets of negative affect in predicting the *urge* to self-injure. They revealed that for individuals high in NUR, daily sadness (but not general negative affect, or guilt) was a significant predictor of urge to self-injure, but for those low in NUR there was no relationship between sadness and NSSI urge. While urge to self-injure is not necessarily a precursor to NSSI engagement, nonetheless this study and that of Di Pierro et al (2014) provide useful explication of the context in which a theorised outcome (affect regulation following NSSI) might hold. In a comprehensive modelling of covariates, Peterson and colleagues (2014) examined the extent to which impulsivity (NUR or LPM) interacts with distress tolerance (the cognitive appraisal of the one's ability to cope with distress) and depression, to predict lifetime NSSI. They revealed that undergraduates high in NUR and depression, but with low distress tolerance, were more likely to report lifetime NSSI; however no significant interaction was found for LPM. Thus a propensity to act rashly in the presence of negative affect, combined with low perceived ability to cope with that affect, may increase NSSI vulnerability.

3.5 Discussion

Findings from this review suggest that, broadly defined, impulsivity relates to self-harm behaviour in community-based populations of adolescents aged 11-25, with evidence of an association with a self-harm outcome of interest in 24 out of 28 studies. However, this relationship varies in accordance with the specificity of constructs, and the wider context of measurement and examination. Considering the consistency and reliability of the constructs used raises some interesting points. Studies were conceptually divided in defining self-harm, with 57%

overtly precluding suicidal intent, although the majority of cases examined a range of similar indicated behaviours through common validated instruments. Importantly, conceptual distinctions did not explain the heterogeneity in review findings, as associations with impulsivity were demonstrated across *NSSI* and *self-harm* studies. Impulsivity facets were more consistently associated with self-injury classified as non-suicidal overall, but a relationship between impulsivity and suicidality was revealed in *NSSI* studies and underscores the difficulties inherent in separating self-harm and suicidality. Namely, students endorsing both *NSSI* and suicide attempts were found to have significantly higher trait impulsivity than those endorsing *NSSI* only (Liang et al., 2014); impulsivity was found to relate to suicidal ideation but not *NSSI* (Liu & Mustanski, 2012); and the association of impulsivity to *NSSI* was found to disappear when controlling in part for suicidal ideation (Rodav et al., 2014). These findings signal that impulsivity is important to understanding both self-injury and suicidality in young people and that this relationship may vary across levels of suicidal thinking and behaviour.

Although the *NSSI* studies by definition endorsed a narrower conception of self-injury, the *self-harm* studies largely employed more stringent inclusion criteria. The requirement to fulfil the robust CASE study methodology brings transparency, consistency and comparability across a large subset of studies in this review. The additional CASE stipulation to corroborate behaviour is conceptually advantageous, although as noted elsewhere, it risks an underestimate of behaviours where the provision of a description may be considered too personal and unwelcome by respondents (O'Connor et al., 2008; 2014). It is problematic that, for the most part reviewed studies examined solely a *lifetime* ($n=11$) or *past year* ($n=8$) indication of self-harm, which provides a very broad-brush indication of behaviour, and which crucially fails to delineate that distress underpinning behaviours may have abated. Arguably, this approach may be obscuring associations between impulsivity and self-harm. The six studies that did examine distinctions in self-harm/*NSSI* (frequency/number of methods/symptoms) notably found associations with cognitive, affective and behavioural impulsivity (Glenn & Klonsky, 2010; 2011; Di Pierro et al., 2012; Madge et al., 2011; Dir et al., 2013; Fikke et al., 2011). Studies that combine

methodological stringency alongside a more finely grained examination of the course of self-harm may reveal a clearer pattern of association.

In terms of impulsivity, the present review demonstrated conceptual comparability, with most cases adopting a trait-based conception of an underlying personality disposition that can be captured via questionnaire (although reflecting an over-reliance on single respondent self-report and associated bias). Demonstrably, the choice of assessment tool is important in explicating the relationship between trait impulsivity and self-harm. The most commonly endorsed and consistently supported tool was the multi-dimensional and well-validated UPPS model which found either a direct association in 12 examinations. All except one (Rawlings et al., 2015) of the UPPS examinations were based within NSSI studies. By contrast, in all but one *self-harm* study (Madge et al., 2011) impulsivity as assessed by the Plutchik scale did not retain an independent association for complete samples (O'Connor et al., 2008; De Leo & Heller, 2004; Portzky et al., 2008) or subset of boys (Hawton et al., 2002; O'Connor et al., 2014) or girls (McMahon et al., 2010). The likelihood that it is the greater utility of the UPPS multidimensional instrument that drives the consistently found association between *NSSI* (rather than *self-harm*) and impulsivity in the present review, is reinforced by Rawlings and colleagues who were able to demonstrate that though UPPS subscales predicted *self-harm* behaviour in a sample of undergraduates, BIS-11 subscales did not. A key conceptual distinction between the UPPS and BIS-11 measures lies in the former's differentiation of affect-based facets of impulsivity. Thus, mood-based facets may in part underlie the strong association between UPPS-assessed impulsivity and NSSI. In support, urgency subscales were the UPPS facets most consistently associated with NSSI/self-harm; whereas less consistent results were found for studies adopting cognitive measures. Yet a key driver in the inconsistent overall pattern of trait *cognitive* impulsivity may be psychometrically based. Although the full Plutchik Impulsivity Scale has demonstrated good psychometric properties in adolescent samples (Grosz, Lipschitz, Eldar, Finkelstein, Blackwood, Gerbinorosen et al., 1994), the present studies using this tool (see Table 3.1) drew on a short form of six items, and in one case (O'Connor et al., 2012) just two items. The psychometric properties of other

tools (such as the BIS-11 and Youth Questionnaire) have not been extensively examined in community samples (Di Pierro et al., 2014; Reise et al., 2013)

In fact, where examinations extend beyond *lifetime* or *past year* indicators of self-harm a more finely grained picture of the association between cognitive impulsivity and self-harm emerges. Facets examining lack of planning and forethought were implicated in the frequency of self-injury (Glenn & Klonsky, 2010; Di Pierro et al., 2012; Madge et al., 2011); and in differentiating self-harm status such as ideation from enactment (Madge et al., 2011; O'Connor et al., 2012) or current from historical NSSI (Glenn & Klonsky, 2010). Thus, the review supports a dual pathway model of risk for the influence of trait impulsivity on self-harm, through rash reactivity to (predominantly negative) affect and deficits in cognitive processing. The question of when these respective components of impulsivity exert their influence over the life-course of self-harm however remains. Of interest, Glenn & Klonsky (2010) produced evidence of a differential role for mood-based and non-mood-based facets, with NUR and LPM implicated in the lifetime presence but not continued maintenance of self-injury – a pattern reversed for LPS. Their interpretation that NUR may lead to the adoption of self-injury, but that LPS is associated with an inability to resist the urge to self-injure once behaviour has been initiated, is persuasive. That impulsivity may be more implicated in the initiation than the maintenance of self-harm is supported cross-sectionally and longitudinally (Glenn & Klonsky, 2011; Taylor et al., 2012). Further longitudinal studies, which consider the interaction between affect and non-affect-based impulsivity facets are needed to clarify if the risk for maintained self-harm may be reduced for those individuals high in trait urgency, but low in traits related to cognitive deficits. Risk models which account for the transaction between trait-based impulsivity and broader cognitive processing may further clarify onset and maintenance risk for self-harm. For example, which it is theorised that those high in NUR may recruit a maladaptive behaviour in the service of immediate short-term relief from negative affect (Cyders & Smith, 2008), this process may be influenced by the 'expectancy' that affect can be regulated and will deliver relief (Smith & Cyders, 2016). The understanding that relief will not last may mean that long-term maintenance of self-harm relates less to the urge to regulate affect and more to deficits in self-control, decision making and the momentary ability to

enlist an alternative coping response (see Pearson, Wonderlich, & Smith, 2015). The present evidence that cognitive appraisal of distress interacted with urgency to predict NSSI (Peterson et al., 2014), or NUR is negatively associated with self-control (Dir et al., 2013), underlines the utility of examining trait-based risk within a wider cognitive context.

Inconsistent findings resulted from the three state-based examinations of inhibitory control and self-harm, with support for behavioural (but not trait) impulsivity (Allen & Hooley, 2015); partial support for behavioural impulsivity (Fikke et al., 2011); or no support for behavioural (but support for trait) impulsivity (Glenn & Klonsky, 2010). The negligible association between trait and behavioural measures of impulsivity was documented in Chapter 1 (section 1.5). Arguably, pathways to self-harm from individuals that display elevated levels of trait impulsivity, or those endorsing situationally impulsive acts, may have little correspondence. It is possible, of course, that behavioural measures are providing an accurate assessment of impulsivity, and, as noted previously (Hamza et al., 2015), the greater association between trait impulsivity and self-harm reflects the bias of an underlying confound such as ‘perceived’ impulsivity, perhaps self-validated by the inclusion of an impulsivity item in a self-harm questionnaire (Janis & Nock, 2009). Present findings in fact suggest that behavioural impulsivity is important under conditions of negative affect. Though employing a-contextual measures of emotional responding as a proxy for self-harm, Allen & Hooley’s (2015) manipulation of the SST task to include non-neutral stimuli nevertheless offers a conceptually stringent test of association and provides objective support for the relevance of emotional reactivity in the relationship between state impulsivity and self-harm.

In this light it is interesting to conjecture methodologically on the endorsement of the UPPS scale. Importantly the UPPS scale measures the traits that lead to impulsive behaviour and hence reactivity is specified within the context of an emotional state: “*When I am upset I often act without thinking*”. As such, the model’s predictive utility may derive in part from its ability to account for intra-individual variation in behaviour in relation to situational (state based) factors to a greater degree than traditional trait-based scales. Problematically, a temporal disconnect remains across many designs (i.e. measuring a baseline assessment of impulsivity with a past

indication of self-harm) that cannot control for such variation. Comprehensive designs that account for the momentary context within which predispositions to impulsivity play out, and move beyond binary state v trait distinctions may offer greater utility in delineating pathways to self-harm. Relatedly, in a recent study using sequence analysis techniques to examine factors leading to self-harm, impulsivity (identified by the item “I did it on impulse without planning” and which may relate to trait disposition or momentary state) was identified as the only proximal factor preceding the first ever and most recent episode (Townsend, Wadman, Sayal, Armstrong, Harroe, Majumder et al., 2016). Support was also found in the present review for the influence of trait impulsivity in the translation of self-harm thoughts into behaviour as theorised by the Integrated Motivational Volitional model of self-harm (O’Connor, 2011). Importantly, discriminating between intention and enactment has been identified as a critical area for self-harm research (Klonsky & May, 2014). That trait impulsivity is closely associated with behavioural enactment speaks to the possible transaction between trait and state conceptions of impulsivity. In light of the review findings, tests of the IMV model with the multi-dimensional UPPS tool, and which extend to longitudinal examination, are an obvious next step to further clarify the role of both affect and non-affect-based facets of impulsivity in the initiation and maintenance of self-harm.

In support of the interrelation between urgency theory and affect-regulation functions of self-harm (e.g. Cyders & Smith, 2008; Edmondson et al., 2016) findings suggest that the relationship between self-harm outcomes and impulsivity is best understood in terms of how impulsivity relates to mood and the short-term management of emotion. Complex models of analysis comprehensively specified this emotional context for impulsive reactivity and revealed: a moderating influence of lack of premeditation on the successful regulation of high arousal affect following NSSI (Di Pierro et al., 2014); that sadness relates to NSSI urge for those high in NUR (Bresin et al., 2013); that vulnerability to NSSI is most significant for those who not only tend to react rashly to negative mood but also perceive themselves as unable to cope with negative mood (Peterson & Fischer, 2012); and that child maltreatment may result in a tendency to deal with negative affect impulsively (Arens et al., 2012). These studies pinpoint the role of cognitive

and affective processing in links between trait impulsivity and self-harm. Importantly, findings suggest a differential relationship between facets of impulsivity and separate indices of affect (Di Pierro et al., 2014; Bresin et al., 2013) in the affect-regulation process. Given the prominence of the affect-regulation function of self-harm future research should now build upon these lines of enquiry. It is interesting to reflect on the finding of Allen & Hooley (2015) in this context who revealed impaired behavioural inhibition over negatively-valenced stimuli, but note that this pattern was reversed when stimuli directly referenced NSSI. The authors suggest this finding indicates a level of habituation to NSSI at which impulsive reactivity is no longer implicated. Such habituation may in part underlie findings that those endorsing more severe or frequent NSSI demonstrate lower impulsivity than those endorsing 'less severe'/frequent NSSI (Di Pierro et al., 2014; Fikke et al., 2011). These findings support theories of habituation and that a dampening response to the aversive nature of self-harm may be implicated in its continuation (Anestis et al., 2014).

The findings from this review have practical implications for clinical treatment. Reference to the UPPS-P tool may help clinicians clarify the nature of risk for individuals. For those who tend to act with little forethought, or have difficulty remaining on task, cognitive regulation techniques which focus on the outcomes of rash action and highlight long-term goals may be helpful, particularly in treating maintained self-harm. Targeting rash reactivity to intense emotions may be useful in identifying those at increased risk for self-harm. Psychological interventions that teach the regulation or tolerance of emotion and focus on rational decision making over emotional response may be most beneficial and usefully directed at those initiating behaviour or indicating ideation. Distress tolerance and problem-solving skills are core components of Dialectical Behaviour Therapy (DBT; Linehan, 1993) and the application of a modified version of DBT for adolescents (DBT-A; Miller, Rathus, & Linehan, 2007) has shown promise in trials with reductions in self-harm frequency sustained at one year follow-up (Mehlum, Ramberg, Tørmoen, Haga, Diep, Stanley et al., 2016; Mehlum, Tørmoen, Ramberg, Haga, Diep, Laberg et al., 2014). Treatment retention and engagement with follow-up are a recognised problem among those who self-harm (Ougrin, Boege, Stahl, Banarsee, & Taylor, 2013) and may be a particular challenge

for those high in impulsivity who experience difficulties remaining on task or focusing on long-term goals. Keeping patients in treatment is an explicit goal of DBT-A and evidence of good treatment retention for DBT-A is noteworthy. Nonetheless, DBT-A requires adolescent and family adherence over a 16-week duration. Promisingly, a brief 40-minute intervention (Therapeutic Assessment) based on cognitive analytic approaches and delivered at initial hospital presentation has demonstrated long-lasting improvements in adolescent engagement with treatment (Ougrin et al., 2013) and may promote increased motivation for adherence with interventions offered. There are limitations to the conclusions that can be drawn from the review. An over-reliance on cross-sectional designs across mainly *lifetime* indications of self-harm limits explication of the long-term relationship, or direction of effects, between self-harm and impulsivity. Future studies should account for the wider and temporal context of how affect and cognitive control of emotion may alter behavioural response across the life-course of self-harm. Greater focus on the differential impact of PUR versus NUR facets is now warranted. In addition, research should examine the self-harm-impulsivity relationship across gender and culture given the differential gender effects outlined (Hawton et al., 2002; O'Connor et al., 2014; McMahon et al., 2010), and a strong bias towards white ethnic populations across the review (Allen & Hooley, 2015; Arens et al., 2012; Dir et al., 2013; Ogle & Clements, 2008; Peterson & Fischer, 2012; Taylor et al., 2012; O'Connor et al., 2014).

KEY POINTS from this chapter

- (1) The present review builds on earlier work (Hamza et al., 2015) in demonstrating an association between impulsivity facets and NSSI/self-harm, specifically in community-based adolescents.
- (2) Methodologically, findings indicate the necessity of clearly defined constructs, specified precisely, to clarify understanding of this relationship. More broadly, examination of the interplay between different facets of impulsivity and a nuanced account of self-harm that considers intention, enactment, frequency and severity, would clarify the strength of this relationship.

(3) Research beyond associative studies is needed to explain when and why the relationship between impulsivity facets and self-harm is expressed and how it relates to affect regulation functions of self-harm.

Table 3.1. Characteristics of studies included in Systematic Review

NSSI studies						
Study/country	Population		Measurement			Quality Score (0-8)
	Source	Gender / Age / ethnicity	Impulsivity	NSSI/Self-harm	Nature of relationship	
Allen & Hooley USA	online experiment	n=64 F (71%) 69% white. (mean age = 23)	SNAP Stop Signal Task	Single Question. Lifetime incidence -intent not established	NSSI group did not report higher levels of trait impulsivity compared to controls, but did demonstrate poorer inhibitory control over <i>rapid</i> behavioural response to negative image [F(1,62)=5.17,p=0.03]; but no broad deficit indicated by SSRT	4 (moderate)
Arens and Gaher USA	uni/college concurrent	n=407 F (65%) 93.6% white (mean age = 20.33)	UPPS-R	DSHI lifetime incidence	NSSI positively correlated with NUR [b=.048, p=.007]; negatively correlated with LPM and LPS. Urgency mediates the relationship between child maltreatment and NSSI presence.	6 (good)
Bresin et al USA	uni/college EMA diary	n=61 F(38) M(29) (mean age = 19.58)	UPPS-R Urgency only	DHSI lifetime incidence and daily NSSI urge	For individuals high in NUR, high daily sadness was a significant predictor of increased NSSI urge (OR=3.93). So was upset, and fear, but not daily negative affect or guilt.	6 (good)
Claes & Muehlenkamp BEL	High schools concurrent	n=613 F(60.4%) 17.3% NSSI (mean age =16.38)	UPPS-P	SIQ-TR lifetime incidence. Examined NSSI methods.	NSSI positively correlated with NUR (rs=.29) and PUR (rs=.18). LPM positively correlated with severe cutting.	5 (moderate)
Di Pierro et al., ITALY	High school concurrent	n=267 F(70.4%) past year NSSI n=36 (mean age 17.03)	Youth Questionnaire	SIQ-TR lifetime incidence and severity (high=5+ cases of past year NSSI).	Impulsivity (lack of premeditation) positively associated with lifetime presence of NSSI, but negatively associated with severity of NSSI p<0.001. Findings held in multivariate analysis.	6 (good)
Di Pierro et al., * ITALY	High school concurrent	n=30 F (63.3%) (mean age 16.63)	Youth Questionnaire	SIQ-TR lifetime incidence	Impulsivity LPM moderated the association between negative high arousal states before and after NSSI p=.03.	5 (moderate)
Dir et al USA	uni/college concurrent	n=430. NSSI(215) F(77.7%) white 74.8% (mean age =22.36)	UPPS-P	DHSI lifetime incidence Also examined frequency, variety and years of NSSI.	DSH group was significantly higher than the non-DSH group on LPM (p=.01), PUR (p<.001) and NUR (p<.001). Higher NUR was associated with increased frequency, method variety, years of NSSI controlling for other UPPS dimensions, self-control and affective lability.	7 (good)
Fikke et al NORWAY	High school experiment	n=97 F(75.3%) (mean age 14.7)	Stop Signal Task	FASM. 2 incidents of past year NSSI. Also severity of behaviour	Those with low NSSI had overall higher scores than controls p=.02 and those with high NSSI p=.01 on SST variables. Students with low NSSI had higher number of SST errors than controls, and higher SSRT scores than those with high NSSI.	5 (moderate)

Glenn & Klonsky USA	uni/college concurrent	n=168 F (71%) 82 endorsed self-injury (mean age = 19.5)	UPPS (short) Stop Signal Task	ISAS Lifetime incidence and current (past year) v historical	Those who self-injured differed from controls on NUR d=.53, LPM d=.40 and SS d=.35, but not LPS. Effect held for NUR and LPM when controlling for depression, anxiety, alcohol abuse. Current self-injury associated with higher LPS d=.63, but no differences in NUR, LPM or SS. Frequency correlated with LPS and LPM. No difference between groups on SST.	6 (good)
Glenn & Klonsky* USA	uni/college longitudinal	n=81 F(51.9%)baseline n=51 F(72.5%) follow up (mean age=19)	UPPS (short)	ISAS Lifetime incidence , frequency and current (past 6 mo) v historical	Lifetime NSSI frequency was positively associated with LPS at baseline – but not the other UPPS dimensions. LPS was not a significant predictor of NSSI frequency between baseline and follow up.	6 (good)
Liang et al., China	school concurrent	n=2131 F (49.1%) NSSI (446), NSSI+SA (48), SA (20) (mean age 13.92)	BIS-11 (Chinese)	Self Harm Questionnaire - Lifetime (NSSI), suicide attempt (SA) and (NSSI+SA)	Lifetime self-harm groups (NSSI) and (NSSI+SA) associated with increased impulsivity compared to NOSH p<0.0083. (NSSI +SA) had higher Impulsivity scores than (NSSI) only.	5 (moderate)
Liu & Mustanski USA	online longitudinal	n=246. NSSI=15.4% F (50.8%). LGBT youth (mean age 18.30).	BIS-11; BSSS	ARBA. Single item recent (6 mo) cutting. Suicidal intent not established.	Multivariate HLM of predictors of NSSI revealed greater past 6 month cutting was associated with sensation seeking p=.04 but not BIS-11; suicidal ideation was associated with BIS-11 but not sensation seeking.	5 (moderate)
Mullins-Sweatt et al USA	uni/college concurrent	F(68%) NSSI (87) (mean age =19.83)	UPPS-P	DHSI lifetime incidence	NSSI group reported higher NUR (d=.58), LPM (d=.47) and LPS scores (d=0.48) than non-NSSI group.	4 (moderate)
Ogle & Clements USA	uni/college concurrent	n=500 NSSI = 44 F(100%) White (88%) (mean age =18.83)	UPPS - R	DSHI lifetime incidence	In univariate tests those engaging in NSSI were significantly higher in NUR (m=29.18) than controls (m=26.08); no difference in the other facets of impulsivity.	4 (moderate)
Peterson & Fischer USA	uni/college longitudinal	n=489 F(100%) white (75.8%) NSSI 23.8% 8mo n=209 (mean= 18.62)	UPPS-R	DHSI short form lifetime incidence	At baseline direct paths from NUR to NSSI were significant p<.01. No other impulsivity facet predicted NSSI. NUR did not contribute incremental variance to increases in symptoms over time beyond baseline NSSI or UPPS scales.	4 (moderate)
Peterson et al USA	uni/college concurrent	n=884 F(82%) NSSI =154 (mean age 19.16)	UPPS-R	DHSI short form lifetime incidence. Also frequency and current v historical.	NUR predicted NSSI engagement (OR=1.047). A three-way interaction was found between NUR, DT and depression with high NUR + depression predicting higher levels of NSSI in those with low DT. A main effect of LPM was found but no interaction effect.	7 (good)
Rodav et al ISRAEL	school concurrent	n= 275 F(49.9%) past year NSSI n=57 (mean age = 14.81)	BIS-11 (Hebrew)	OSI-F - past year incidence	Those reporting NSSI had higher impulsivity compared to controls (p< .0001) but impulsivity was no longer significant when controlling for age, depression and suicidal ideation.	7 (good)
Taylor et al * USA	uni/college concurrent	n= 429 F(77.2%) white (79%) lifetime n=120 current =33 (mean age 19.77)	UPPS-R	DSHI short form lifetime also current (past mo) v lifetime and motives.	Main effect for NUR (p< .001), LPM (p< .001) and LPS (p< .016) on lifetime presence of NSSI, but not SS. No association between Impulsivity and motives for SI or current NSSI status.	4 (moderate)

Self-harm studies						
De Leo & Helier AUSTRALIA	school concurrent	n= 3757. n=233 (mean age= 15.4)	Plutchik short-form (6 items)	CASE LCQ. Past year and lifetime incidence	Impulsivity was associated with past year self-harm in univariate analysis. No association found in multivariate analysis. Time to engage measures showed that more than a third engaged in SH less than an hour after first thinking about it.	7 (good)
Hawton et al UK	school concurrent	n=6020 past year SH =398. F (75.1%) (age mainly 15-16 yrs)	Plutchik short form (6 items)	CASE LCQ. Past year and lifetime incidence	Impulsivity was associated with past year self-harm in boys (OR 1.22) and girls (OR 1.20). In multivariate analysis impulsivity distinguished females (OR 1.10) but not males.	7 (good)
Madge et al., EUROPE and AUS	school concurrent	n= 30,477 (mainly 15-16)	Plutchik short form (6 items)	CASE LCQ. Past year and lifetime incidence. Also ideation / single / multiple episodes.	Increased severity of self-harm history associated with greater impulsivity. Impulsivity was independently associated with self-harm thoughts only (OR=1.06), single episode (OR=1.10), multiple episode (OR 1.13). Only Impulsivity among psychological correlates distinguished ideation from single episode self-harm.	7 (good)
McMahon et al IRELAND	school concurrent	n=3881 F (52%) (mainly 15-16 years)	Plutchik short form (6 items)	CASE LCQ. Past year and lifetime incidence	Past year self-harm associated with impulsivity in boys (OR 1.30) and girls (OR 1.19) in univariate analysis, but only retained independent significance in multivariate analysis for boys (OR 1.17).	7 (good)
O'Connor et al NI	school concurrent	n=3596 white (98.1%) F (47.8%) SH n=394 F(261) (mean age =15)	Plutchik short form (6 items)	modified version of CASE LCQ lifetime self-harm	In univariate analysis increased impulsivity was associated with lifetime SH in girls (OR=1.20) and in boys (OR=1.25). In multivariate analysis impulsivity was independently associated with lifetime SH in boys only (OR=1.18).	7 (good)
O'Connor et al SCO	school concurrent	n= 2008 F (53%). SH n=272 F(209) (mean age = 15.4)	Plutchik short form (6 items)	modified version of CASE LCQ lifetime self-harm	Lifetime SH was associated with increased impulsivity in boys (OR =1.18) and girls (OR = 1.17) in univariate analysis but no longer an independent predictor in multivariate analysis.	7 (good)
O'Connor et al* subsample SCO + N.I	school concurrent	n=5604 n=628 enactors; 675 ideators. F (49%) (mainly 15-16yrs)	Plutchik short form (2 items)	modified version of CASE LCQ Lifetime self-harm and ideation	Lifetime self-harm ideators and enactors differed from controls (OR=1.17 and 1.29) and each other (i.e. enactors were more impulsive (OR=1.13) in univariate analysis. This effect did not retain significance in multivariate multinomial logistic regression.	6 (good)
O'Connor et al* subsample SCO study	school longitudinal	n=737 F(367) n=500 at 6 month FU (mean age =15.2)	Plutchik short form (6 items)	modified version of CASE LCQ lifetime self-harm and status at 6 mo follow up	In univariate analysis impulsivity at baseline was not associated with first time self-harm between T1 and T2 or with repeat self-harm between T1 and T2. But those who failed to complete measures at T2 were significantly more impulsive than completers.	7 (good)
Portzky et al HOLLAND /BELGIUM	school concurrent	n=4431 F (49.5%) SH =243 (mean age 15.45)	Plutchik short form (6 items)	CASE LCQ Past year and lifetime incidence	In Univariate analysis impulsivity was significantly associated with lifetime self-harm, but did not retain significance in multivariate analysis.	7 (good)

Rawlings et al UK	uni/college concurrent	n=1350 F(71.7%) SH=85 (mean age 23.62)	BIS-11 and UPPS-P	Two questions recent (4 weeks)	No relationship between (BIS-11, LPM and LPS) and self-harm. Affective Impulsivity (NUR/PUR) higher in those reporting sel- harm (OR=2.0). Relationship between affective impulsivity and SH mediated by depression/anxiety.	7 (good)
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Notes: *DSHI* Deliberate Self-Harm Inventory (Gratz, 2001); *SIQ-TR* Self-Injury Questionnaire Treatment Related (Claes & Vandereycken, 2007); *ISAS* Inventory of Statements about Self-injury (Klonsky, 2009); *FASM* Functional Assessment of Self-Mutilation (Nock, 2004); *ARBA* Aids -Risk related behavior among adolescents (Donenberg et al. 2001); *OSI-F* Ottawa Self-Injury Inventory Functions (Nixon & Cloutier, 2002); *SNAP* Schedule for Nonadaptive & Adaptive Personality – 2 (Clark et al 2008); *BSSS* Brief Sensation Seeking Scale (Hoyle et al., 2002); *LCQ* "Lifestyle and Coping Questionnaire"; UPPS facets: *NUR* Negative Urgency; *PUR* Positive Urgency; *LPM* Lack of Premeditation; *LPS* Lack of Perseverance; *SS* Sensation Seeking; *SST* Stop Signal Tasks

*indicates repeat sample or subsample

3.6 The current thesis

On the basis of reviewed evidence presented in Chapters 1-3 four overarching aims are identified for this thesis. The first, to establish evidence for the relationship between facets of impulsivity and aspects of self-harm that go beyond a simple lifetime incidence. The second, to provide a contextualised account for this relationship, which reflects the influence of wider correlates, temporal dynamics, or which situates the research within theoretical frameworks. The third, to consider how the relationship between impulsivity and self-harm is manifest at different developmental stages of adolescence. The fourth to draw on multiple methods of analysis and research approaches which ensure that individual perspectives are reflected and integrated within the thesis. The approach to understanding the influence of impulsivity on self-harm behaviour adopts a pragmatist position (Morgan, 2014) in which methods are applied as best suit the research question and not as prescribed by a specific philosophical paradigm.²

3.6.1 Main research questions

1. What is the concurrent association between dimensions of impulsivity, as delineated by the UPPS-P Impulsivity scale, and self-harm outcomes in community-based populations in adolescence, accounting for the influence of other correlates? (Chapters 4 and 7).
2. What is the prospective or longitudinal relationship between dimensions of impulsivity and self-harm? Are dimensions of impulsivity related to the onset and maintenance of behaviour? (Chapter 5 and Chapter 8).
3. How does a dimensional examination of impulsivity contribute to theoretical understanding of self-harm? For example, do facets of impulsivity contribute to understanding of the ideation-to-enaction framework and distinguish between thoughts of self-harm and acts of self-harm? (Chapter 4 and 5).

² Historically, quantitative (positivist) paradigms which seek objective knowledge and adopt statistical approaches to observe, measure predict and generalise, have been held as incompatible with qualitative (interpretivist) paradigms, which suggest that context-free generalisation is impossible. A pragmatic approach does not reject these epistemological positions, but rejects the notion of their incommensurability. Pragmatism is outcome focused and adopts a needs-based approach to enquiry (Johnson, Onwuegbuzie, & Turner, 2007) in which methods and approaches are adopted in whichever ways provide the best opportunities to find useful answers. This focus fits readily into a health field of research, which must be results-focused and evidence-based (O'Cathain, Murphy, & Nicholl, 2007).

4. How is the impulsive context of self-harm understood and explained by young people in general and in relation to a specific incidence of behaviour? Do the dimensions of impulsivity specified by the UPPS-P make sense to young people as an organisational framework for their own experiences? (Chapter 8).
5. Can we be sure that involving community-based young people in self-harm research is ethically sound? How have young people felt about taking part in this research? (Chapter 6).

3.7 Studies identified following the systematic review search

Post completion of the systematic search of papers (up to July 2015), four articles were identified which met the search criteria. (1) Riley and colleagues (Riley, Combs, Jordan, & Smith, 2015) considered if trait impulsivity (UPPS-P) predicted the onset and maintenance of NSSI nine months later in a university sample of women. They found that NUR predicted the onset of behaviour above and beyond other UPPS-P traits; and that lack of Perseverance predicted maintenance across the course of the study. (2) Garisch & Wilson (2015) found no evidence of a cross-sectional association between trait impulsivity (BIS-11) and NSSI in school-based adolescents. (3) Huang and colleagues (Huang, Liu, Tsai, Sun, Huang, Chiu et al., 2017) found a significant correlation between impulsivity (BIS-11) and self-harm in high school students in Taiwan. Gender modulated the relationship between impulsivity and self-harm, such that associations were particularly strong in boys. (4) You and colleagues (You, Deng, Lin, & Leung, 2016) examined the effects of impulsivity (UPPS-P) and negative emotion (anxiety, depression, stress) on level of NSSI and change in NSSI over one year in high school students in Hong Kong. Using latent growth curve analysis, they found that initial level of NUR was associated with initial level of NSSI; changes in NUR predicted changes in NSSI over time. In addition, among those with higher NUR or less Premeditation, higher negative emotion was associated with higher levels of NSSI.

Chapter 4: Impulsive pathways to adolescent self-harm: Cross-sectional findings from the SHIP-SHAPE school study

4.1 Overview of Chapter 4

The Systematic Literature Review in Chapter 3 revealed that trait “impulsivity” is a broad risk factor for lifetime self-harm in adolescence, but progress in understanding how impulsivity relates to such a complex mental health outcome has been hindered by conceptual and measurement disparities among studies. Research is now beginning to test associations between different self-harm outcomes and impulsivity using a measure that captures the multifaceted nature of the construct – the UPPS-P impulsivity scale. As such, the pattern and magnitude of associations between self-harm and impulsivity can be more accurately specified and compared between studies. However, examinations of unidimensional impulsivity facets and different self-harm outcomes within young community-based adolescents are currently missing from the research corpus. The SHIP-SHAPE school studies address this gap by collectively exploring the cross-sectional and prospective relationships between impulsivity dimensions and self-harm in young school-based adolescents. This chapter examines the cross-sectional relationship between UPPS-P dimensions and categories of self-harm thoughts and behaviour. It begins by reviewing the current status of knowledge about unidimensional impulsivity facets and specific self-harm outcomes (lifetime self-harm, the recency or frequency of self-harm, and transition from thoughts to act) in young adolescents and identifying areas in need of further study. It then presents Study 1.1 which provides novel data about the influence of impulsivity traits on these self-harm outcomes within a young school-based population.

4.2 Background

A growing body of research has utilised the organisational structure of the UPPS-P scale (Cyders & Smith, 2008; Whiteside & Lynam, 2001) to clarify the relationship between impulsivity and self-harm in adolescence. Cross-sectional findings to date have largely implicated cognitive- and emotion-based facets of UPPS-P impulsivity in adolescent self-harm (Arens et al., 2012; Dir et al., 2013; Glenn & Klonsky, 2010; Maxfield & Pepper, 2017; Mullins-Sweatt et al., 2013; Ogle &

Clements, 2008; Peterson et al., 2014; Rawlings et al., 2015; Riley et al., 2015; Taylor et al., 2012). Nonetheless, they indicate that NUR – or rash reactivity to emotion – is the trait most consistently associated with lifetime self-harm (Arens et al., 2012; Claes & Muehlenkamp, 2013; Dir et al., 2013; Glenn & Klonsky, 2010; Mullins-Sweatt et al., 2013; Ogle & Clements, 2008; Peterson & Fischer, 2012; Riley et al., 2015). On the strength of such findings, an associative relationship between lifetime self-harm and NUR is now established in late adolescent university-based samples. However, more work is needed to clarify this relationship in younger age groups.

4.2.1 Urgency and lifetime self-harm in early adolescence

Just one study from the Systematic Review in Chapter 3 (Claes & Muehlenkamp, 2013) examined trait-based impulsivity using the multidimensional UPPS-P measure in relation to self-harm in school-aged students (although ages ranged from 14-20 years.) The authors found that both NUR and PUR were significantly associated with lifetime self-harm across six specified behaviours (scratching, superficial self-cutting, severe self-cutting, hitting, burning and head-banging). No other UPPS-P facet was associated with any of these self-harm behaviours with the exception of LPM which was a correlate of severe self-cutting only (Claes & Muehlenkamp, 2013). In evidence published subsequent to the review, You and colleagues (2016) found that initial level of NUR (but not Premeditation) predicted level of NSSI in a large school sample (n=3453) aged 12-18 years. Additional school-based studies which identify impulsive risk pathways in younger adolescents (e.g. younger than 16 years of age) are crucial given (i) high and rapidly rising rates of self-harm in this group (Morgan et al., 2017), and (ii) that this is the developmental stage at which self-harm may first occur (Nock, 2010), or reach a peak (Moran et al., 2012). Moreover, evidence suggests that impulsivity facets may not be immutable traits, but may follow distinct patterns of change across adolescence (Littlefield et al., 2016). In particular, work examining the developmental stability of NUR, PUR and SS, has suggested that early to mid-adolescence marks a period in which levels of these traits are highest.

As a more recent subscale added to the UPPS model, PUR has been subject to less empirical scrutiny than NUR. Nevertheless, some studies have found an association between PUR and

lifetime self-harm in adolescence (Claes & Muehlenkamp, 2013) (Dir et al., 2013; Rawlings et al., 2015), although this association is not always demonstrated (Mullins-Sweatt et al., 2013). Urgency is theorised to increase an individual's vulnerability to engage in a rash and readily accessible behaviour (such as self-harm) in response to strong emotion in order to regulate heightened arousal (Smith & Cyders, 2016). As such, the mechanisms underpinning urgency parallel the widely supported affect-regulation function of self-harm (Chapman, 2006; Hamza & Willoughby, 2015; Klonsky, 2007; Linehan, 1993). Further clarification that urgency may prompt self-harm in response to both a negatively- and a positively-valenced affect state could have important theoretical and treatment-related implications, and may indicate that where affect-regulation driven mechanisms underlie impulsive self-harm they are served via both negative and positive reinforcement strategies. Broader findings have indicated that the nature of the affective change that results from self-harm is often unclear (Klonsky, 2007) and may relate to both the valence (positive or negative) and intensity of an emotion (Klonsky, 2009). Further clarification of the role of Positive Urgency in self-harm is therefore warranted.

4.2.2 Frequent and recent self-harm and the differential importance of non-affect-based impulsivity

Chapter 3 revealed that facets of impulsivity that are not driven by emotion appear to be differentially influential in self-harm outcomes when greater specificity beyond lifetime history is considered. Evidence was presented which found that facets relating to poor forethought and consideration of the consequences of actions (deficits in Premeditation), or difficulties remaining focused when tasks are boring or challenging (deficits in Perseverance), but *not* rash reactivity to negative emotion (NUR), had a positive relationship with the frequency of reported self-harm in University-based samples (Glenn & Klonsky, 2010). Those with greater impulsivity endorsed more frequent behaviour. For a contrary view, Dir et al (2013) found only NUR predicted self-harm frequency (Dir et al., 2013). A role for personality dispositions relating to low premeditation in frequent self-harm has been found in other studies. In a High School sample, Di Pierro and colleagues (2014) found that having low premeditation was a protective factor – i.e. more frequent self-harm was concurrently associated with less impulsivity, While not directly assessing

impulsivity, Lüdtke and colleagues (Ludtke, Weizenegger, Rauber, Contin, In-Albon, & Schmid, 2017) found in a community sample of adolescents aged mainly 14 years of age, that those who endorsed repetitive self-harm (more than 4 episodes per year) had lower levels of 'self-directedness' as measured by the Junior Temperament and Character Inventory (JTCI; Goth & Schmeck, 2009) than those endorsing occasional self-harm (less than 4 episodes per year). Self-directedness requires accounting for potential future consequences of present behaviour and acting in accordance with long-term goals, and may conceptually overlap with LPM. Assessment of self-harm frequency is important given that a history of multiple episodes of self-harm in adolescence is common in community and clinical presentations (Bjarehed et al., 2012; Hawton, 2012; Madge et al., 2008; Morgan et al., 2017; Zetterqvist et al., 2013) and could indicate a more severe risk profile. (See discussion Chapter 2, section 2.4). Adverse outcomes associated with self-harm – such as suicide – escalate with repetition of the behaviour, particularly in young girls (Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999; Zahl & Hawton, 2004). Research using latent class analysis in young adults (Klonsky & Olino, 2008) has identified distinct sub-groups of those who self-harm and suggests that low frequency self-harm is often coupled with fewer or less severe behaviours and fewer clinical symptoms. Hence, low frequency self-harm may be a qualitatively different phenomenon to frequently repeated behaviour (Klonsky & Olino, 2008) and thus display a distinct association with impulsivity traits. Furthermore, sub-group analyses have shown that younger adolescents (13-15 years) may be more likely than older adolescent groups to endorse a low frequency of self-harm behaviour (1-2 incidences) with few additional psychological difficulties (Bjarehed et al., 2012).

The Systematic Review in Chapter 3 found there was little evidence to support an association between adolescent self-harm and UPPS-P based SS i.e. the tendency to seek and pursue novel and thrilling sensations, disregarding the risk involved. However, this trait is consistently linked to the frequency of involvement in other risky behaviours in youth such as drinking and gambling (Smith et al., 2007). Given findings that SS peaks in early adolescence (around age 14-15 years) before declining by early adulthood (Harden & Tucker-Drob, 2011; Steinberg et al., 2008) it is possible that the influence of this trait may have been attenuated in the older adolescent

samples that constitute the bulk of investigation to date. Notably, Lüdtke and colleagues in their study of personality found that young adolescents endorsing repetitive self-harm were distinguished from controls by increased Novelty Seeking (on the JTCl) – which reflects exploratory activity and impulsive decision-making (Ludtke et al., 2017). More work is now needed to clarify if UPPS-P facets, and particularly non-affect based facets in light of the findings presented in this section, are implicated in the frequency of self-harm in younger age groups.

Although examinations of multidimensional impulsivity and time-related expressions of self-harm are lacking, there is some evidence to indicate that cognitive facets of impulsivity also distinguish between those who have engaged in self-harm in the past and those engaging in behaviour more recently. As referenced in Chapter 3, Glenn and Klonsky (2010) found that undergraduates endorsing self-harm in the past year were characterised by lower Perseverance (but not NUR) than those indicating no self-harm for over a year. They reasoned that increased LPS might indicate diminished ability to follow through with efforts to stop self-harming. However, no distinction in levels of Perseverance (or any other impulsivity facet) have been found among groups who have self-harmed in the past month (Taylor et al., 2012). Additional gradations somewhere between a past year or past month may better clarify the role of impulsivity in on-going versus past self-harm. Indeed, a finer grained analysis may be useful when considering the self-harm of young adolescents for whom behaviours may be just emerging or not long established. Comparison between self-harm profiles according to age could offer clinically-relevant benchmarks for risk assessment: comparable psychological profiles between young people who have never self-harmed or who have not self-harmed for over a year could indicate that impulsive risk has largely dissipated over this time period; establishing a distinct psychological risk profile for current (past month) behaviour, compared to less recent indications, could highlight important treatment targets. On the basis of limited findings to date, it is plausible that urgency facets may specify a general risk for any self-harm behaviour – regardless of when that self-harm occurred, but non-affect based UPPS-P facets may distinguish heightened risk profiles associated with more contemporaneous self-harm.

4.2.3 *The role of impulsivity in the translation of thoughts to action*

Community-based research has shown that more adolescents report thinking about self-harm than report self-harm acts (Madge et al., 2008) however little research to date has sought to clarify if factors associated with self-harm thoughts (ideation) differ from those associated with engagement in the behaviour. Notably, a recent meta-analysis of risk factors for suicide found that of the many factors that identified risk for suicide ideation and suicide behaviour, relatively few usefully distinguished between these outcomes (May & Klonsky, 2016). Identifying factors which distinguish behavioural enactment from ideation is an important component of delivering targeted prevention and treatment efforts for those at greatest risk, and has been identified as a critical focus for research in this field (Glenn & Nock, 2014; Klonsky & May, 2014).

As outlined in Chapter 2 (section 2.5.2) the Integrated Motivational-Volitional Model (O'Connor, 2011) proposes a role for impulsivity within an ideation-to-enaction framework for suicide and self-harm behaviour. According to the model, impulsivity is specified as a volitional moderator, increasing the risk that an individual will act on their self-harm thoughts. Tests of the model in school samples support this volitional role (O'Connor et al., 2012), that is, adolescents aged 15-16 years with thoughts only of self-harm and with self-harm behaviour were more impulsive than controls, but those who thought about self-harm were less impulsive than those who acted on their thoughts. However the magnitude of the effect was small (OR = 1.1, 95% CI 1.02-1.20) and no longer significant within multivariable analysis. Importantly, this study employed a broad measure of impulsivity, which did not assess distinct facets of the construct.

As discussed in Chapter 3, tests of the influence of impulsivity on adolescent self-harm within an ideation-to-enaction framework are needed which observe the multidimensional nature of impulsivity. Notably, consistent with the IMV model, evidence from suicide research in university and high-school populations using a short form of the UPPS-P model found that NUR characterised those with both suicide thoughts and attempts, but only LPM distinguished between them (Klonsky & May, 2010). Relatedly, in a psychiatric sample aged 13-19 years, Auerbach and colleagues tested a model of impulsivity which differentiated *impulsive thoughts in*

relation to negative emotion, from impulsive actions in response to emotion (Auerbach, Stewart, & Johnson, 2017). They found that the former was uniquely associated with suicidal thinking, but impulsive actions in response to emotion was uniquely associated with the occurrence of suicide attempts. To date, no study has directly tested the ideation-to-enaction framework as it applies specifically to early adolescent self-harm, using the UPPS-P model.

Given that symptoms of anxiety or depression and other affective states are robustly associated with self-harm (Guerry & Prinstein, 2010; Hankin & Abela, 2011; Hawton et al., 2002; Klonsky, Oltmanns, & Turkheimer, 2003; Moran et al., 2012; Morgan et al., 2017; You, Leung, Lai, & Fu, 2012) and individuals high in impulsivity traits also display elevated depressive and anxiety symptoms (Billieux, Gay, Rochat, & Van der Linden, 2010; Kämpfe-hargrave & Mitte, 2009; Pawluk & Koerner, 2016; Peluso, Hatch, Glahn, Monkul, Sanches, Najt et al., 2007), adjusting for the potential confounding effect of affective state on the relationship between impulsivity facets and self-harm is necessary to establish the unique contribution of impulsivity in pathways to self-harm. In particular, disentangling the influence of emotionality from the influence of urgency is essential to establish that it is the tendency to act while experiencing emotion and not the experience of that emotion per se that confers risk for self-harm. While some evidence suggests that NUR remains a significant predictor of self-harm over and above the influence of depressive and anxiety symptomatology or negative affect (Glenn & Klonsky, 2010) this is not always the case (Rawlings et al., 2015). No previous examinations have considered if the influence of PUR on self-harm in adolescence is fully accounted for by high positive affect. Similarly, disentangling rash action in response to emotion, from broader difficulties in the regulation and management of emotion will be important in establishing the specificity of emotion-based impulsivity in influencing self-harm.

4.3 Study aims and hypotheses

Research presented in this chapter aims to explore the following study questions:

1. Is there a relationship between impulsivity facets and self-reported history of self-harm in young adolescents?

2. Is there a relationship between the frequency of self-harm in young people, or how recently they have self-harmed, and unidimensional levels of impulsivity?
3. Are young people who think about self-harm less impulsive than those who act on their thoughts?

In light of the reviewed evidence, it is specifically hypothesised that:

1. Young people who report a history of self-harm will have greater levels of impulsivity facets, and in particular urgency facets, than those that do not, even after adjusting for other affect-relevant variables (Claes & Muehlenkamp, 2013; Rawlings et al., 2015).
2. Urgency facets will distinguish young people with any self-harm history (current/recent/historical) compared with those with no history of self-harm; among those who report self-harm, LPS will differentiate between historical/recent/current self-harm (Glenn & Klonsky, 2010).
3. Urgency facets will distinguish young people with any self-harm presentation (seldom, occasional, frequent) compared to those with no history of self-harm; LPM or LPS will differentiate between frequencies of self-harm (Di Pierro et al., 2014; Glenn & Klonsky, 2010).
4. Young people with self-harm thoughts-only or behavioural enactment will have greater levels of impulsivity compared to those who endorse neither thoughts nor acts; levels of dimensional impulsivity will differentiate between these groups (O'Connor et al., 2012).

4.4 Methods

4.4.1 Design

The study was a longitudinal, paper-based self-report survey - the SHIP SHAPE school survey (Self-Harm and ImPulsivity in School Aged young PEople) which captured data at two time points, 12 weeks apart (see Appendix B3). The short follow-up period was chosen to allow for natural changes in self-harm behaviour to occur (e.g. repetition/onset) while being sufficiently spaced in time to be accommodated within a dense school timetable. Moreover, short follow-up designs are under-represented in the self-harm/suicidality literature (Franklin, Ribeiro, Fox, Bentley,

Kleiman, Huang et al., 2017). Cross-sectional findings from Study 1.1 are reported in this chapter. Prospective findings from Study 1.2 are reported in Chapter 5.

4.4.2 Participants

Participants were recruited from three large secondary schools across the East Midlands from October 2016 until February 2017. Three schools were recruited, two based in city suburbs, and one in a semi-rural location. Eligibility for free school meals, based on OFSTED data of pupils in Key Stage 4, ranged from 6% to 22%. Students in Years 9 and/or 10 (aged 13-15 years) were recruited. These year groups were selected on theoretical and practical grounds as representing a developmental stage at which self-harm behaviours are likely to occur (Nock, 2010) but avoiding year groups with high academic burden. Originally, ethical approval was sought to recruit whole year groups to ensure that there was no suggestion of specific classes being selected. However, the practicalities of fitting data collection around the school curriculum meant that this universal year group approach was only possible in one school (which scheduled simultaneous data collection for all students). In the two remaining schools a number of classes from Years 9 and 10, selected on the basis of timetable availability, took part. For these schools, data collection took part over three consecutive days. The target sample size was 600, based on a self-harm prevalence of 17% (Muehlenkamp et al., 2012) and a minimum of 10 participants per parameter for regression models (Norman & Streiner, 2003).

Parents were sent an Information Sheet and a Consent form by electronic parent mail and asked to withdraw consent by a certain date if they did not want their child to participate. Opt-out parental consent is considered to bring the methodological and ethical advantage of reducing the risk of under-representation from minority groups or those most vulnerable (i.e. target groups) and is a common approach in the field of suicidology and school-based research (O'Connor, Rasmussen, & Hawton, 2009; Stallard et al., 2013). Parents were asked to discuss the Study Information Sheet with their child and to contact the researcher if they wanted to discuss the study further. Two parents got in touch (one by email, one by phone). School assemblies and tutor sessions were also conducted before data collection to inform students further about the

research. Reminder messages and an opportunity to withdraw consent were sent to parents one week ahead of data collection. At follow-up, all parents of children participating at baseline were sent a reminder opt-out consent form via electronic Parentmail one week before data collection. A total of 710 students were invited to take part. Parental consent was withdrawn for 18 students (2.5%). In addition, 46 students (6.5%) did not take part due to withdrawing assent (n=11), other school commitments, or absence. The total number of participants completing the survey at baseline was thus 646. Numbers were similar across schools (198:218:230). Ages ranged from 13-15 years (mean age = 13.5, SD= 0.61). The sample was 51% male, 46% female, with 3% not stating a gender. The majority (81%) identified their ethnicity as white. Of the baseline participants, 594 (92%) completed the follow-up survey. Average follow-up time was 12.1 weeks, SD=1.15. The retention rate compares favourably with other school-based longitudinal studies (Hasking, Tatnell, & Martin, 2015). Reasons for attrition (n=52) at follow-up included spoiled or missing codes from completed papers n=27 (52%); parent removed consent for follow-up n=3 (6%); and unspecified absence n=22 (42%). Distributions of gender (male 50%, female 47%, 3% unspecified) and ethnicity (white 84%) were similar at follow-up. Main analyses focus on those who participated at both time points (n=594) i.e. where longitudinal data was available (See Figure 4.1).

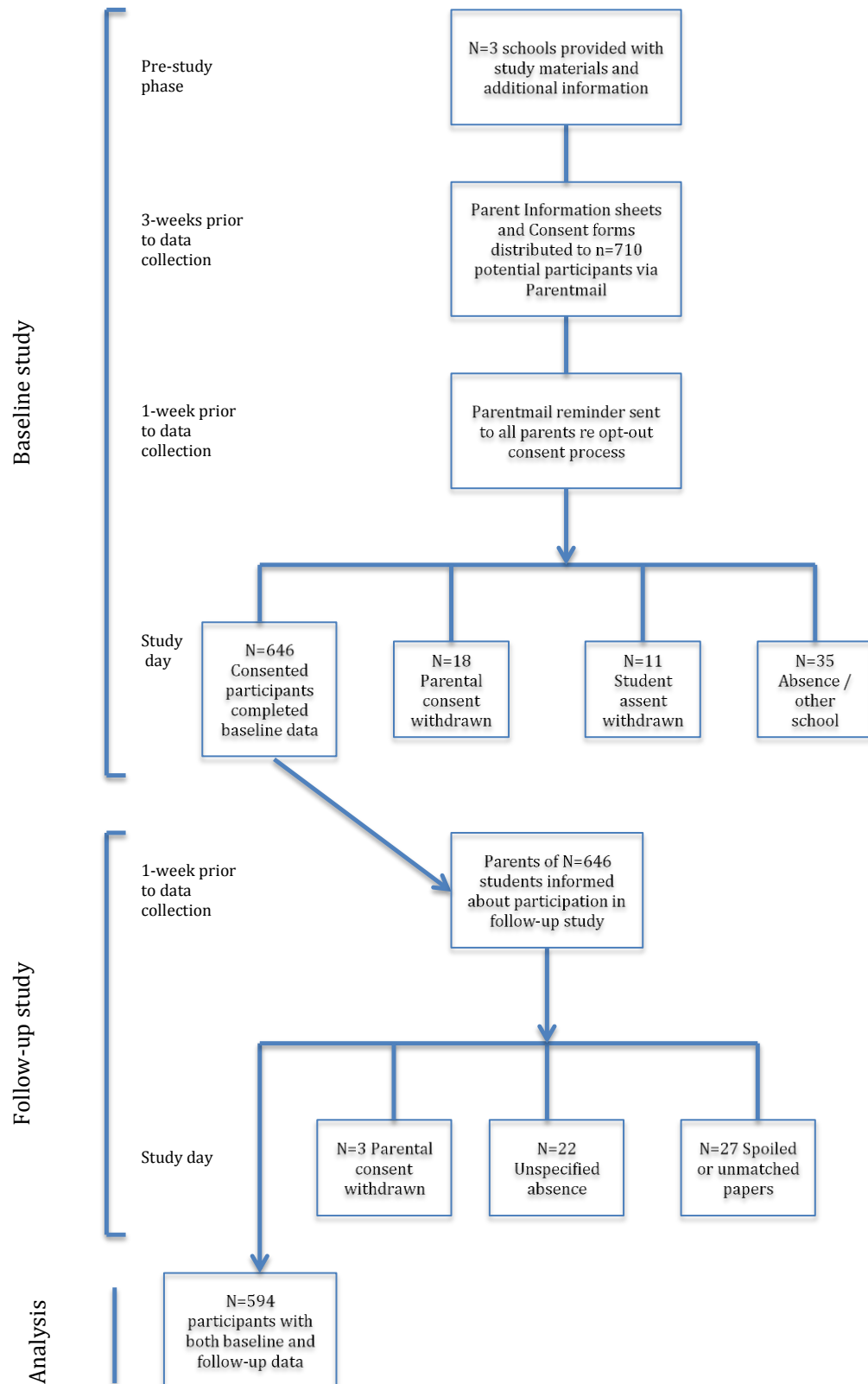


Figure 4.1. Flow diagram of the SHIP SHAPE study process and recruitment

4.4.3 Measures

The SHIP-SHAPE school survey is a paper-based questionnaire that captures demographic information (age, gender, and ethnicity) alongside psychological measures concerning impulsivity and mood, and questions about self-harm history and status. Measures comprised:

4.4.3.1 Pathways to Impulsivity

The UPPS-P scale (Cyders & Smith, 2008; Whiteside & Lynam, 2001) assesses five distinct personality-based traits that lead to impulsive behaviour (see Chapter 1, section 1.4). The UPPS-P is comprised of 59 items rated on a 4-point scale from 1 (agree strongly) to 4 (disagree strongly). Responses are not time-dependent, but refer to behaviour that occurs generally or within a particular context, e.g. “*When I feel rejected...*” The scale has demonstrated good internal consistency and reliability (Cyders & Smith, 2007; Smith et al., 2007; Zapolski, Stairs, Settles, Combs, & Smith, 2010). Given the length of the full UPPS-P scale, a brief version has been developed (Lynam, 2013) to reduce participant burden. The 20-item short form – SUPPS-P (Cyders et al., 2014) consists of four items per subscale. Items included are based on those with the highest item-total correlations on the original subscales (Cyders & Smith, 2007; Whiteside & Lynam, 2001). Tests of the SUPPS-P in adolescent samples have shown it to retain the psychometric properties of the full scale and to be a valid and reliable alternative to the full UPPS-P for non-clinical samples (Cyders et al., 2014). Based on an internal consistency criteria for Cronbach’s α of .6 - .7 =questionable; .7 - .8 =acceptable; .8 - .9 =good; .9 and above = excellent, (Hinkle, Wiersma, & Jurs, 2003), internal consistencies for baseline data were acceptable to good: NUR (.74); LPS (.74); LPM (.83); SS (.69); PUR (.82).

4.4.3.2 Difficulty regulating emotion

In order to be able to separate the influence of impulsivity facets - and in particular emotion-based impulsivity - on self-harm outcomes, from broader difficulties in managing and regulating emotion, items capturing a broad measure of emotion dysregulation were included in the survey. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a widely used 36 item self-report questionnaire designed to assess clinically relevant emotion dysregulation, but

also used to assess normative development. Responses are not time-dependent, but refer to behaviour that occurs generally, or within the context of distress, e.g. “*When I feel upset...*” DERS assesses emotion dysregulation across six domains: non-acceptance of emotional response; difficulties engaging in goal directed behaviour when experiencing negative emotion; difficulties controlling impulsive behaviour when distressed; (lack of) emotional awareness; (lack of) emotional clarity; and limited access to emotion regulation strategies perceived as effective. Item scores are summed to give a subscale score and Total score with higher scores indicating greater emotion dysregulation. The measure has demonstrated good reliability and validity with adolescent samples (Neumann, van Lier, Gratz, & Koot, 2010). The DERS-SF (Kaufman, Xia, Fosco, Yaptangco, Skidmore, & Crowell, 2015) is an 18 item short-form of the original scale which has been validated in adolescent and adult samples and demonstrates comparable or better psychometric properties than the original scale (Kaufman et al., 2015). In the present study internal consistency scores were good ($\alpha = .89$).

4.4.3.3 Recent Positive and Negative mood

The Positive Affect and Negative Affect Schedule-Short Form (I-PANAS-SF Thompson, 2007) was used to assess recent (past week) positive affect (PA) and negative affect (NA) at baseline and follow-up. The short form includes five items for each affect scale rated on a 5-point scale from 1=not at all to 5=extremely. Mood scores in each scale are summed to give a Total PA and Total NA score. The I-PANAS-SF is an internationally reliable and validated psychometric assessment of affect (Karim, 2011; Thompson, 2007). In the current study alphas at baseline were acceptable: NA ($\alpha = .78$); PA ($\alpha = .70$).

4.4.3.4 Recent depressive and anxiety symptomatology

Depressive and anxiety symptomatology experienced across the previous week was assessed with the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). The 14-item scale (7 depressive and 7 anxious items) has demonstrated good validity and reliability with adolescent samples in community settings (White, Leach, Sims, Atkinson, & Cottrell, 1999). Item scores from each subscale are summed with higher scores indicating increased symptomatology.

Internal consistency in the present study were good for anxiety ($\alpha = .83$) and acceptable for depression ($\alpha = .75$). Due to an administrative error at one school one item from each anxiety and depression scale was not captured at baseline. Hence analyses are based on 6 items for anxiety and 6 items for depression. Nevertheless the factor structure remained consistent with a two-factor solution (Zigmond & Snaith, 1983). Given that the study is not seeking a clinical cut-off score, the reduced number of items is considered adequate to capture elevated symptomatology. (Clinical levels of depressive and anxious symptomatology will not be examined in subsequent chapters in this thesis.)

4.4.3.5 Questions about self-harm behaviour

Self-harm thoughts and behaviour: Participants were provided with the following definition of self-harm based on NICE (National Institute for Health and Care Excellence) guidelines ((NICE), 2004) “Self-harm is hurting yourself on purpose such as cutting, hitting, biting, burning or self-poisoning such as swallowing too many pills or other dangerous substances, no matter what the reason. Self-harm is not hurting yourself by accident.” This definition recognises the dimensional structure of self-harmful behaviour (Orlando et al., 2015). Participants were asked to answer the following questions modified from the Lifestyle and Coping Questionnaire (LCQ; Madge et al., 2008)): “Have you ever seriously *thought* about trying to harm yourself on purpose in some way (e.g. cutting, hitting or swallowing things) but *not* actually done so?” and “Have you ever on purpose harmed yourself in some way (e.g. cutting, hitting, biting or swallowing things)?” The LCQ was developed for use in the Child and Adolescent Self-Harm in Europe (CASE) study (Madge et al., 2008) in which a standard methodology of recording self-harm was adopted across seven countries. A modified version of the LCQ has been used in other school-based studies (O’Connor et al., 2009).

Description of self-harm: Participants were asked to describe their self-harm behaviour: “Please describe what you did to harm yourself the last time.” This enabled classification of reported self-harm to be verified in accordance with CASE study definitions (Madge et al., 2008). In some cases young people chose not to provide an answer to this question, stating they preferred not to say,

or couldn't remember. All indications of self-harm were therefore accepted with or without a definition of behaviour. There were four exceptions in which young people indicated one-off behaviours that did not fit with the provided self-harm definition (smoking / restricting food / wobbling loose teeth / accidental injury).

Recency of self-harm: Participants were asked to indicate how recently they had last self-harmed by selecting from the following options: Over a year ago / in the last six months / in the last 2 months / in the last 4 weeks / Not relevant. These criteria were selected in line with previous studies identified in the Systematic Review (Chapter 3) which examined self-harm over lifetime and in more recent timeframes: past 6 months and past month behaviour (Glenn & Klonsky, 2010; Liu & Mustanski, 2012; Rawlings et al., 2015). Research has shown that young people are at increased risk for repeat self-harm in the immediate months following self-harm (Chitsabesan, Harrington, Harrington, & Tomenson, 2003). As such, additional weighting was given to recent timeframes (past 6 months, 2 months, 1 month) within the data collection.

Frequency of self-harm: Participants were asked to indicate how often they had self-harmed by selecting from the following options: Very often (More than 10 times) / Often (5-10 times) / Sometimes (3-5 times) / Rarely (1-2 times) / Never. These criteria were selected in line with previous research (Klonsky & Olino, 2008).

Reason for self-harm: An open response section asked young people to provide a reason for the last episode of self-harm: "The last time you harmed yourself, what was the reason?" Multiple specified options (eight possible answers) are provided in the CASE studies (Madge et al., 2008). An open response option was preferred in the present study to reduce participant burden.

Urge to act: Participants were asked to indicate the typical length of time between first having an urge to self-harm and completing the act. Response options were: Less than 10 minutes / 10-30 minutes / 30-60 minutes / 1-3 hours / 3-6 hours / 6-12 hours / more than one day / not relevant.

All participants were asked to provide an answer to the self-harm questions, even if this was to select or write “not relevant” as a response option. This approach ensured that all participants completed each section and sought to reduce the visible distinction during testing between those individuals with and without experience of self-harm. Due to school authority requests, the survey did not directly collect data on suicidal behaviour. To establish good relations with schools, additional help-seeking data were collected (see Appendix B3). The analysis of this data was used to inform local pastoral care provision, but did not form part of the thesis.

4.4.4 Procedure

Ethical approval was obtained from the Division of Psychiatry and Applied Psychology Research Ethics sub-committee at the University of Nottingham (see Appendix E1). On the day of the baseline study consented students were provided with an Information Sheet, assent form and envelope. Study procedures, rights of withdrawal and limits of confidentiality and anonymity were explained by the researcher (in person or by video) or by individual tutors according to a set script. Participants were instructed to generate a unique ID number and write this on their surveys. They were told that they would need to remember this at follow-up and instructed to create a memorable code based on their initials and date of birth. In order that surveys could be linked to a student if responses indicated concern for safety, students were asked to include their ID code on a named assent form and envelope, and to seal the form inside the envelope. Sealed envelopes and surveys were collected and stored separately. Students sat individually within class groups and were instructed not to discuss answers. Completion of the survey took 20-30 minutes. At the end of the survey all participants were provided with a resource sheet detailing sources of support. This information was verbally reinforced. Data collection took place during designated lesson time. Survey responses were scrutinised within 24 hours according to the study ethics protocol to determine any immediate risk. A subjective assessment was made by the researcher in the first instance on the basis of open indication of suicidality, or other disclosure of concern. In three instances (two at baseline and one at follow-up) this resulted in further discussion between the researcher and supervisory team. In a further two instances (one at

baseline and one at follow-up) a decision was made to breach anonymity and the designated school liaison was consulted. In these cases, specific survey answers were not disclosed.

4.4.5 Advisory Youth Panel

To ensure the SHIP-SHAPE school survey was intelligible and acceptable for young respondents all survey materials were trialled, piloted and modified with a youth advisory panel. The panel comprised young people aged 15 years with lived experience of self-harm. They completed the questionnaire and provided advice on the design, content and delivery of the survey in a school setting. The panel was recruited from voluntary service users of a local charity which supports people dealing with self-harm and suicidality. The young people were taking part in 10-week therapy programmes in which they were asked on a weekly basis about their self-harm. They understood that participation in the panel in no way related to their therapy. Each was provided with a £10 shopping voucher as a thank you for their time. The panel made three procedural recommendations:

Recommendation 1 *Ensure that students are not sitting too close to one another in class as this would impact on the likelihood of answering truthfully.* When probed, the concern was less about sharing information with a research team, and more about feeling uncomfortable being seen answering a question on self-harm by classmates. **Outcome:** Data collection was completed in “formal conditions” i.e. at separate desks where practicable. Furthermore, response options for self-harm items within the survey were altered to remove skip items so that all students were asked to indicate a response to each self-harm question even if it was to select the “not relevant” option. Originally, skip items were included to reduce burden on those who were not engaging in self-harm. Ensuring all participants had cause to be writing on each page of the survey reduced the visible distinction between those individuals completing sections on self-harm and those not.

Recommendation 2 *Reinforce to students that they can talk to someone at the beginning and end of the survey.* The panel felt that this message of available support was reassuring and should be reinforced from the start of the data collection process so that students could feel more

confident completing the survey. **Outcome:** Information about the support route in school (e.g. to pastoral care teams) and to outside agencies and organisations was provided verbally and via an A5 poster (see Appendix B2) to all students at the start of data collection.

Recommendation 3 *Emphasise to participants the need to engage with the doodle page.* The last page of the survey contained jokes, cute animal images, and doodle spaces. Participants were invited to engage with this page once they had completed the survey questions. This page aimed to recalibrate, or set back to neutral the mood of participants which may have been lowered as a result of engaging with the survey. Research has suggested that looking at cute images of baby animals may stimulate positive affect (Nittono, Fukushima, Yano, & Moriya, 2012) and mood elevation techniques have been employed within the self-harm literature (Arbuthnott, Lewis, & Bailey, 2015). The inclusion of positive mood induction tasks in research settings is ethically advocated for self-harm research (Lloyd-Richardson, Lewis, Whitlock, Rodham, & Schatten, 2015; Whitlock, Pietrusza, & Purington, 2013). **Outcome:** Participants were alerted to the doodle page at the start of data collection.

4.4.6 Data analysis

The IBM Statistical Package for the Social Sciences (SPSS) version 24.0 for Windows (SPSS, IBM) Descriptive statistics and group differences were calculated for lifetime self-harm, recency, frequency, and ideation to enactment analyses. As most continuous variables were not normally distributed (as indicated by Kolmogorov-Smirnov tests at $p < .05$), median scores and the interquartile range (IQR) were obtained for participant characteristics. Mann-Whitney U, and Kruskal-Wallis tests were used to calculate group differences. Spearman's Rho correlations were run to examine the relationship between continuous variables. Binary or multinomial logistic regression analyses were performed for each key question. Exploratory tests confirmed the suitability of the logistic regression approach. Specifically, multiple linear regression analysis tested whether there was a linear relationship between the continuous independent variables and the logit transformation of the dependent variable confirmed via the Box-Tidwell (1962) procedure (Box, 1962). Inspection of the correlation coefficients and Tolerance/VIF values

indicated that the data did not show multicollinearity e.g. no tolerance value less than .1, and no variance inflation factor (VIF) value greater than 10 (Menard, 1995). Outliers were removed for multivariable analyses. Although it has been recommended that variables failing to meet a univariable candidate inclusion level of $p = 0.15$ should be excluded from multivariable analyses in logistic regression (Bursac, Gauss, Williams, & Hosmer, 2008), alternative guidance has argued that univariable pre-filtering does not provide benefits when building multivariable models and may lead to overlooking adjustment variables important on theoretical grounds (Heinze, 2017; Sun, Shook, & Kay, 1996). Predictor variables were therefore not excluded from multivariable analyses on the basis of univariable non-significance. Missing Value Analysis revealed that missing data comprised less than 3% of the total data for each scale and was Missing Completely at Random (Little's MCAR test $\chi^2 = 228.376$, $p > .05$). Given low levels of missing values analyses proceeded with pairwise deletion. The modal age of respondents in this study was 13 years with ages ranging from 13-15 years. To account for the influence of age, Year Group (which remained stable across time points) was included as a categorical proxy for age in multivariable analyses.

To test the relationship between UPPS-P facets and lifetime self-harm, a series of univariable binary logistic regression analyses were performed with self-harm dichotomised into no self-harm (0) and self-harm (1). Mood-based factors (depressive and anxiety symptomatology, positive and negative affect) and emotion dysregulation were also examined. A multivariable model was estimated to test the independent predictive utility of variables. All UPPS-P variables, age and gender were entered in step one; mood-related covariates were included in step two to see if their inclusion attenuated the influence of impulsivity facets on lifetime self-harm.

To test the relationship between UPPS-P facets and the recency and frequency of self-harm a series of univariable and multivariable multinomial regressions were estimated. Recency was specified by four categories: never self-harm / past self-harm (more than a year ago) / recent self-harm (in the past 6 months) / current self-harm (in the past 4 weeks). Frequency was specified by four categories: (never self-harm / often self-harm (more than 10 times) / occasional

self-harm (up to 10 times) / seldom self-harm (1-2 times). Multivariable analyses adjusted for age and gender. In multivariable analyses UPPS-P facets were entered simultaneously.

To test if UPPS-P facets differentiate between self-harm thoughts compared to self-harm acts a series of univariable and multinomial logistic regression analyses were run. Given no specific hypothesis, all UPPS-P facets were entered simultaneously into the multivariable multinomial logistic regression model. Analyses adjusted for age, gender and other mood-related covariates.

4.5 Results

4.5.1 Descriptive and correlational analysis

4.5.1.1 Prevalence and frequency of self-harm thoughts and acts

A total of 23.6% of participants reported a lifetime history of self-harm. An additional 13.3% indicated having had thoughts about self-harming, but having never acted on those thoughts. Girls were over two times more likely to report lifetime self-harm than boys, but there was no statistical difference in the reporting of self-harm thoughts between genders (see table 4.1). Pairwise comparisons revealed that endorsement of self-harm thoughts and acts did not differ according to Year group, ethnicity, or school.

Table 4.1. Lifetime self-harm episodes and self-harm thoughts only in girls, boys and the total sample.

	N	N (%) yes/no	OR (95% CI)	sig
Self-harm episodes				
Total sample	594	137 (23.6)		
Girls	278	82 (29.4)	2.21 (1.48-3.31)	<.0001
Boys	299	48 (16.1)		
Self-harm thoughts				
Total sample	594	77(12.9)		
Girls	278	42(15.1)	1.52 (.92-2.48)	0.097
Boys	299	32 (10.7)		

Notes: OR = Odds ratio. Odds ratios show the change in odds for each increase in the outcome variable (self-harm acts/self-harm thoughts) associated with being female. Statistically significant differences are shown in bold.

Over half of those endorsing self-harm (58%) indicated 1-2 episodes. Fewer respondents indicated 3-5 episodes (26%) or 5-10 episodes (5%). More frequent behaviours (more than 10 incidences) were endorsed by 9% of participants. In terms of recency of behaviour, 42% of those who reported self-harm indicated that the episode had last occurred over a year ago; 38% said it was in the last six months; and 20% indicated that self-harm had occurred in the past 4 weeks.

4.5.1.2 Acting on the urge to self-harm

Around half of participants who reported self-harm (47.6%) indicated acting within 10 minutes of first having the urge to self-harm; 15.5% acted within 30 minutes; and a further 5.8% acted within an hour of first thinking of self-harm. Of the remaining respondents 12.6% thought of self-harm more than one day before self-harm occurred.

4.5.1.3 Methods and reason for last act of self-harm

In open responses young people indicated that self-cutting was the most common method of self-harm endorsed for their last incidence of self-harm (Table 4.2). Feelings of anger or annoyance were the most commonly endorsed reasons for self-harm (Table 4.3).

Table 4.2. Main methods for last incidence of self-harm

Method of self-harm	N (%)
Cutting	46 (40.7)
Hitting or punching self	24 (21.2)
Hitting or punching an object (e.g. wall)	14 (12.4)
Scratching self until bleeding	10 (8.8)
Biting self	9 (7.9)
Prefer not to say	7 (6.2)
Burning self	1 (0.8)
Don't know	1 (0.8)
Swallowing pills	1 (0.8)

Notes: Number of participants providing a response to this item = 113/137

Table 4.3. Main reasons for last incidence of self-harm

Reasons for self-harm	N (%)
Feeling angry or annoyed	32 (25.2)
Family arguments/problems	19 (14.9)
Friendship issues	14 (11.0)
Feeling bad or upset about something	12 (9.4)
Hating self / self-esteem issues	12 (9.4)
Issues at school / bullying	9 (7.1)
Feeling unwanted or worthless	9 (7.1)
Feeling sad or depressed	9 (7.1)
Don't know / can't remember	4 (3.1)
Curiosity	3 (2.4)
Illness of others / death of others	3 (2.4)
To help me think	1 (0.8)

Notes: No. of respondents providing a response to this item at baseline n=113/137
Some participants reported multiple reasons for self-harm

4.5.1.4 Correlational analysis of continuous variables

A Spearman's rank-order (r_s) correlation was run on baseline data to assess the relationship between continuous variables (see Table 4.4). There were small positive associations between both facets of impulsivity reflecting deficits in consciousness (LPM and LPS: $r_s=.21$) and both affect-based facets (NUR and PUR: $r_s=.49$)

Table 4.4. Correlation matrix showing the association between continuous study variables

	NUR base	LPS base	LPM base	SS Base	PUR base	DERS base	PA base	NA base	DEP base
Negative Urgency									
(lack of) Perseverance	-.10*								
(lack of) Premeditation	.35**	.21**							
Sensation-Seeking	-.09*	-.20**	.07						
Positive Urgency	.49**	-.06	.37**	.17**					
Emotion dysregulation	.57**	.10*	.38*	-.02	-.45*				
Positive affect	-.15*	-.26**	-.26**	.36**	.06	-.25**			
Negative affect	.45**	.02	.16**	-.05	.32**	.55**	-.13**		
Depressive symptoms	.38**	.05	.32**	-.08**	.29**	.53**	-.39**	.45**	
Anxious symptoms	.50**	-.15**	.03	-.01	.39**	.63**	-.17**	.65**	.53**

Notes: Significance: *p < .05 ** p < .01. The table presents Spearman rank-order correlation coefficients (r_s). Strength of association is indicated as (r_s .0 to .3) = little or no relationship; (</. .3 to .5) = weak relationship; (</. .5 to .7) = moderate relationship; (</. .7 to .9) = strong relationship. Difficulties in Emotion Regulation (DERS); Positive and Negative Affect (PANAS); NA (Negative Affect); DEP (Depressive symptoms)

4.5.1.5 Levels of impulsivity, and other covariates by self-harm status

Descriptive statistics were produced to compare median scores in impulsivity, emotion dysregulation, positive and negative affect and depressive and anxiety symptomatology for those with and without lifetime self-harm. Mann-Whitney U tests examined if differences in scores between groups were statistically significant (See Table 4.5). Results indicated that those with a lifetime history of self-harm were more impulsive as measured by NUR, PUR and LPM, but did not differ for SS or LPS. In addition, those endorsing self-harm had higher negative affect, emotion dysregulation, anxiety and depressive symptomatology, and lower positive affect than those without a history of self-harm.

Table 4.5. Descriptive statistics and Mann-Whitney U-tests examining differences between those with and without lifetime self-harm on UPPS facets and additional covariates.

	No self-harm		Self-harm		SH status difference
	<i>Median</i>	<i>IQR</i>	<i>Median</i>	<i>IQR</i>	<i>sig (eta²)</i>
Negative Urgency	8	4	11	4	<.0001(0.19)
(lack of) Perseverance	9	4	9	4	0.13
(lack of) Premeditation	8	3	10	4	<.0001 (0.07)
Sensation-Seeking	11	4	11	5	0.789
Positive Urgency	7	4	9	4	<.0001 (0.09)
Emotion dysregulation	36	13	53.5	21.75	<.0001 (0.22)
Positive affect	18	5	16.5	5	.008 (0.01)
Negative affect	11	4	15	6	<.0001 (0.19)
Depressive symptoms	3	3	5	4.38	<.0001 (0.12)
Anxious symptoms	5	3	10	6	<.0001 (0.22)

Notes: Significant variables which survive Bonferroni corrections ($p < .004$) and are shown in bold. $\eta^2 = z^2 / \sqrt{n}$

4.6 Key research questions

4.6.1 Question 1: Is impulsivity associated with lifetime history of self-harm?

Univariable logistic regression analyses revealed that three UPPS subscales (NUR, PUR and LPM) were related to increased risk of lifetime self-harm. Risk of self-harm increased by 64.4% for each one unit rise in NUR; and by 33.5% and 29.0% respectively with unit rises in PUR and LPM. In addition, those who self-harmed had higher levels of depressive and anxiety symptomatology, emotion dysregulation, and negative affect, and lower positive affect compared to those without a history of self-harm. Girls were more than two times more likely to endorse self-harm than boys (see Table 4.6).

Table 4.6. Univariable binomial logistic regression of the association between UPPS-P facets additional covariates and lifetime self-harm

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	0.497	0.051	94.978	1.644	1.487 - 1.816	<.0001
(lack of) Perseverance	-0.061	0.039	2.434	0.941	.872 - 1.016	0.119
(lack of) Premeditation	0.254	0.041	37.857	1.290	1.189 - 1.399	<.0001
Sensation-Seeking	0.013	0.036	0.136	1.013	.945 - 1.087	0.712
Positive Urgency	0.289	0.039	55.321	1.335	1.237 - 1.440	<.0001
Emotion dysregulation	0.105	0.01	105.097	1.111	1.089 - 1.134	<.0001
Positive affect	-0.073	0.027	7.200	0.930	.881 - .981	0.007
Negative affect	0.357	0.037	93.798	1.429	1.329 - 1.536	<.0001
Depressive symptoms	0.341	0.042	66.871	1.406	1.296 - 1.526	<.0001
Anxiety symptoms	0.383	0.037	105.768	1.466	1.363 - 1.578	<.0001
Gender	0.795	0.206	14.907	2.215	1.479-3.316	<.0001
Age	-0.303	0.206	2.173	0.739	.494-1.105	0.140

Note: Odds Ratios (OR) represent the increase in likelihood of reporting lifetime self-harm relative to no self-harm per one unit rise in predictor variable. Gender reference category = Boys. Numbers in bold remain significant after adjusting for multiple analyses at $p < .005$.

The individual predictive utility of UPPS-P variables was established using multivariable logistic regression models. In the first block, UPPS-P facets, age and gender were investigated. The model was significant $\chi^2(7) 135.629 p < .0001$, and explained 35.5% of the variance in self-harm history (Nagelkerke r^2). Three impulsivity facets (NUR, PUR and LPM) and gender were independently associated with a lifetime history of self-harm. A second model was specified in which mood-related variables were included to see if this led to attenuation in the influence of UPPS-P facets. This model was a good fit for the data (Hosmer and Lemeshow, $p = 0.80$) and Nagelkerke r^2 increased to 46.5%. Full model details are shown in Table 4.7. NUR retained the strongest significant predictive contribution, adjusting for all other variables. Each unit increase in NUR increased the odds of reporting lifetime self-harm compared to never having self-harmed by 27.8%. Those with a lifetime history of self-harm were not differentiated from those without by any other impulsivity facet, however they did report significantly higher anxiety symptomatology and levels of emotion dysregulation. A further multivariable logistic regression model was estimated in which interactions (by gender, by impulsivity) were included in a third step. None were significant and change in Nagelkerke r^2 was negligible (0.3%).

Table 4.7. Multivariable binomial logistic regression of the association between UPPS-P facets, additional covariates and lifetime self-harm

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
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Negative Urgency	0.246	0.065	14.12	1.278	1.125-1.453	<.0001
(lack of) Perseverance	-.015	0.06	0.066	0.985	0.878-1.110	0.979
(lack of) Premeditation	0.085	0.062	1.877	1.090	0.964-1.230	0.169
Sensation-Seeking	0.016	0.056	0.083	1.016	0.917-1.14	0.774
Positive Urgency	0.055	0.055	1.009	1.057	0.954-1.182	0.315
Emotion dysregulation	0.034	0.015	4.909	1.038	1.004-1.066	0.016
Positive affect	0.082	0.05	2.611	1.084	0.983-1.198	0.115
Negative affect	0.098	0.057	2.983	1.102	0.987-1.233	0.088
Depressive symptoms	0.064	0.069	0.876	1.070	0.932-1.221	0.329
Anxiety symptoms	0.132	0.059	5.082	1.134	1.017-1.280	0.032
Gender	0.190	0.299	0.406	1.210	.674-2.172	0.524
Age	-.348	0.297	1.366	0.706	.394-1.265	0.242

Note: OR represents the increase in likelihood of reporting lifetime self-harm relative to no self-harm per one-unit rise in predictor variable adjusting for the effects of other variables. Gender: reference category = Boys. Numbers in bold remain significant after adjusting for multiple analyses at $p < .004$.

Additional multivariable analyses were conducted separately for boys and girls. Among the boys, those who endorsed self-harm had significantly higher NUR (OR=1.292, 95% CI 1.045-1.597, $p=.018$) and negative affect (OR=1.22, 95% CI, 1.012-1.472, $p=.037$). Among the girls, an incremental rise in NUR (OR=1.223, 95% CI 1.031-1.452, $p=.021$) and emotion dysregulation (OR=1.052, 95% CI 1.010-1.096, $p=.015$) was associated with self-harm.

In sum: Young adolescents who self-harm are best characterised by a tendency to rash action in the face of heightened negative emotion. This conclusion is reinforced by consistent findings across boys and girls. More broadly, higher levels of anxiety and difficulties regulating emotions may increase risk for lifetime self-harm in school-aged youth.

4.6.2 Question 2: Is impulsivity associated with the recency of self-harm behaviour?

Kruskal-Wallis and Man-Whitney U tests revealed that self-harm groups (Historical – over a year ago, Recent – in the last 6 months, Current – in the last 4 weeks, No self-harm) statistically differed on four facets of impulsivity (NUR, PUR, LPM and SS) as shown in Table 4.8.

Table 4.8. Descriptive statistics and non-parametric tests examining differences between self-harm groups according to recency of self-harm on UPPS-P facets

	Never (N) (n=431)		Historical (H) (n=62)		Recent (R) (n=52)		Current (C) (n=28)		KW χ^2 (sig)	Pairwise comparisons sig (r ²)*
	M	IQR	M	IQR	M	IQR	M	IQR		
Negative Urgency	8	4	10	3	11	2	12.5	3	116.888 (<.0001)	R>H p=.001 (.09); C>H p=.036 (.05)
(lack of) Perseverance	9	4	9	3	8	4	9	3	.468 (.926)	
(lack of) Premeditation	8	3	9	3	10	4	11	4	43.413 (<.0001)	R>H p=.009 (.06); C>H p=.034 (.05)
Sensation-Seeking	11	4	11	4.75	10	3.25	13	5	4.732 (.192)	C>R p=.036 (.05)
Positive Urgency	7	4	8	4	9	4	9	3	63.084 (<.0001)	R>H p=.001 (.08)

Notes: M (Median) IQR (Interquartile range). Historical= more than a year ago; Recent = within the past 6 months Current = in the past 4 weeks. Kruskal-Wallis (KW) tests the difference between distributions of scores across all groups using the χ^2 statistic. Man-Whitney U tests (MWU) test pairwise comparisons between groups. *All comparisons between Never self-harm and Historical/Recent/Current were significant at p<.0001 for NUR, LPM and PUR.

Simple univariable analyses indicated that all UPPS-P facets were significantly associated with at least one comparison of the outcome variable with the exception of LPS (Table 4.9). Higher NUR and PUR predicted increased risk of historical, recent and current self-harm relative to no self-harm. Individuals high in NUR and PUR were also more likely to endorse recent (past 6 months) over historical (over a year ago) self-harm, but only the influence of PUR retained significance following corrections for multiple analyses. However, neither NUR nor PUR differentiated between current (past 4 weeks) and historical self-harm, or between the two most recent categories of behaviour (past 4 weeks vs past 6 months). By contrast, LPM was associated with a 23.2% increase in likelihood of endorsing recent self-harm and a 28.0% increased risk of endorsing past month self-harm, relative to historical self-harm. SS was the only variable to differentiate between recent and current self-harm.

In the multivariable multinomial logistic regression, higher NUR retained an independent association with increased risk of self-harm across all categories of recency relative to no self-harm with more recent behaviour demonstrating a stronger risk. Higher PUR also increased the risk of recent versus no self-harm by 25.3%. However, neither urgency facet differentiated

between endorsed categories of self-harm recency. Within the multivariable model, LPM retained its independent utility, significantly increasing the risk of current relative to historical self-harm (by 25%) per one-unit rise; as did SS, which increased the risk of current relative to recent self-harm (by 12.3%). However, neither comparison of LPM or SS survived Bonferroni adjustment (Table 4.10).

In sum: NUR not only distinguishes those who do and do not endorse self-harm behaviour from those who do, but demonstrates a 'dose response' effect with more recent expressions of self-harm characterised by higher NUR scores. However, facets relating to planning and forethought and rash sensation seeking offer greater discrimination than urgency facets when distinguishing between recent and current behaviour.

Table 4.9. Univariable multinomial logistic regression of the association between self-harm recency and UPPS facets.

	Historical v Never SH			Recent v Never SH			Current v Never SH			Recent v Historical SH			Current v Historical SH			Current v Recent SH		
	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	1.436	1.269 – 1.615	<.0001	1.837	1.536 – 2.132	<.0001	1.775	1.473 – 2.139	<.0001	1.279	1.083 – 1.510	0.004	1.181	.962 – 1.451	0.111	1.035	.839 – 1.276	0.750
(lack of) Perseverance	0.986	.889 – 1.093	0.787	0.978	.873 – 1.095	0.694	0.973	.837 – 1.131	0.725	0.992	0.858 – 1.146	0.523	0.987	.829 – 1.176	0.886	1.004	0.838 – 1.204	1.204
(lack of) Premeditation	1.139	1.021 – 1.270	0.020	1.403	1.246 – 1.579	<.0001	1.404	1.206 – 1.636	<.0001	1.232	1.063 – 1.427	0.005	1.280	1.070 – 1.534	0.007	0.999	.838 – 1.190	0.989
Sensation-Seeking	1.000	.908 – 1.102	0.992	1.082	.971 – 1.206	0.155	0.888	0.770 – 1.025	0.104	1.081	0.943 – 1.240	0.263	0.888	0.753 – 1.048	0.159	1.218	1.024 – 1.448	0.025
Positive Urgency	1.208	1.093 – 1.334	<.0001	1.517	1.352 – 1.701	<.0001	1.312	1.138 – 1.512	<.0001	1.256	1.092 – 1.439	0.001	1.087	0.924 – 1.277	0.318	1.156	0.978 – 1.367	0.089

Notes: Bold numbers survive Bonferroni correction at ($p < .001$). SH = self-harm.

Table 4.10. Multivariable multinomial logistic regression of the association between self-harm recency and UPPS facets (adjusting for age and gender).

	Historical v Never SH			Recent v Never SH			Current v Never SH			Recent v Historical SH			Current v Historical SH			Current v Recent SH		
	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig
Negative Urgency	1.391	1.215–1.594	<.0001	1.552	1.304–1.848	<.0001	1.575	1.262–1.967	<.0001	1.116	.915–1.360	0.279	1.132	.890–1.441	0.312	0.985	.766–1.268	0.909
(lack of) Perseverance	1.026	.910–1.158	0.674	0.938	.806–1.092	0.410	0.982	.793–1.170	0.703	0.914	.767–1.090	0.317	0.938	.757–1.163	0.560	0.974	.780–1.217	0.818
(lack of) Premeditation	1.020	.895–1.163	0.762	1.220	1.260–1.607	0.011	1.275	1.051–1.548	0.014	1.195	.999–1.431	0.052	1.250	1.007–1.551	0.043	0.956	.768–1.190	0.690
Sensation-Seeking	0.995	.891–1.111	0.933	1.067	.929–1.225	0.359	0.857	.721–1.018	0.078	1.072	.914–1.258	0.395	0.861	.711–1.041	0.123	1.245	1.020–1.520	0.031
Positive Urgency	1.048	.929–1.181	0.447	1.253	1.089–1.441	0.002	1.089	.906–1.310	0.365	1.196	.925–1.406	0.060	1.039	.849–1.272	0.708	1.151	.937–1.413	0.180

Notes: Model diagnostics: $\chi^2 (21) 161.769, p<.0001$, Nagelkerke =32.9% Bold numbers survive Bonferroni correction at ($p<.007$). SH = self-harm. Never self-harm (n=407); Historical self-harm (n=57); Recent self-harm (n=46); Current self-harm (n=23).

4.6.3 Question 3: Is impulsivity associated with the frequency of self-harm?

Kruskal-Wallis and Man-Whitney U tests revealed that self-harm groups [never], [seldom – one to two incidences of self-harm], [sometimes –up to 10 incidences of self-harm] and [often – more than 10 incidences] statistically differed from each other on all facets of impulsivity (Table 4.11).

Table 4.11. Descriptive statistics and non-parametric tests examining differences between self-harm groups according to frequency of self-harm on UPPS-P facets

	Never (N) (n=427)		Seldom (SL) (n=91)		Sometimes (SM) (n=46)		Often (O) (n=14)		KW χ^2 (sig)	Pairwise comparisons sig (r ²)*
	M	IQR	M	IQR	M	IQR	M	IQR		
Negative Urgency	8	4	11	3	11	4	12.5	5.25	72.769 (<.0001)	SM>SL p=.001 (.01); O>SL p=.042 (.04)
(lack of) Perseverance	9	4	9	4.5	8	3.75	9	3	.713 (.870)	O>SM p=.046 (.03)
(lack of) Premeditation	8	3	9	3	10	4	11	4	29.691 (<.0001)	SM>SL p=.009 (.02)
Sensation-Seeking	11	4	11	4	10	4.5	13	4.75	.398 (.941)	O>SM p=.05 (.06)
Positive Urgency	7	4	9	5	9	3	9	3.5	45.181 (<.0001)	

Notes: M (Median score) IQR (Interquartile range). Seldom= 1-2 times; Sometimes = up to 10 times
Often = more than 10 times. Kruskal-Wallis (KW) tests the difference between distributions of scores across all groups using the χ^2 statistic. Man-Whitney U tests (MWU) test pairwise comparisons between groups. *All pairwise comparisons between Never self-harm and Seldom/Sometimes/Often were significant at p<.01 for NUR, LPM and PUR.

Univariable multinomial logistic regression analyses revealed that all impulsivity facets were significantly associated with at least one comparison of the outcome variable at p<.05 (Table 4.12). Relative to never having self-harmed, increases in NUR, PUR and LPM were all associated with increased odds of seldom, sometimes and often endorsing self-harm. A one-unit rise in NUR increased the risk of endorsing more than 10 incidences of self-harm by 98.9%. An increase in LPS lowered the risk of endorsing sometimes vs never self-harm by 16%. Among those who self-harm, two impulsivity facets differentiated between categories of frequency. A one-unit rise in LPM increased the risk of often (>10 times) vs seldom (1-2 times) by 28.8%. A one-unit rise in SS increased the risk of often vs sometimes self-harm by 28.1%. In multivariable multinomial logistic regression (Table 4.13) only PUR failed to make a significant contribution to the model. NUR retained an independent association with each category of frequency relative to no self-harm.

With each one-unit rise in NUR the likelihood of reporting seldom, sometimes or often self-harm (compared to no self-harm) increased by 36.3%, 44.4% and 93.3% respectively, significant at $p < .0001$. In addition, LPS retained a protective influence, reducing the risk of endorsing sometimes self-harm (up to 10 episodes) compared with no self-harm by 20.9% ($p < .05$). Interestingly, LPS also distinguished between those who often self-harm and those who sometimes self-harm – *reducing* the risk of up to 10 episodes relative to only 1-2 episodes by 21.8%. Two UPPS facets (NUR, and LPM) independently differentiated between the most frequent and the least frequent categories of endorsed self-harm at $p < .05$ with increased odds of 41.8% and 39.2% for more frequent behaviour with each one-unit rise. An increase in SS increased the odds of often compared to sometimes self-harm by 37%.

In sum: Urgency levels are highest in those with more frequent self-harm. However, once behaviour is initiated its frequency may be better explained by facets of impulsivity which are less to do with emotion and more to do with difficulties in thinking through the consequences of behaviour, or the tendency to seek out novel experiences. The tendency to give up when situations are challenging may protect those who do self-harm from engaging in more frequent behaviour.

Table 4.12 Univariable multinomial logistic regression of the association between self-harm frequency and UPPS facets

	Seldom v Never			Sometimes v Never			Often v Never			Sometimes v Seldom			Often v Seldom			Often v Sometimes		
	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	1.459	1.318- 1.616	<.0001	1.622	1.410- 1.867	<.0001	1.989	1.529- 2.588	<.0001	1.112	.956- 1.293	0.170	1.363	1.045 - 1.777	0.022	1.169	.881 - 1.552	0.280
(lack of) Perseverance	0.993	.909 - 1.084	0.867	0.861	.759 - .978	0.021	0.972	.784 - 1.204	0.796	0.868	.750- 1.004	0.056	0.980	.782 - 1.228	0.980	1.129	.885 - 1.439	0.329
(lack of) Premeditation	1.173	1.069 - 1.286	0.001	1.338	1.184 - 1.512	0.001	1.510	1.227 - 1.859	<.0001	1.141	.994 - 1.310	0.061	1.288	1.037 - 1.599	0.022	1.129	.899 - 1.416	0.296
Sensation-Seeking	1.026	.944 - 1.114	0.550	0.962	.860 - 1.075	0.491	1.232	0.999 - 1.519	0.051	0.938	.823 - 1.068	0.332	1.201	.964 - 1.497	0.102	1.281	1.015 - 1.617	0.037
Positive Urgency	1.251	1.150 - 1.361	<.0001	1.312	1.174 - 1.465	<.0001	1.267	1.049 - 1.529	0.014	1.048	.926 - 1.187	0.455	1.013	.832 - 1.233	0.900	0.966	.784 - 1.190	0.745

Note: Bold numbers survive Bonferroni correction at ($p < .01$).

Table 4.13. Multivariable multinomial logistic regression of the association between self-harm frequency and UPPS facets

	Seldom v Never			Sometimes v Never			Often v Never			Sometimes v Seldom			Often v Seldom			Often v Sometimes		
	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig
Negative Urgency	1.363	1.211 – 1.534	<.0001	1.444	1.219 – 1.711	<.0001	1.933	1.378 – 2.713	<.0001	1.059	.881 – 1.273	0.255	1.418	1.006 – 2.001	0.046	1.339	.938 – 1.912	0.108
(lack of) Perseverance	1.006	.905 – 1.119	0.906	0.827	.706 – .968	0.018	0.863	.638 – 1.167	0.339	0.821	.692 – .975	0.025	0.858	.630 – 1.167	0.329	1.044	.757 – 1.441	0.793
(lack of) Premeditation	1.042	.930 – 1.167	0.477	1.226	1.047 – 1.434	0.011	1.450	1.096 – 1.920	0.009	1.176	.991 – 1.397	0.064	1.392	1.004 – 1.856	0.024	1.183	.878 – 1.595	0.269
Sensation-Seeking	1.000	.909 – 1.099	0.995	0.952	.830 – 1.092	0.421	1.304	.983 – 1.729	0.065	0.952	.820 – 1.106	0.522	1.304	.979 – 1.737	0.069	1.370	.1.017 – 1.845	0.038
Positive Urgency	1.079	.973 – 1.196	0.149	1.123	.975 – 1.294	0.108	0.931	.708 – 1.224	0.608	1.041	.893 – 1.213	0.607	0.863	.652 – 1.141	0.301	0.829	.619 – 1.109	0.206

Note: Bold numbers survive Bonferroni correction at ($p < .007$). SH = self-harm. Model diagnostics: $\chi^2(21) 148.534, p < .0001$. Nagelkerke = 30.5%.
Never self-harm (n=403); Seldom self-harm (n=83); Sometimes self-harm (n=40); Often self-harm (n=12)

4.6.4 Question 4: Are those who enact self-harm more impulsive than those who have only thought about self-harm (people with ideation)?

Kruskal Wallis tests were run to examine if self-harm groups (no self-harm or ideation; self-harm ideation only; self-harm enactment) differed in levels of impulsivity facets and other covariates. Group differences were found for all variables with the exception of LPS and SS. Mann-Whitney U tests were conducted to examine where the differences lay (Table 4.14).

Univariable logistic regression analyses examined the influence of UPPS-P facets, and additional variables, on self-harm status adjusting for age and gender (See Table 4.15). Three UPPS facets (NUR, LPM and PUR) were predictive of both self-harm ideation and self-harm enactment relative to no self-harm or ideation and demonstrated a 'dose response' effect with greater severity of outcome associated with the highest odds. Those thinking about self-harm and those acting on those thoughts were also characterised by increased depressive and anxiety symptomatology, negative affect and difficulties regulating emotion, relative to those with no self-harm/ideation history, with odds again highest in those endorsing behavioural enactment. NUR, LPM and PUR differentiated between self-harm ideation and enactment, with a unit rise increasing the risk of enactment relative to ideation by 34.7%, 18.0% and 20.9%, respectively. In addition, emotion dysregulation, anxiety symptomatology and negative affect differentiated between those with thoughts only of self-harm and those with behavioural enactment.

UPPS-P variables were then entered into the multivariable multinomial logistic regression model to see if they retained an independent predictive utility over and above other covariates (Table 4.16). No impulsivity facets predicted self-harm ideation. A one-unit rise in NUR increased the odds of self-harm enactment by a third relative to no self-harm/ideation. NUR was the only variable that differentiated between those with thoughts-only and those with behavioural enactment, increasing the odds of self-harm enactment by 17.2% per one-unit rise.

In sum: Those who enacted self-harm were best distinguished from those who have thought about self-harm but not acted on those thoughts by NUR. This association holds in multivariable analyses adjusting for the influence of other impulsivity facets, and mood and anxiety-related correlates.

Table 4.14. Descriptive statistics and non-parametric tests examining differences between self-harm ideation, self-harm behaviour enactment and those with no history of self-harm ideation or enactment

	No SH (N)		Ideation (I)		Enactment (E)			
	<i>median</i>	<i>IQR</i>	<i>median</i>	<i>IQR</i>	<i>median</i>	<i>IQR</i>	<i>KW χ^2(sig)</i>	<i>Pairwise comparisons I>N E>N I>E sig(r2)</i>
Negative Urgency	8	3	9	3	11	2	135.127 (<.0001)	I>N p<.0001 (.06) E>N p<.0001 (.25) E>I p<.0001(.25)
(lack of) Perseverance	10	3.75	8	4	9	4	3.200 (.202)	
(lack of) Premeditation	8	3	9	2	10	4	46.123 (<.0001)	I>N p=.007 (.02) E>N p<.0001 (.08) E>I p=.002 (.08)
Sensation-Seeking	11	4.5	11	2	11	5	2.604 (.272)	
Positive Urgency	6	3	8	4	9	4	61.226 (<.0001)	I>N p=.004 (.02) E>N p<.0001 (.12) E>I p=.001 (.12)
Emotion Dysregulation	35.5	12	44	16	53.5	21.75	153.878 (<.0001)	I>N p<.0001 (.08) E>N p<.0001 (.28) E>I p<.0001 (.28)
Positive Affect	18	5	17	5	16.5	5	8.485 (<.0001)	E<N p=.005 (.02)
Negative Affect	11	4	13	4	15	6	139.595 (<.0001)	I>N p<.0001 (.08) E>N p<.0001 (.25) E>I p<.0001(.25)
Depressive symptoms	2	3	4	3	5	4.38	96.091 (<.0001)	I>N p<.0001 (.07) E>N p<.0001 (.16) E>I p=.015 (.16)
Anxious symptoms	5	4	7	4	10	6	150.108 (<.0001)	I>N p<.0001 (.06) E>N p<.0001 (.28) E>I p<.0001(.28)

Note: SH = self-harm. Kruskal-Wallis (KW) tests the difference between the distributions of scores for the three groups (Ideation, Enactment, No self-harm/ideation) using the χ^2 statistic. The Mann-Whitney U (MWU) tests pairwise comparisons between these groups.

Table 4.15. Univariable multinomial logistic regression of the association between UPPS facets, additional covariates and three categories

	Ideation vs no self-harm/ideation			Enactment vs no self-harm/ideation			Enactment vs Ideation		
	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	1.301	1.171-1.447	<.0001	1.753	1.576-1.949	<.0001	1.347	1.189 – 1.525	<.0001
(lack of) Perseverance	0.972	0.883-1.070	0.557	0.932	0.859-1.011	0.935	0.963	0.862 – 1.074	0.963
(lack of) Premeditation	1.117	1.009-1.235	0.033	1.318	1.211-1.434	<.0001	1.180	1.054 – 1.322	0.004
Sensation-Seeking	1.073	0.980-1.176	0.058	1.028	0.957-1.105	0.452	0.958	0.864 – 1.062	0.413
Positive Urgency	1.135	1.033-1.248	0.008	1.380	1.270-1.501	<.0001	1.209	1.088 - 1.342	<.0001
Emotion Dysregulation	1.073	1.047-1.099	<.0001	1.135	1.109-1.161	<.0001	1.058	1.033 - 1.084	<.0001
Positive Affect	0.962	0.898-1.030	0.263	0.926	0.877-0.978	0.006	0.963	0.892 – 1.040	0.335
Negative Affect	1.290	1.185-1.405	<.0001	1.543	1.422-1.674	<.0001	1.196	1.096 – 1.305	<.0001
Depressive symptoms	1.333	1.202-1.479	<.0001	1.509	1.378-1.652	<.0001	1.132	1.022 – 1.252	0.017
Anxious symptoms	1.270	1.167-1.381	<.0001	1.569	1.446-1.701	<.0001	1.236	1.131 - 1.349	<.0001

Note: Numbers in bold retain significance after correcting for multiple analyses ($p < .005$).

Table 4.16. Multivariable multinomial logistic regression of the association between UPPS facets, additional covariates and three categories

	Ideation vs no self-harm/ideation			Enactment vs no self-harm/ideation			Enactment vs Ideation		
	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	1.135	.993 -1.298	0.063	1.331	1.161 - 1.525	<.0001	1.172	1.003 – 1.369	0.045
(lack of) Perseverance	0.995	.880 – 1.125	0.936	0.987	.871- 1.118	0.836	0.992	.860 - 1.144	0.911
(lack of) Premeditation	1.026	.896 - 1.175	0.711	1.107	.970 – 1.263	0.132	1.079	.931 – 1.251	0.314
Sensation-Seeking	1.112	.989 – 1.250	0.075	1.062	.945 – 1.193	0.311	0.955	.834 - 1.093	0.501
Positive Urgency	0.963	.850 – 1.084	0.509	1.045	.932 – 1.172	0.453	1.088	.954 – 1.242	0.208
Emotion Dysregulation	1.022	.989 - 1.057	0.195	1.043	1.010 – 1.078	0.011	1.021	.984 – 1.058	0.283
Positive Affect	1.023	.925 -1.133	0.657	1.095	.985 – 1.217	0.093	1.072	.950 -1.205	0.264
Negative Affect	1.151	1.025 – 1.292	0.017	1.174	1.043 – 1.322	0.008	1.023	.894 - 1.165	0.765
Depressive symptoms	1.230	1.061 – 1.426	0.006	1.151	1.052 - 1.323	0.058	0.935	.798 – 1.095	0.404
Anxious symptoms	0.989	.873 – 1.120	0.865	1.129	.999 - 1.275	0.052	1.141	.993 - 1.310	0.062

Notes: Ideation only (n=70), self-harm enactment (n=117) and no-self-harm (n=328). Model diagnostics: $\chi^2 (24) 247.853$, $p<.0001$. Nagelkerke = 46%. Numbers in bold retain significance after correcting for multiple analyses ($p<.004$). Analyses adjust for age and gender

4.7 Discussion

Study 1.1 investigated cross-sectional associations between unidimensional facets of impulsivity and self-harm in adolescents aged 13-15 years old. The results identify a clear differential relationship between dimensions of impulsivity and self-harm when examining lifetime, recent or frequent history and self-harm enactment relative to self-harm ideation, even when adjusting for other affect-relevant variables. This is the first examination of multidimensional impulsivity and such outcomes in a young school-based population and the findings extend the literature in important and novel ways.

Results from the four key questions were broadly in line with hypotheses. Three facets of impulsivity were associated with lifetime self-harm: NUR, PUR and LPM, but as predicted, the magnitude of effect was strongest for NUR. Results support the broad pattern of findings in other school-based examinations (Claes & Muehlenkamp, 2013; You et al., 2016). Given that both urgency facets were incrementally associated with self-harm in univariable analysis, this suggests that, at a broad level, rash reactivity to an intense emotion, however valenced, may increase the risk of self-harm. The facet of PUR is a late addition to the UPPS-P model (Cyders & Smith, 2008) with mixed evidence of an association with adolescent self-harm reported in the few examinations to date (Claes & Muehlenkamp, 2013; Dir et al., 2013; Lengel, DeShong, & Mullins-Sweatt, 2015; Mullins-Sweatt et al., 2013; Rawlings et al., 2015). The present findings suggest that considering reactivity to heightened positive state may be important when modelling risk for self-harm in some young people.

Of note, NUR and PUR were moderately correlated in this sample ($r=.49$) suggesting that they are conceptually separable. It has been suggested that PUR may relate to self-harm via cognitive dissonance – “I do not deserve to be happy therefore I will self-harm” (Claes & Muehlenkamp, 2013). Qualitative examinations may offer a clearer picture of potential mechanisms underpinning this relationship. Those endorsing lifetime self-harm were also distinguished by higher LPM as previously reported in studies using the UPPS (Arens et al., 2012; Dir et al., 2013; Glenn & Klonsky, 2010; Mullins-Sweatt et al., 2013; Taylor et al., 2012) and those adopting other

measures of impulsivity which primarily tap into low Premeditation (Di Pierro et al., 2014; Garisch & Wilson, 2015; Liang et al., 2014; Rodav et al., 2014). As such, the tendency to act quickly without planning and without thinking about the long-term consequences of action, or perhaps having a high tolerance for any negative consequences that result from such actions (Berg et al., 2015), may contribute to self-harm in youth. However, consistent with other findings (Arens et al., 2012; Dir et al., 2013; Glenn & Klonsky, 2010; Mullins-Sweatt et al., 2013; Taylor et al., 2012), LPM was no longer a significant factor in multivariable analysis, suggesting that low deliberation and planning alone is not a specific enough marker to identify broad self-harm risk. In fact, only the relationship between NUR and self-harm remained robust when adjusting for the influence of other impulsivity facets, anxious and depressive symptomatology, current level of affect and broad emotion dysregulation. This applied to analysis across gender. These findings, consistent with evidence in older adolescent groups, provide strong confirmation that elevated urgency may contribute to self-harm behaviour in younger adolescent groups.

The present findings are helpful in clarifying a role for impulsivity within functional accounts of self-harm which suggest that individuals act based on a need to relieve or reduce unbearable emotional states (Chapman, 2006; Klonsky, 2007; Nock & Prinstein, 2004). The role of urgency in this behavioural pattern, is outlined by Urgency Theory (Cyders & Smith, 2008) which suggests that heightened reactions to overwhelming emotion can lead to a narrowed focus on the immediate affective stimulus. This results in a loss of the necessary executive control required to make decisions in line with long-term interests, and thus an increased likelihood of acting rashly to relieve the affective tension. Importantly, susceptibility to self-harm as specified by Urgency Theory thus derives from a dual emotion + cognitive deficit pathway: it is reactivity to emotion, and poor cognitive management of that reaction, which leads to rash, adverse outcomes.

Notably, emotional dysregulation (as measured by the DERS) and anxiety symptoms were also significant multivariable factors in the present findings – reinforcing that emotion and difficulties in the management of emotion set the context for self-harm risk. Given present findings, further research should consider positive reinforcement models (which underlie PUR) as well as negative reinforcement models (which underlie NUR) in understanding the continued motivation to act

upon that affective tension. According to the present data, in addition to anxiety, affective states which relate to anger/annoyance are likely to be important targets when working with younger adolescents given that the majority of young people described anger and annoyance as their motivation for self-harm (Table 4.3).

In terms of the recency of self-harm, we found partial support for our hypotheses. Unsurprisingly, given robust lifetime self-harm findings, young people with any history of self-harm (historical/recent/current) self-reported more impulsivity than those without. NUR had the strongest independent association with self-harm across all categories of recency relative to no self-harm - was also significantly associated - which suggests that individuals characterised by rash reactivity to emotion are at increased risk of self-harm (compared to those who are not high in urgency) regardless of when that history of self-harm has taken place. That both urgency facets distinguished between self-harm that occurred in the past 6 months and self-harm that occurred more than a year ago is a potentially novel finding and indicates that urgency is not just a broad marker of self-harm risk, but contributes additional incremental information about heightened risk i.e. more proximal behaviour. However, this effect did not hold in multivariable analyses.

In fact, the multivariable model clarified that emotion-based pathways are less informative than other facets in signalling current risk profiles. When all facets were considered together, LPM differentiated between those who have self-harmed over the past month, compared to those who have not self-harmed for over a year. LPM indicates a reduced cognitive capability to plan ahead and foresee the negative consequences of behaviour, or perhaps to let awareness of those consequences inhibit behaviour. As such, it is intuitive that among those who have experienced the urge to self-harm, those low in Premeditation would be less likely to resist that urge, and those high in Premeditation more able to do so. Evidence of a proximal role for “impulsivity” has also been revealed in studies employing different methodologies. Using sequence analysis techniques to examine factors relating to self-harm, Townsend and colleagues showed that adolescents identified impulsivity (identified by the item “I did it on impulse, without planning”)

as the only proximal factor immediately preceding the first ever and most recent episode of self-harm (Townsend et al., 2016) . Although this is a broad categorisation of impulsivity, this description nonetheless reflects the notion that self-harm is not a premeditated act.

Contrary to previous findings (Glenn & Klonsky, 2010) LPS was not an important facet differentiating among categories of self-harm recency. Low perseverance reflects cognitive difficulties maintaining focus on a course of action and links between self-harm and deficits in perseverance in older adolescent groups are theorised to relate to difficulties in carrying out alternative strategies or stopping self-harm, which thus maintain the behaviour. Empirical work with university samples has supported this function for LPS (Riley et al., 2015). Arguably in a younger adolescent sample for whom self-harm behaviour is still becoming established, facets relating to the cessation of behaviour may not yet be influential factors. Longitudinal work with younger samples is needed to tease out any potential maintenance role for this trait in those who self-harm, although present findings might tentatively indicate that this would not be the case.

It is interesting that high SS distinguished between recent and current self-harm in univariable and multivariable analyses. The Systematic Review in Chapter 3 found little evidence of a role for SS in self-harm, although Liu & Mustanski (2012) found that cutting behaviour in the past 6 months was associated with increased SS as measured by the BSSS in an LGBT sample. SS, which reflects a drive for new and thrilling experience and a tolerance for risk, could arguably be differentially important in younger adolescence for whom levels of SS may be developmentally high (Steinberg et al., 2008). It is also possible that the influence of SS has been attenuated in previous examinations that have only examined lifetime episodes.

In terms of the frequency of self-harm, support was found for hypotheses. All facets of impulsivity were significant in differentiating between aspects of self-harm frequency relative to no self-harm. A broad ‘dose-response’ effect was found, with lower levels of impulsivity across facets in those indicating seldom self-harming (1-2 incidences of behaviour) compared to those

with more frequent self-harm. In line with expectations, LPM distinguished between categories of self-harm frequency. Those endorsing the highest frequency of behaviour (more than 10 incidences) were characterised by poor cognitive capabilities of reflection and forethought, compared to those endorsing 1-2 incidences of behaviour. Notably, deficits in Premeditation could also relate to high tolerance for negative outcomes (Berg et al 2015). Under this conception, it may also be argued that young people may assess the negative consequences of self-harm, but judge these as insufficient to deter enactment. The present results are potentially useful in supporting and extending previous findings (Glenn & Klonsky, 2010) to a young school-based sample and underline that failure to distinguish between frequency of self-harm risks obfuscating clinically and practically important information about the role of impulsivity in self-harm. In line with previous findings (Dir et al., 2013) the data revealed that among those who self-harm, pathways towards more frequent behaviour may be driven by NUR. However, NUR only distinguished between the most frequent and the least frequent behaviours, which potentially reinforces the conception that those who self-harm infrequently are close in impulsive profile to individuals who have never self-harmed, but psychologically distinct from those endorsing frequent behaviour (Klonsky & Olino, 2008; Stanford & Jones, 2009) and hence distinguished by a broad predictor (NUR). Small group sizes and multiple comparisons means that caution must be applied to these findings.

In addition, the data present some novel findings. Contrary to previous findings (Glenn & Klonsky, 2010) here LPS *reduced* the risk of endorsing more frequent self-harm i.e. it had a protective influence, which held in multivariable analysis. It could be speculated that difficulties staying on task in the face of challenge which could be problematic in some situations, are protective in the case of self-harm because they result in difficulties maintaining a course of action (self-harm). Alternatively, LPS may relate to insufficient reinforcement processes (Berg et al., 2015). Hence, those low in Perseverance may derive an ineffective stimulus response from the act of self-harm, which prompts the abandonment of the behaviour. SS was the only dimension of impulsivity to differentiate between the two severest categories of outcome, which strengthens the conclusion that SS is a potentially useful dimension of impulsivity in understanding the processes underlying

heightened risk among young adolescents who self-harm. As noted earlier, links between SS and frequent engagement in risky behaviours (drinking/gambling) are evident in the wider literature (Smith et al., 2007). SS may reflect a strong sensitivity to the possibility of reward (Berg et al., 2015) and hence those who derive positive benefit from self-harm engagement may be more susceptible to positive reinforcement from this behaviour, which could drive increased frequency.

In terms of the final hypothesis, the findings suggest that those who endorse self-harm behaviour may be best distinguished from those who have thought about self-harm but not acted on those thoughts, in terms of rash behaviour when experiencing strong and particularly negative emotions and difficulties planning and thinking through the consequences of actions. These findings are important on a number of levels. Firstly, they provide empirical support for the theorised role of impulsivity as a volitional moderator in the IMV model of self-harm (O'Connor, 2011). As specified by the model, this study tests the prediction that those who think about self-harm and those who act on thoughts will differ from those with no self-harm history on levels of impulsivity (they did); but that these groups would also differ from each other on levels of impulsivity (this was also the case). Thus, these data extend earlier findings (O'Connor et al., 2012) that impulsivity is a 'volitional moderator' in the translation of self-harm thoughts to acts to a sample of youth at an earlier developmental stage. Secondly, by testing the ideation to enactment framework model with the multidimensional UPPS-P measure, the present findings are able to pinpoint the pathway via which impulsivity may contribute to behavioural enactment. Previous findings (in suicide research with High School and university students) have suggested those with ideation and those with enactment are distinguished from controls on levels of NUR, but that LPM is the only UPPS-P facet to distinguish between these groups (Klonsky & May, 2010). The present findings indicate that three facets of impulsivity are important at a univariable level in distinguishing between self-harm ideation and enactment (both urgency facets and LPM) but a direct pathway between impulsivity and behavioural enactment may only exist for NUR, albeit with a small effect size. Of note, those with enactment were also distinguished from those with ideation by higher anxiety and depressive symptoms, negative affect, and emotion

dysregulation, although none of these factors retained significance in the multivariable model. Thirdly, the multivariable model pointed to a distinct psychological profile for those with ideation only which is characterised by depressive symptoms and low affect, compared to the profile of those indicating behavioural enactment which is better characterised by NUR, difficulties regulating emotion, and anxious symptoms. Hence feeling sad and low may cause young people to contemplate self-harm, but in and of themselves these factors may carry little risk of escalation. By contrast, feeling low, feeling anxious and having difficulties managing and regulating those emotions, may heighten the risk of tipping young people over into action.

It is important to note that reported rates of self-harm thoughts of 12.9% were lower than the rates of self-harm acts of 23.6% (see Table 4.1). This finding is not consistent with other community based studies which have shown that greater numbers of respondents typically endorse thinking about self-harm than go on to enact self-harm (Madge et al., 2008; O'Connor et al., 2014; Stallard et al., 2013). Given that our rate of ideation is similar to other school-based samples (e.g. O'Connor et al., 2012) this discrepancy may relate to greater endorsement of self-harm acts in this sample, rather than lower rates of ideation. Rates of self-harm in our study (between 23% and 28% over the two time points) are slightly higher than have been reported in some large community studies (Hawton et al., 2002; O'Connor et al., 2014; O'Connor, Rasmussen, Miles, et al., 2009; Stallard et al., 2013) although higher rates have been found in other young school-based samples (Bjarehed et al., 2012; Garisch & Wilson, 2015; Lundh, 2007). This may reflect the flexible acceptance criteria for self-harm in the present study i.e. this study did not require a description of self-harm to corroborate endorsement. (Seventeen per cent of respondents indicating self-harm at baseline and 13% at follow-up chose not to provide a description of their self-harm.) It could also be the case that our findings represent a true picture of highly prevalent self-harm in early adolescence, and that if young people have a thought of self-harm they are likely to act upon it. Additionally, young people may have been uncertain about what constitutes a self-harm thought. Notably, other community studies with older adolescents have reported low prevalence of ideation relative to enactment (Nielsen, Sayal & Townsend, 2017).

4.7.1 Strengths, limitations and next steps

These findings should be considered in the context of some limitations. As a cross-sectional study the temporal dynamics and causal connections between the variables cannot be inferred. Given evidence that cross-sectional correlates of behaviour are not necessarily robust predictors of future behaviour (Glenn & Klonsky, 2010) a next step is to examine the association between UPPS-P facets and self-harm outcomes using a prospective design. In particular, longitudinal examinations would allow for temporal dynamics in the life-course of self-harm such as first onset of behaviour – a development of particular relevance in young samples – to be examined. In addition, while evidence presented here illuminates the role of impulsivity in the transition of thought to act and provides important support for models such as the IMV (O'Connor, 2011), prospective examination will provide a robust test of theorised relationships.

In addition, this study was based entirely on self-report. Thus the possibility of bias associated with poor recall, or difficulties understanding concepts cannot be ruled out. It is also possible that completion of the survey in communal settings (even when completed individually under silent conditions) may have led to an under- or even over-reporting of self-harm endorsement. Steps were taken to minimise differences between respondents with and without self-harm histories during data collection (i.e. requiring all participants to record a response to each question). Examination of the influence of impulsivity on the course and expression of self-harm using additional methods of enquiry (e.g. such as face to face interviews which allow for the clarification of questions or responses) would strengthen and extend present conclusions.

Given that the study focused on the natural occurrence of self-harm with a community sample there were unequal and small group sizes for some analyses (e.g. categories of recency and frequency), which may have led to an underestimation of effects. Caution must be applied to these findings given multiple comparisons and small group sizes. In addition, no significant variable in the current analyses displayed more than a small effect size, and multivariable models accounted for only around 40-50% of the variance in self-harm, suggesting a substantial amount of variance remained unidentified. Thus significant findings must be recognised as a small

component of a complex pattern of predictors. The categories of recency included in the survey aimed to parsimoniously capture current, recent and past histories of behaviour or no behaviour at all. Categories were chosen which reflected those employed in previous research (e.g. Rawlings et al., 2015; Glenn & Klonsky, 2011) weighted towards more recent and potentially clinically relevant time frames. Nonetheless, important information may have been missed by the failure to capture self-harm occurring between 6-12 months. Furthermore, in terms of the collection of demographic information, the inclusion of only three specified options (male; female; prefer not to say) potentially represented too narrow and prescriptive a range of gender options which may have compromised the validity of responses offered and clouded important dimensions of variation in the data.

The present findings suggest that the brief version of the UPPS-P scale is sufficiently specified to detect distinct correlates of influence. Importantly, the adoption of this brief measure may be easily incorporated into assessments of risk in young samples with little time burden.

Nonetheless, while the psychometric properties of the short-form measures used in the present study are well established, the full version of this scale may have provided a more detailed picture of associations. Notably, the present study used a reduced number of items from the HADS scale, which may have limited the sensitivity of this measure. In addition, the measures included in the study captured data across different time frames i.e. general or context specific behaviour (SUPPS-P; DERS) as well as past week behaviour (HADS; PANAS). This temporal inconsistency may call into question the validity of the present findings.

Notwithstanding these limitations, the present study has a number of key strengths. Adopting a multidimensional measure of impulsivity enabled a meaningful examination of the unique effects of separate impulsive pathways in the pattern of self-harm behaviour in youth. As such, findings from this study can be interpreted in the context of a growing body of literature now employing the UPPS-P measure of impulsivity to understand the relationship between impulsivity and maladaptive behaviour in youth. This work contributes to theoretical understanding of self-harm. It supports theoretical models of self-harm/suicide identified in Chapter 2, which draw on

emotion regulation as a risk for self-harm and can accommodate the transaction between impulsivity and a broad emotion/cognitive context (CEM-NSSI), and which set out the role of impulsivity in increasing risk of a self-harm act (IMV). The findings indicate that a short, quick to administer multidimensional impulsivity measure can help to identify high-risk profiles (more frequent, more recent behaviour, likelihood of progressing from thought to act in youth as young as 13). Hence, the work described in this chapter offers clinical and treatment targets.

KEY POINTS from this chapter

- (1) Young people who by the age of 15 have a history of self-harm report more impulsivity than those who do not – and this impulsivity relates largely to how they respond to strong (predominantly negative) emotion. Among those with a history of self-harm, NUR – rash reactivity in response to negative mood - increased risk for more frequent self-harm, and recent (past 6 month) relative to past (over a year ago) self-harm.
- (2) Elevated NUR also distinguished between those who think about self-harm and those with self-harm enactment.
- (3) However, rash behaviour in response to emotion in itself is insufficient in explaining the full context of risk for young adolescents. Cognitive-deficit models which relate to poor planning and forethought may characterise those with more frequent or more recent behaviour; while having an increased likelihood of giving up in the face of difficulty may lower the risk of high frequency self-harm. Finally, a drive for risk-taking and novel experience may be a pertinent pathway towards more frequent self-harm in younger age groups.

Implications for the next chapters

- (1) Prospective examinations of SUPPS-P facets and self-harm in adolescence are required to consolidate the predictive utility of unidimensional impulsivity facets in self-harm (Chapter 5).
- (2) Extending evidence for the role of impulsivity in self-harm to an older adolescent sample would support the relevance and utility of the SUPPS-P across developmental stages (Chapter 7).

Chapter 5: Impulsive pathways to adolescent self-harm: Short-term (12-week) prospective findings from the SHIP-SHAPE school study

5.1 Overview

Findings from the cross-sectional analysis of the SHIP-SHAPE school data in Study 1.1 revealed that separate unidimensional facets of impulsivity had differential relationships with different aspects of self-harm (lifetime behaviour, recency and frequency of self-harm, self-harm ideation relative to self-harm enactment). Findings revealed that those who self-harm (relative to those who do not) are best characterised by emotion-based dimensions of impulsivity and these facets may be considered broad indicators of self-harm risk, but non-affect based dimensions are important in differentiating more nuanced patterns of behaviour among those with a history of self-harm. However, prospective examinations which can clarify the temporal relations between SUPPS-P facets and self-harm outcomes in young people are needed to support and extend these findings. This chapter will first review the limited evidence from prospective studies which examine the influence of impulsivity on self-harm, before presenting findings from Study 1.2 which prospectively examined the SHIP-SHAPE school study dataset.

5.2 Background

5.2.1 The developmental course of self-harm

Research suggests that self-harm typically starts in early adolescence at around 12-14 years, increases to a peak at around 14-16 years, and thereafter tends to decline through late adolescence/emerging adulthood (Moran et al., 2012; Morey, 2016; Nixon, Cloutier, & Jansson, 2008; Nock, 2010; Plener, Schumacher, Munz, & Groschwitz, 2015). As such, adolescence represents a crucial target period for research aiming to clarify mechanisms underpinning temporal dimensions in self-harm such as first emergence, continued or escalated engagement, and the start of remittance/cessation. Establishing the factors associated with the onset, maintenance and remittance of self-harm are important in enabling specific targets for prevention and intervention to be established. The directional nature of any association between factors and outcomes can only be identified by means of longitudinal examination. Nonetheless,

cross-sectional evidence can provide useful candidate pathways for theoretically grounded examinations.

5.2.2 Proposed roles for impulsivity in the developmental course of self-harm from cross-sectional data

Findings from Chapter 4 converged with previous evidence across adolescent groups (Arens et al., 2012; Claes & Muehlenkamp, 2013; Dir et al., 2013; Glenn & Klonsky, 2010; Mullins-Sweatt et al., 2013; Ogle & Clements, 2008; Peterson et al., 2014) to indicate that, compared with those with no history of self-harm, school-based adolescents with a lifetime history are best characterised by urgency facets, in particular NUR or rash reactivity to negative affect. Moreover, the relationship between NUR and self-harm exists over and above the influence of other emotion-related covariates (Arens et al., 2012; Glenn & Klonsky, 2010, 2011). Yet, the cross-sectional findings also indicated that a differential relationship between affect-based and non-affect based facets of impulsivity operated when time-related self-harm outcomes were considered. In multivariable analyses, Urgency facets were consistent predictors of any engagement of self-harm: historical (over a year ago), recent (in the past six months) or current (in the past 4 weeks) relative to no self-harm. However, among those with a history of self-harm, LPM and SS were the only facets to offer further predictive utility in identifying the recency of that behaviour i.e. they differentiated between more recent presentations and past presentations of risk. Tentatively then, these data indicated that a broad non-time specific risk for engagement in self-harm may be associated with urgency facets, but a heightened risk-profile (current on-going risk) may relate to non-affect based processes, specifically deficits in deliberation, and SS.

In line with broader affect-regulation models of NSSI (Chapman, 2006; Klonsky, 2009), NUR is theorised to operate as part of an affect-regulation strategy, in which rash impulsive acts provide immediate relief or distraction from heightened emotional arousal (Cyders & Smith, 2008). Hence heightened NUR – above all other facets of impulsivity – could indicate a vulnerability to *initial engagement* in self-harm. The first onset of a number of problem behaviours in youth

which may operate within a negative reinforcement affect-regulation cycle, such as problem drinking, eating disorders, smoking, drug use, or gambling, are predicted by NUR (Pearson, Combs, Zapolski, et al., 2012; Settles et al., 2014; Smith & Cyders, 2016). Evidence presented in Chapter 4 that urgency is associated with lifetime self-harm, all frequencies of self-harm, and ideation and enactment is consistent with this broad risk pattern.

At the same time, however, it has been argued that NUR could also contribute to continued engagement in self-harm, maintained via negative reinforcement (Glenn & Klonsky, 2010). Consistently, the SHIP-SHAPE cross-sectional data revealed that levels of urgency were highest in those with more recent presentations of self-harm. Yet, emotion-based pathways to impulsive behaviour were less informative than non-emotion based pathways in signalling current and recent risk among those with a history of self-harm. Arguably, processes relating to affect-regulation may alter, or become less critical, in maintained behaviour over long periods of time. This fits with articulated hypotheses (Glenn & Klonsky, 2010; Riley et al., 2015; Taylor et al., 2012) that once self-harm is established, non-affect based facets of impulsivity may have a role to play in the persistence of the behaviour. According to the findings of Study 1.1, difficulties in premeditation may relate to the maintenance of behaviour over the short-term for young adolescents. Di Pierro and colleagues (2014) found that high schools students low in premeditation had greater difficulty regulating their negative affect following an episode of self-harm than those who revealed higher levels of premeditation. Specifically, young people who experienced increased negative high arousal states (anxiety, anger, nervousness) were less likely to find that these states reduced, and positive arousal states increased, following an act of self-harm, if they reported difficulties with deliberation and thinking through the consequences of action. Arguably then, LPM may contribute to the persistence of self-harm via interference in (and thus the failure of) affect-regulation processes, which could again perpetuate the self-harm cycle.

Interestingly, contrary to the findings of Glenn & Klonsky (2010) data examined in Study 1.1 found no association between LPS and current versus past self-harm. Glenn & Klonsky (2012)

proposed that individuals with established self-harm who are low in Perseverance may find it hard to rationally resist the urge to self-harm or follow through with replacement strategies, hence contributing to the maintenance of behaviour over time. Unfortunately, the dearth of research which has empirically tested how unidimensional facets of impulsivity are prospectively associated with temporal dynamics in self-harm (first onset, maintenance or remittance) makes it difficult to clarify or confirm these conflicting positions.

The SHIP-SHAPE cross-sectional data also indicated that those with the most recent presentation of self-harm had an increased tendency to seek out novel and thrilling experiences without due regard to the risk involved (SS). Notably, the SS pathway to self-harm has largely been uninfluential in previous examinations of adolescent self-harm using the UPPS-P (Hamza et al., 2015; Lockwood et al., 2017). This is not always the case however, for example moderate correlations between SS and self-harm have been reported in university students (Glenn & Klonsky, 2010). Notably, Liu and Mustanski (2012) found that SS prospectively predicted self-harm in a sample of LGBT youth aged 16-20 years, over and above the influence of non-affect based impulsivity as measured by the Barratt Impulsivity Scale (BIS-11; Patton et al., 1995). SS, though also a relatively rarely endorsed function of self-harm identified in a review of both clinical and non-clinical adolescent and adult populations (Klonsky, 2007), was nonetheless endorsed by 13% of one community-based sample of youth aged mainly 15 years who indicated that they self-harm “for fun”, and other research has similarly shown that young people endorse engagement in NSSI for “excitement” (Nixon, Cloutier, & Aggarwal, 2002). Increased risk-taking in adolescence is viewed as a normative and adaptive process (Steinberg, 2008) and evidence suggests this trait may peak in early adolescence (Littlefield et al., 2016; Steinberg et al., 2008). SS has also been linked to onset of behaviours such as substance and alcohol use, smoking or bulimia (Doran, Khoddam, Sanders, Schweizer, Trim, & Myers, 2013; Fischer et al., 2008; Magid & Colder, 2007) and thus may be a common aetiological factor underlying risky behaviour.

5.2.3 Prospective findings to date

There are early indications from the few longitudinal examinations to date that heightened NUR predicts the onset of self-harm in adolescents. In the only prospective study to explore this association to date (Riley et al., 2015) it was found that NUR scores at baseline uniquely among UPPS-P facets predicted the *onset* of self-harm behaviour nine months later in a female-only sample of university students aged 18-19 years. At the same time, Riley and colleagues found that LPS, but not NUR or any other UPPS-P facet, predicted the *maintenance* of self-harm over the course of the study. The maintaining role of LPS is consistent with the cross-sectional findings of Glenn & Klonsky (2010). However, in a subsequent one year longitudinal study with undergraduates which tested the maintaining role of LPS (Glenn & Klonsky, 2011) the authors found no prospective association between LPS (or any other UPPS facet) and self-harm maintenance (i.e. continued self-harm over the study period). In addition, UPPS facets were not related to the relapse (re-emergence of past self-harm during the study period) or remittance (past self-harm, but no indication of behaviour during the study period) of self-harm. Relatedly, in other longitudinal work, You and colleagues (2016) found that changes in levels of NUR, but not lack of Premeditation, reported by adolescents (aged 12-18 years) were related to changes in the level of NSSI reported across three time points over a one-year period. Using latent growth curve analysis they found that a faster rise in levels of NUR was associated with a faster increase in NSSI. Hence level of emotion-based impulsivity may contribute to the escalation or diminution of NSSI over time.

Null findings have yielded from all other studies which have examined impulsivity (by UPPS-P, or other measures) as a prospective predictor of self-harm in university (Peterson & Fischer, 2012) or school samples (Garisch & Wilson, 2015; O'Connor, Rasmussen, & Hawton, 2009) over time periods ranging from five to 12 months. However, both these school-based studies employed measures of impulsivity, which did not distinguish emotion-based facets. Importantly, impulsivity facets had demonstrated baseline cross-sectional correlations with self-harm in the three prospective studies which also reported cross-sectional results (Garisch & Wilson, 2015; Glenn & Klonsky, 2011; Peterson & Fischer, 2012). This is an important distinction. Findings from the

wider field of suicidology, that cross-sectional correlates of behaviour are not always predictive of behaviour over time (Franklin et al., 2017), have cemented the need to move beyond associative studies and to identify risk-factors which can be confirmed prospectively. No school-based study to date has sought to examine the prospective utility of impulsivity in predicting self-harm onset or maintenance in young adolescents (13-15 years) using the multidimensional SUPPS-P tool. Such work would be an essential next step in helping to clarify the mixed pattern of prospective findings to date, and is theoretically and practically important given that onset and peak of self-harm typically occurs during this developmental stage (Nock, 2010). It would also confirm if putative risk factors identified cross-sectionally within Study 1.1 remain significant in prospective examinations.

Identifying factors distinguishing between those who think about self-harm and those who act on their thoughts is a vital focus for the field of self-harm and suicide (Glenn & Nock, 2014; Klonsky & May, 2014). Cross-sectional data from Study 1.1 indicated that both those with ideation and those with behavioural enactment were more impulsive than controls, and that NUR (and no other facet) distinguished between these groups in univariable and multivariable analyses. This evidence, and comparable findings using a broad measure of impulsivity (O'Connor et al., 2012), provide support for the theorised role of impulsivity as a volitional moderator in the Integrated Volitional Motivational model of self-harm (IMV; O'Connor, 2011). Thus, NUR may play a role in the translation of self-harm thoughts into self-harm acts. The need to include tests of temporality within empirical examinations of the IMV has been identified as important next step for further validation of the IMV model (O'Connor & Kirtley, 2018). A prospective examination of the influence of impulsivity on changes in state between having thought about self-harm and acting on those thoughts over the course of the study would provide an additional and novel test of the role of multi-dimensional impulsivity in the ideation-to-enaction framework specified by the IMV model.

5.3 Study aims and hypotheses

This longitudinal examination of the SHIP-SHAPE school data aims to:

- (a) Provide evidence of which unidimensional facets of impulsivity are prospectively associated with the first emergence of self-harm, or its maintenance over a short-term (12 week period), specifically within a young school-based sample.
- b) Clarify if cross-sectional results presented thus far are confirmed within a prospective (12-week follow-up) examination.
- c) Identify differentiated, and thus clinically meaningful, treatment targets for impulsivity driven risk-processes over a short-term (12-week) period in relation to first onset, maintenance, or the transition from thought to act.

In light of reviewed evidence the research tests three main hypotheses:

- (1) SUPPS-P facets, and NUR in particular, will independently predict those who self-harm for the first time during the course of the study (“onset” of self-harm) relative to those with no history of self-harm (Riley et al., 2015).
- (2) NUR will predict those whose ideation status changes over the course of the study (i.e. those with ideation at baseline who endorse behavioural enactment over the course of the study) compared to those whose status does not change (i.e. those with ideation at baseline and at follow-up).
- (3) SUPPS-P facets will independently predict those who maintain their self-harm behaviour over the course of the study (“maintained” self-harm), relative to those with a history of self-harm who have not repeated the behaviour over the course of the study (“remitted” self-harm) and those with no self-harm history (Glenn & Klonsky, 2010; Riley et al., 2015).

5.4 Methods

Full details of the Participants, Measures (including their psychometric properties), and the Procedure for Study 1.2 are as described for Study 1.1 within Chapter 4 (see Methods, section 4.4). As the follow-up survey was a replication of the baseline survey, details are not replicated here (see Limitations, page 135).

5.4.1 Data analysis plan

Self-harm onset: A series of univariable multinomial logistic regressions were run to determine if baseline impulsivity as delineated by the five SUPPS-P facets predict first-time self-harm by follow-up assessment, relative to no self-harm behaviour. To predict onset of behaviour, participants were identified who indicated no self-harm history at baseline (*Never self-harm*) but endorsed self-harm engagement 12 weeks later (*past 4 weeks; past 2 months; past 6 months*). Multivariable regression models were run to examine if SUPPS-P facets were independently predictive, adjusting for the influence of other facets. Given that examinations are largely exploratory (given the shortage of studies prospectively examining the role of SUPPS-P facets in self-harm in school-samples), all predictor variables were entered simultaneously into the multivariable model. Kruskal-Wallis tests were conducted to compare differences in impulsivity between those with no self-harm or first-time self-harm.

Self-harm ideation vs. enactment of self-harm: A series of univariable logistic regression analyses were run to examine the associations between SUPPS-P facets and self-harm ideation/enactment status over the course of the study. Participants were identified who identified self-harm ideation, but no enactment at baseline and at follow-up (*ideation remains ideation*); and those who identified self-harm ideation, but no enactment at baseline, but self-harm enactment by follow-up (*ideation becomes enactment*). All variables were entered into a multivariable multinomial logistic regression to determine if impulsivity facets predicted change in status over and above the influence of other covariates. Non-parametric analyses (Kruskal-Wallis) were conducted to compare differences in impulsivity and other covariates between the groups.

Self-harm maintenance: A set of univariable multinomial logistic regressions were run to determine if impulsivity facets at baseline predicted maintained self-harm over the course of the study compared to those with no self-harm or historical (remitted) behaviour. Participants who endorsed maintained self-harm were those who reported a lifetime incidence of self-harm at baseline and then reported repeated self-harm during the study period i.e. endorsed *past 4 weeks; past 2 months*. Participants who endorsed remitted self-harm were those who indicated

that they last self-harmed over a year ago at either baseline or follow-up.³ A multivariable model was run to determine the unique predictive value of each impulsivity facet. All variables were entered simultaneously given the lack of evidence of the prospective influence of UPPS-P facets on self-harm behaviour in young adolescents. For twenty participants who indicated self-harm at both time points it was not possible to ascertain if the behaviour was repeated during the study period. These participants were therefore excluded from this analysis. Kruskal Wallis and Mann-Whitney U tests were conducted to compare differences in impulsivity between self-harm groups (no self-harm/maintained self-harm/remitted self-harm).

5.5 Results

5.5.1 *Sample demographics and characteristics*

Six hundred and forty-six Year 9 and 10 students from three large secondary schools completed the SHIP-SHAPE school survey at baseline assessment and 594 (92%) of these young people completed the survey for a second time approximately three months later (average follow-up time was 12.1 weeks SD=1.15). The average age of participants at baseline was 13.5 years (SD 0.60). Slightly more boys completed the survey at baseline than girls (male 50%, female 47%, 3% unspecified) and the ethnicity of the sample was predominantly white (84%).

5.5.2 *Study completion rates*

Preliminary analysis compared the 594 participants who completed the follow-up survey (completers) with the 52 lost to follow up (non-completers) on demographic and predictor variables. Chi-square analysis revealed that completers and non-completers did not differ by gender ($p=.287$), age ($p=.192$) or ethnicity ($p=.497$). However, there was a statistically significant difference according to school ($p<0.001$). This finding was driven by one city-based school, which had the lowest SES rating as indicated by eligibility for free school meals, which accounted for 63.5% of those lost to follow-up. Mann-Whitney U tests revealed that median scores were not statistically different between groups for any impulsivity dimension, emotion dysregulation,

³ Fifteen participants indicated no history of self-harm at follow-up – but had reported historical (past year) self-harm behavior at baseline assessment. Analyses are reported on the assumption that these individuals had a lifetime history of self-harm.

negative affect, or anxiety symptomatology scores. Completers did not differ on lifetime history of self-harm ($p=.313$) or thoughts of self-harm ($p=.470$). However non-completers had lower positive affect compared to completers (median score 16 v 17) and higher depressive symptomatology (median score 4 vs. 3), significant at $p<.05$.

5.5.3 Characteristics of participants reporting self-harm

At follow-up 28% of the sample indicated lifetime self-harm, compared to 24% at baseline.

During the three-month period to follow-up, the majority of participants did not self-harm (83.2%; $n=494$). However, 55 young people (9.3%) indicated repeating self-harm over the course of the study. An additional 25 (4.2%) reported a first incidence of self-harm between baseline and follow-up. The majority of those indicating repeat self-harm over the course of the study were female (67%, $n=37$), but slightly more boys than girls indicated first time self-harm (56%, $n=14$). In total, 31% of those indicating thoughts of self-harm at baseline went on to report an act of self-harm three months later.

5.6 Key research questions

5.6.1 Question 1: Is onset of self-harm predicted by baseline impulsivity?

Univariable and multivariable multinomial logistic regressions were run to examine the predictive effects of SUPPS-P facets on self-harm onset. First, group differences in SUPPS-P facets and additional mood-related covariates were examined between those who self-harmed for the first time during the course of the study (*first-time*), and those who had not reported self-harm at either time point (*no self-harm*). Table 5.1 presents median scores for SUPPS-P facets and mood-related covariates (depressive and anxiety symptomatology, current level of affect, and emotion dysregulation) and reports Mann-Whitney U-tests examining differences between groups.

Table 5.1. Descriptive statistics and non-parametric tests comparing first time and no self-harm

	No SH (N)			First-time (F)			MWU sig(r^2)
	<i>N</i>	<i>median</i>	<i>IQR</i>	<i>N</i>	<i>median</i>	<i>IQR</i>	
Negative Urgency	411	8	4	25	8	2.5	F=N $p=.174$
(lack of) Perseverance	407	9	4	24	9.5	5.5	F=N $p=.972$
(lack of) Premeditation	409	8	3	24	9	4	F=N $p=.096$
Sensation-Seeking	409	11	5	25	13	3	F>N $p=.018$ (0.01)
Positive Urgency	411	7	3	25	8	5	F=N $p=.166$
Emotion Dysregulation	403	37	13	25	46	20	F>N $p=.011$ (0.02)
Positive Affect	407	18	5	25	18	5	F=N $p=.908$
Negative Affect	406	11	3	25	12	5.5	F=N $p=.125$
Depressive symptoms	407	3	3	25	3	3.5	F=N $p=.056$
Anxiety symptoms	410	5	3	25	6	4	F=N $p=.209$

Note: SH = self-harm. MWU = Mann-Whitney U test. MWU tests the difference between the distributions of scores for each group (No self-harm, First time self-harm).

Univariable analyses revealed that those reporting self-harm for the first time during the course of the study had higher levels of SS than those without a history of self-harm (Table 5.2).

Specifically, a higher tendency towards rash risk-taking and novelty seeking increased the likelihood of first-time self-harm by 19.3% ($p=.030$). Against the study hypothesis, NUR was not a significant predictor of self-harm onset compared to no self-harm, nor were any other SUPPS-P variables. From the included covariates, only difficulties in regulating emotion separated first-time self-harm from no self-harm.

Next, the independent predictive effects of all five impulsivity traits were considered in an additional multinomial logistic regression model (see Table 5.3). Given the small sample size for those endorsing first-time self-harm only SUPPS-P variables and Emotion dysregulation (as a significant univariable predictor) were included in the model as predictors. Analyses also adjusted for age and gender. The influence of SS was attenuated ($p=.059$) and no other Urgency facet made a significant contribution to the multivariable model. Emotion Dysregulation retained an independent predictive utility. However, the regression model overall was not significant.

Table 5.2. Univariable multinomial logistic regressions examining associations between baseline SUPPS-P facets, additional mood-related covariates and onset of self-harm vs. no self-harm.

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	.124	.085	2.133	1.132	.958-1.337	0.137
(lack of) Perseverance	.014	.079	0.034	1.015	.869-1.184	0.855
(lack of) Premeditation	.150	.084	3.207	1.162	.986 - 1.369	0.073
Sensation-Seeking	.176	.081	4.703	1.193	1.017-1.401	0.030*
Positive Urgency	.120	.078	2.330	1.127	.967-1.314	0.116
Emotion Dysregulation	.042	.016	6.644	1.043	1.010-1.077	0.010*
Positive Affect	-.007	.058	0.013	0.993	.886 – 1.114	0.910
Negative Affect	.094	.063	2.224	1.098	.971-1.242	0.136
Depressive symptoms	.148	.080	3.419	1.159	.991-1.355	0.064
Anxiety symptoms	.088	.066	1.817	1.092	.961 - 1.242	0.178

Note: * significant at $p < .05$. No variables retain significance after correcting for multiple comparisons at ($p < .05/10 = < .005$)

Table 5.3. Multivariable multinomial logistic regression examining associations between baseline SUPPS-P facets and Emotion Dysregulation and self-harm onset vs. no self-harm

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	-0.011	0.104	0.011	1.004	0.819 - 1.229	0.975
(lack of) Perseverance	-0.084	0.091	0.864	1.089	0.910 - 1.302	0.353
(lack of) Premeditation	-0.019	0.105	0.032	1.021	0.832 - 1.254	0.841
Sensation-Seeking	-0.168	0.091	3.38	1.189	0.994 - 1.422	0.059
Positive Urgency	-0.073	0.094	0.607	1.087	0.903 - 1.308	0.436
Emotion Dysregulation	-0.048	0.021	5.295	1.050	1.008 - 1.093	0.019
Age (year group)	0.356	0.538	0.437	1.427	0.497 - 4.096	0.508
Gender	0.120	0.418	0.082	1.127	0.497 - 2.558	0.774

Note: Model diagnostics: $\chi^2 (14) 14.262$, $p < .072$. (Nagelkerke .097). First-time self-harm ($n=25$) and No-self-harm ($n=380$). Gender is for females compared to males.

In sum: A tendency to act rashly in pursuit of novel and exciting experience best characterised young people who engaged in self-harm for the first time over the study period. No other impulsivity facet related to onset of behaviour, however broad difficulties in emotion regulation may also contribute to risk in young adolescents.

5.6.2 Question 2: Are those with self-harm ideation at baseline but self-harm enactment by follow-up more impulsive than those with self-harm ideation only over the course of the study?

During the three month period to follow-up 25 young people who had indicated self-harm ideation at baseline reported no change in this status, and 35 young people indicated that they had changed status from someone who thought about self-harm to someone who had acted on those thoughts. Closer inspection revealed that in 12 of these cases young people were reporting self-harm which occurred prior to the baseline assessment. These cases were removed from the analyses, which proceeded with the 23 young people who indicated that they had changed status from ideation to enactment over the course of the study. Descriptive statistics and non-parametric tests examined group differences in levels of SUPPS-P facets for those reporting ideation at baseline and follow-up, and those reporting a change from baseline ideation to enactment at follow-up (see Table 5.4.) Results indicated that groups only differed statistically in terms of PUR.

A series of univariable multinomial logistic regressions were run to examine if SUPPS-P facets predicted the self-reported change in status from having thoughts of self-harm only at baseline to self-harm enactment over the course of the study (see Table 5.5). No impulsivity facet was associated with increased risk of ideation becoming enactment over the study period. A further multivariable model was specified but the model was not significant $\chi^2 (5) 6.487, p < .262$ (Nagelkerke .180).

Table 5.4. Descriptive statistics and non-parametric tests examining differences between those with self-harm ideation at both time points and those who changed from ideation to behavioural enactment over the course of the study, by SUPPS-P facets.

	Ideation remains ideation (II) (n=25)			Ideation becomes enactment (IE) (n=23)			MWU comparison sig(r^2)
	N	Median	IQR	N	Median	IQR	
Negative Urgency	25	10	3	23	8	2.5	II = IE $p=0.545$
(lack of) Perseverance	25	8	4.5	22	9.5	5.25	II = IE $p=.720$
(lack of) Premeditation	25	9	2	22	9	3.5	II = IE $p=.706$
Sensation-Seeking	25	11	5	22	12	3	II = IE $p=.185$
Positive Urgency	25	7	4	23	8	5	II < IE $p=.038 (0.02)$

Note: The Mann-Whitney U tests pairwise comparisons between the groups. Ideation remains ideation (n=25); Ideation becomes enactment (n=23).

Table 5.5. Univariable multinomial logistic regression predicting change in status (ideation becomes enactment vs. ideation remains ideation) over the study period by SUPPS-P facets

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>95% CI</i>	<i>sig</i>
Negative Urgency	-.052	0.124	0.175	0.949	0.744 – 1.211	0.675
(lack of) Perseverance	-0.000	0.095	0.000	1.000	0.827 - 1.210	0.997
(lack of) Premeditation	-0.103	0.133	0.604	1.190	0.894 - 1.583	0.233
Sensation-Seeking	-0.123	0.101	1.493	1.131	0.935-1.386	0.222
Positive Urgency	-.240	0.127	3.546	1.271	0.990 – 1.631	0.060

Note: Odds Ratios (OR) represent the increase in likelihood of reporting ideation becomes enactment (n=23), compared to ideation remains ideation (n=25).

In sum: Neither NUR, or any other unidimensional impulsivity facet predicted a reported change in behaviour from thinking about self-harm to endorsing an episode of self-harm over the course of the study period.

5.6.3 Question 3: Is maintained self-harm behaviour predicted by baseline impulsivity?

Analyses examined the relationship between baseline impulsivity facets and those who maintained self-harm over the course of the study, those with remitted self-harm (i.e. for whom behaviour had last occurred over a year earlier than the study) and those who had not reported self-harm at either study time point. Kruskal Wallis and Mann-Whitney U-tests tests were run to establish and explain group differences (Table 5.6).

First, univariable multinomial logistic regressions were run to examine if SUPPS-P facets, and mood-related covariates, predicted the maintenance of self-harm over the course of the study (Table 5.7). Three impulsivity variables (NUR, PUR and LPM) were significant predictors of maintained self-harm relative to no self-harm, increasing the likelihood of continued self-harm between study points by 61.3%, 37.4% and 30.4% respectively. All other variables were significant predictors of maintained behaviour over no self-harm in the expected directions. However, only LPM predicted the likelihood among those with a history of self-harm that self-

harm behaviour would be maintained over the study period. Hence, lower deliberation increased the odds of maintained self-harm compared to remitted self-harm by 16% per one-unit rise. In addition, those maintaining self-harm behaviour had more depressive and anxiety symptomatology, greater negative affect, and more difficulties in regulating their emotions than those who had not self-harmed in over a year. Positive affect had a protective influence decreasing the likelihood that those with a past history of self-harm would maintain their behaviour. Those with remitted self-harm were distinguished from those who had never self-harmed by negative affect, depressive and anxiety symptoms and emotion dysregulation. NUR and PUR also differentiated between these groups.

All SUPPS-P variables were included in a multivariable multinomial model to examine which individual predictors maintained their individual influence on self-harm status (see Table 5.8). The model was significant $\chi^2(24) 657.831, p < .0001$, and explained 38% of the variance associated with self-harm status. A one-unit increase in NUR raised the likelihood of maintained self-harm (by 21.2%) and remitted self-harm (by 34.4%) compared to no self-harm, but did not differentiate between these groups. No SUPPS-P facets, or any other variable, distinguished those with self-harm whose behaviour continued during the study period from those whose behaviour had remitted when analysed in the context of the other predictive variables.

In sum: Among those with a history of self-harm, those who continued to self-harm over the study period were characterised by LPM - an increased tendency to poorly reflect and think through the long-term consequences of behaviour before acting. In addition, a heightened emotional context (increased anxiety, depressive symptomatology, low affect and emotion dysregulation) may contribute to on-going risk in the short-term.

Table 5.6. Descriptive statistics and non-parametric tests examining differences between those who maintained self-harm during the study, those with remitted behaviour and those with no self-harm

	Maintained (M)			Remitted (RM)			No self-harm (N)				
	<i>N</i>	<i>Median</i>	<i>IQR</i>	<i>N</i>	<i>Median</i>	<i>IQR</i>	<i>N</i>	<i>Median</i>	<i>IQR</i>	<i>KW</i> χ^2 (sig)	<i>MWU pairwise comparisons M / RM / N sig (r²)</i>
Negative Urgency	55	11	4	80	11	3	411	8	4	87.190 (<.0001)	M>N p<.0001 (0.14) RM>N p<.0001 (0.10)
(lack of) Perseverance	52	9	3	79	9	3	407	9	4	2.973 (.226)	
(lack of) Premeditation	55	10	4	80	9	3	409	8	3	22.910 (<.0001)	M>N p<.0001 (.05) RM>N p<.0.14 (0.01) M>RM p=.028 (0.05)
Sensation-Seeking	53	11	4.5	81	11	4	409	11	5	.180 (.914)	
Positive Urgency	55	9	5	80	8	4.75	411	7	3	44.373 (<.0001)	M>N p<.0001 (.09) RM>N p<.0001 (0.04)
Emotion Dysregulation	54	55	20	80	44	22.5	403	37	$\frac{1}{3}$	88.139 (<.0001)	M>N p<.0001 (0.18) RM>N p<.0001 (0.05) M>RM p<.0001 (0.13)
Positive Affect	55	15	5	80	13	5	404	18	5	10.124 (.006)	M>N p=.002 (0.02)
Negative Affect	54	17	3.5	79	17	4.75	406	11	3	89.178 (<.0001)	RM>N p<.0001 (0.04) M>RM p<.0001 (0.16)
Depressive symptoms	54	5.50	3.5	81	4	3	407	3	3	60.269 (<.0001)	M>N p<.0001 (0.12) RM>N p<.0001 (0.03) M>RM p<.0001 (0.10)
Anxiety symptoms	55	10	5	81	7	6	410	5	3	96.441 (<.0001)	M>N p<.0001 (0.20) RM>N p<.0001 (0.05) M>RM p<.0001 (0.13)

Note: SH = self-harm. Kruskal-Wallis (KW) tests the difference between the distributions of scores for the three groups (Maintained self-harm, Remitted self-harm, and no self-harm) using the χ^2 statistic. The Mann-Whitney U tests pairwise comparisons between these groups.

Table 5.7. Univariable multinomial logistic regression predicting maintained self-harm, remitted self-harm and no-self-harm from SUPPS-P facets

	Maintained vs. no self-harm			Remitted vs. no self-harm			Maintained vs Remitted SH		
	OR	95% CI	sig	OR	96% CI	sig	OR	95%CI	sig
Negative Urgency	1.613	1.415-1.840	<.0001	1.455	1.308-1.619	<.0001	1.108	.959-1.282	0.164
(lack of) Perseverance	0.993	.888 - 1.110	0.899	.927	.843 - 1.020	0.120	1.071	.934 -1.228	0.327
(lack of) Premeditation	1.304	1.163 - 1.461	<.0001	1.124	1.020 - 1.239	0.019	1.160	1.013 - 1.328	0.005
Sensation-Seeking	1.005	.905 - 1.115	0.932	1.026	.941 - 1.120	0.558	0.979	0.863 - 1.110	0.739
Positive Urgency	1.374	1.238 - 1.524	<.0001	1.235	1.130 - 1.349	<.0001	1.112	0.988 - 1.253	0.079
Emotion Dysregulation	1.113	1.086 - 1.141	<.0001	1.059	1.038 - 1.081	<.0001	1.051	1.024 - 1.079	<.0001
Positive Affect	0.884	.820 - 0.953	0.001	0.976	.913 - 1.045	0.489	0.905	0.825 - .993	0.035
Negative Affect	1.512	1.374 - 1.664	<.0001	1.202	1.115 - 1.297	<.0001	1.258	1.136 - 1.392	<.0001
Depressive symptoms	1.529	1.369 - 1.709	<.0001	1.201	1.091 - 1.322	<.0001	1.273	1.125 - 1.442	<.0001
Anxiety symptoms	1.533	1.393 - 1.687	<.0001	1.246	1.156 - 1.342	<.0001	1.231	1.114 - 1.360	<.0001

Note: Numbers in bold retain significance following Bonferroni correction ($p=.004$). SH = self-harm.

Table 5.8. Multivariable multinomial logistic regression predicting maintained self-harm, remitted self-harm and no-self harm from SUPPS-P facets and additional covariates

	Maintained vs. no self-harm			Remitted vs. no self-harm			Maintained vs. Remitted SH		
	OR	95% CI	sig	OR	96% CI	sig	OR	95%CI	sig
Negative Urgency	1.212	1.012 - 1.452	0.037	1.344	1.171 - 1.542	<.0001	0.888	0.724 - 1.091	0.250
(lack of) Perseverance	1.085	0.911 - 1.291	0.361	0.985	0.872 - 1.114	0.815	1.101	0.913 - 1.327	0.315
(lack of) Premeditation	1.009	0.849 - 1.200	0.917	0.998	0.876 - 1.136	0.971	1.012	0.839 - 1.219	0.903
Sensation-Seeking	1.134	0.968 - 1.328	0.121	1.016	0.909 - 1.136	0.780	1.116	0.942 - 1.321	0.204
Positive Urgency	1.161	1.001 - 1.347	0.049*	1.057	0.945 - 1.183	0.334	1.099	0.940 - 1.284	0.237
Emotion Dysregulation	1.036	0.992 - 1.082	0.114	1.012	0.979 -1.047	0.478	1.023	0.976 - 2,073	0.340
Positive Affect	1.002	0.866 - 1.158	0.984	1.011	0.914 -1.118	0.836	0.991	0.848 - 1.158	0.908
Negative Affect	1.114	0.945 - 1.313	0.200	1.010	0.897 - 1.137	0.872	1.103	0.926 - 1.314	0.273
Depressive symptoms	1.146	0.949 - 1.384	0.157	0.990	0.855 - 1.148	0.899	1.157	0.943 - 1.421	0.163
Anxiety symptoms	1.160	0.978 - 1.376	0.089	1.079	0.952 - 1.223	0.236	1.075	0.894 - 1.294	0.442
Age (year group)	1.723	0.746 - 3.979	0.152	1.367	0.759-2.463	0.298	1.667	0.635 - 3.379	0.300
Gender	1.930	0.784 - 3.749	0.203	1.158	0.645-2.080	0.624	1.261	0.517 - 3.076	0.611

Note: Maintained self-harm (n=45), Remitted self-harm (n=73) and no self-harm (n=367). Numbers in bold retained significance following Bonferroni correction ($p=.004$). SH = self-harm

5.7 Discussion

Study 1.2 investigated the prospective relationship between unidimensional facets of impulsivity assessed at baseline and self-harm outcomes three months later, in a school-based sample of 594 adolescents aged 13-15 years. The findings contribute to an emerging body of longitudinal work and help to clarify that distinct dimensions of impulsivity are risk factors over time for self-harm.

In terms of the onset of self-harm, findings revealed partial support for the hypotheses. Just one facet of SUPPS-P based impulsivity – Sensation-Seeking – predicted first time self-harm over the course of the study. Contrary to expectations and to previous findings (Riley et al., 2015; You et al., 2016) self-harm onset was not associated with NUR in the present sample. This finding is surprising given that NUR was a strong cross-sectional correlate of different self-harm outcomes in the SHIP SHAPE data. It is possible that the discrepancy between the present findings and those of Riley and colleagues (2015) reflects a developmental difference between the young age of the sample (aged mainly 13 years of age) for whom the first onset of behaviour appears to relate to rash (but not emotional) risk-taking, and the older sample (aged 18-19 years) of Riley and colleagues for whom reactivity to negative affect was instrumental in the initial development of behaviour. Arguably, onset at an older developmental stage may be driven by a different set of factors. Indeed, evidence has shown other distinctions (such as greater severity of self-harm) in those whose onset starts earlier (Ammerman, Jacobucci, Kleiman, Uyeji, & McCloskey, 2018).

It is interesting that Sensation-Seeking was a univariable predictor of self-harm onset. In SHIP-SHAPE cross-sectional analyses this trait also distinguished between those with current (past 4 weeks) and recent (past 2 month) behaviour, and distinguished between those with higher and lower frequencies of self-harm. Hence a tendency to seek out novel experience has demonstrated some consistent utility within the SHIP-SHAPE data overall. Sensation-Seeking is purported to influence behavioural enactment through a positive reinforcement process (Berg et al., 2015), but notably, its mechanism of action may relate not just to a propensity to seek out fun and exhilaration, but to a high tolerance of any associated risks or a high threshold for fear,

or perhaps to valuing the reward of the activity as greater than the risk (Berg et al., 2015). It is also argued that Sensation Seekers may have an “optimistic bias” (Weinstein, 1980) and as such may consider themselves to be less at risk of negative consequences from action than others. Notably, adolescent risk-seeking, but not novel experience seeking assessed via the Sensation-Seeking Personality Type Scale (SSPT; Conner & Henson, 2011) was predictive of NSSI in an undergraduate sample (Knorr, Jenkins, & Conner, 2013) and it is this component of the trait which may be a particular marker of future risk. Future research which considers how young people appraise self-harm and the likely sequelae may be informative. Overall, the implication may follow that self-harm onset in younger adolescence may not necessarily function as an affect-regulatory device. Notwithstanding this discussion, it must be noted that the effect size for the influence of SS on self-harm onset in the present analysis is very small and no longer significant within multivariable examination. (Of note, additional analyses indicated that adjusting for gender, age and NUR did not attenuate the influence of SS on self-harm onset). Overall, given evidence that SS is a trait variable that may peak in early adolescence (Steinberg, 2008), there may be theoretical merit in further examining putative relationships between onset of self-harm and this trait within a larger young adolescent sample.

In terms of the second hypothesis – that impulsivity will predict the translation from ideation to enactment, the present research suggests that impulsivity is not an important risk factor in predicting where thoughts about self-harm are likely to escalate to self-harm acts - at least over the short-term. Null findings here are perhaps surprising. Convincing indications were found in the cross-sectional SHIP-SHAPE data analysed in Study 1.1 – at both time-points and within univariable and multivariable analyses – that while those with ideation and those with enactment similarly report elevated impulsivity (compared to controls), these associations are more pronounced in those with self-harm enactment. The lack of statistical significance may relate to the small sample, which may not have been adequately powered to detect a small effect. However, the null finding chimes with the pattern of results found in the examination of self-harm onset, in so much as urgency did not play a role in the likelihood of developing self-harm for the first time (compared to those with no history of self-harm) over the course of the study.

In terms of establishing impulsivity as a risk factor for the development of self-harm from ideation to enactment, the present results indicate that, contrary to hypotheses and previous findings (O'Connor et al., 2012) those with thoughts who went on to act were no more impulsive than those who retained only ideation, in fact they had lower average NUR scores. Overall, in line with the predictions of the Integrated Motivational Volitional model, (O'Connor, 2011; O'Connor & Kirtley, 2018) impulsivity, as specified by rash reactivity to predominantly negative emotion, appears broadly to be an important distinguishing characteristic between those that think about self-harm and those that act on self-harm thoughts, but it may not be a sufficiently specific prospective marker to explain individual behavioural progression. That is to say, the findings call into question the mechanism of action through which trait impulsivity exerts its influence on the proximal processes involved in an initial change from thought to act (first onset), and may suggest that the trait impulsivity of respondents (which was captured in the present study) should be distinguished from the state impulsivity of the act (which was not) when modelling that first progression between thought and act.

Notably, as reported in Chapter 4, around half of those reporting self-harm indicated acting within ten minutes of first thinking about self-harm, and other studies have found that high numbers of adolescents (between 39% and 53% who report self-harm indicate acting within an hour of the first thought (De Leo & Heller, 2004; O'Connor et al., 2014; O'Connor, Rasmussen, Miles, et al., 2009). Notably, in these studies, no (or only partial) evidence was found of increased trait-based impulsivity. It is plausible that self-harm outcomes may relate to the speed with which an impulse is actioned, but this mechanism is not necessarily being captured by trait impulsivity. More work is needed to unpick the notion of premeditation and its association with a complex behavioural outcome such as self-harm. That impulsivity is an important proximal risk factor in the progression towards a self-harm act was demonstrated recently using a card-sort task in which individuals identified the item "I did it on impulse – without planning" immediately preceding a self-harm act (Townsend et al., 2016). Notably, this item similarly blurs the distinction between trait-based low deliberation and an impulsive state-based act. Relatedly, Rawlings and colleagues directly tested if multidimensional measures of trait impulsivity (derived

from the BIS, and UPPS-P urgency scales) distinguished the level of pre-planning (a distinct aspect of premeditation) involved in self-harm taking place in the previous 4 weeks. They found that undergraduates indicating some degree of planning in their self-harm (n=43) were equivalent to those endorsing no planning at all (n=42) in their reporting of both cognitive and affective impulsivity. While affective impulsivity (urgency), but not cognitive impulsivity, was related overall to self-harm – there was no evidence of an association between urgency and unplanned self-harm (Rawlings et al., 2015). Further work is therefore needed to clarify how impulsivity (trait and state) is implicated in the progression towards a first, or a repeated self-harm act.

In terms of the persistence of self-harm over time, in line with hypotheses, the results indicated that repetition of self-harm over the short term (compared to no self-harm) was associated with affect-based rash reactivity (NUR and PUR) and difficulties with planning and thinking through the consequences of action (LPM). Individuals repeating self-harm over the study period were also characterised by anxiety or depressive symptoms, lower mood, more difficulties with emotion regulation and lower positive affect than those who did not self-harm. However, when distinguishing between those with a past history of self-harm – and those maintaining their behaviour over the study period – LPM was the only impulsivity facet to retain a significant predictive association. This distinction is important as it shows that LPM is a significant predictor of the maintenance of self-harm over and above past history of behaviour. Notably, evidence of a role for LPM supports the SHIP-SHAPE cross-sectional findings which found that this facet distinguished between those with current and those with past self-harm. Theoretically, these findings underscore that impulsive behaviour in the face of intense emotion *and* core cognitive processes underpin the maintenance of self-harm behaviour, but that tackling the core cognitions which underpin behaviour may be useful in treatment efforts for persistent contemporaneous self-harm. LPM reflects a reduced cognitive capability to plan ahead and foresee the negative consequences of behaviour, or perhaps to let awareness of those consequences inhibit behaviour. Hence treatment efforts which target these cognitive deficits and in which young people explore the potential negative consequences of action may be differentially useful in helping to break the cycle of self-harm repetition. That NUR did not

distinguish between maintained and historical self-harm is consistent with the results outlined by Riley and colleagues (2015). This finding also supports the theoretical position that once a pattern of behaviour is established, urgency facets may offer less clinically relevant targets for intervention than cognitive deficits (Glenn & Klonsky, 2010; Riley et al., 2015; Taylor et al., 2012). Notably, other emotion-based variables (such as depressive and anxiety symptomatology) were predictive of maintained versus remitted self-harm (in univariable analyses), therefore the current experience of emotion is important to understanding on-going risk, but is insufficient in explaining the complexity of maintained self-harm. Contrary to the previous findings (Riley et al., 2015), LPS was not an important facet in the maintenance of self-harm. Low perseverance reflects cognitive difficulties maintaining focus on a course of action and links between self-harm and deficits in perseverance in older adolescent groups are theorised to relate to difficulties in carrying out alternative strategies or stopping self-harm, which maintain the behaviour (Glenn & Klonsky, 2010). Arguably in a younger adolescent sample for whom self-harm behaviour is still becoming established, facets relating to the cessation of behaviour may not yet be influential factors.

Limitations in the present study require consideration. The study relied exclusively on self-reported data and as such may be prone to bias associated with poor recall and other response bias which could call into question the validity of findings. Critically, within anonymised studies, self-report precludes the clarification or corroboration of responses and the present findings highlighted particular challenges in the identification of ideation status. Identifying those who changed status in the present sample involved separating out individuals who reported ideation (but not enactment) at baseline but who subsequently reported an act of self-harm prior to the baseline survey. It could be the case that by follow-up respondents felt more comfortable accurately reporting a self-harm behaviour. Equally, respondents may have been uncertain about what qualified as an “ideation” episode, may have struggled to recall accurately even over a relatively short time frame, or may simply have been unreliable respondents. One implication is that a more precise means of measuring ideation i.e. more than one yes/no item is required. Work with young participants or those in more fragile mental states, may benefit from

intervention-based approaches in which interpretations can be substantiated and discussed. In addition, the measurement approach to capturing self-harm data, which asked participants to indicate recency of self-harm in terms of 4 weeks, past 2 months and past 6 months, was insufficient in certain cases to identify all incidents of self-harm occurring between baseline and follow-up (a 12 week period) and resulted in the loss of potential data. A more suitable approach would have been to ask participants at follow-up if they had self-harmed since the baseline assessment.

A further limitation to the conclusions reached in the present study was that effect sizes where found were small, and not all effects held within multivariable models. It is possible that our sample limited the power to detect small effects. It is important to note that the sample size was small in terms of examining change in ideation status, and, as such, findings should be interpreted with caution. Further, this study employed a short-time frame (12 weeks) which was chosen specifically as a means of providing a time frame short enough for clinical relevance given that clinical decisions are often made in terms of hours, days weeks (Glenn & Nock, 2014), and long enough to allow for the onset or maintenance of behaviour. Nonetheless the time frame may have been too short to allow the natural course of self-harm to play out and it was not possible within this design to prospectively examine remittance.

Notwithstanding these limitations, the results of this study are noteworthy on a number of levels in line with aims set out in the Introduction. First, findings from the wider field of suicidology that cross-sectional correlates of behaviour are not always predictive of behaviour over time (Glenn & Nock, 2014), have cemented the need to move beyond associative studies and identify prospective risk factors. The present longitudinal framework offers a direct comparison between cross-sectional correlates and prospective risk factors within the same sample. In line with cross-sectional evidence, the study demonstrates significant associations between unidimensional facets of impulsivity and self-harm outcomes. Consistent with cross-sectional data results confirmed that differential pathways of association between SUPPS-P facets and self-harm outcomes are identifiable, and broadly support a dual impulsive pathway of risk which reflects

emotion and cognition. However, only partial support for prospective hypotheses were found – notably the broad importance of NUR was attenuated in the present analysis (Hypothesis 1 and 2). Overall, further tests of the incremental predictive utility of SUPPS-P facets in predicting self-harm over time will be important to add to theoretical understanding of the role of unidimensional facets of impulsivity in self-harm. Second, the present findings extend the evidence base to a young school-based sample and represent the first prospective examination of multi-dimensional impulsivity to consider the temporal course of self-harm (onset, and maintenance). This is relevant, given that this sample reflects the developmental stage at which first initiation of behaviour is most relevant (Nock, 2010). Evidence that SS is associated with self-harm onset is a novel finding and may relate to the early developmental stage of the sample. Third, as discussed above, the present findings indicate putative individual markers of risk, which may inform a more targeted approach to treatment for onset and for maintenance. Fourth, the findings tentatively contribute information about the influence (or lack thereof) of established predictors of self-harm to contemporary models of ideation-to-enaction when temporality is included within designs. Future directions for exploring temporal connections between “impulsivity” as a state or trait construct and self-harm, and in larger samples, are advocated. Notwithstanding null findings, an important message from these data is that young people who say they have thought about self-harm are at high risk for subsequent onset. In all but two cases those indicating behaviour at follow-up were identifiable from their baseline report of ideation.

Finally, it is worth reflecting on the challenges present in conducting research in school-based settings and the potential impact this can have on recruitment. Although attrition was small for this study overall (n=52), results indicated that 63.5% of those lost to follow-up were from one school which had the lowest SES rating. It may be too simplistic to suggest that SES level accounted for this effect. There were subtle differences between schools in the degree to which the SHIP-SHAPE survey was championed by staff and integrated within a broader mental health focus. Levels of engagement and follow-up were higher in those schools that scheduled the survey within Personal, Social Health Education/Citizenship lessons in which students were subsequently invited to reflect on wider mental health issues. These schools also provided

additional opportunities for students to engage with issues relating to the involvement of young people in research. Efforts to promote and support the positioning of survey-based studies within a welcoming research/mental health school culture may pay particular dividends for research recruitment in educational settings.

KEY POINTS from this chapter

(1) These findings add to a growing body of research within the field of suicidology which is questioning how risk-factors for self-harm/suicide which are established as cross-sectional correlates of behaviour, stand up to scrutiny within prospective designs. As with cross-sectional findings, results revealed a differential pattern of association between separate impulsivity facets and distinct self-harm outcomes. As such the results confirm the discriminative utility of using a multidimensional measure of impulsivity, and specifically, the SUPPS-P measure.

(2) For young adolescents, short-term maintenance of behaviour was best characterised by rash reactivity under conditions of extreme emotion (negatively and positively valenced) but first-time self-harm related to rash (but not emotional) risk-taking. Issues with low mood and its regulation, and feeling anxious were also important in determining maintained risk, but did not create the context for the onset of risk in this sample. Only deficits in cognitive impulsivity – specifically, low deliberation – distinguished between individuals who maintained their behaviour and those for whom behaviour had abated.

(3) Individuals who reported thinking about self-harm at baseline and who subsequently reported self-harm enactment three months later, were not distinguished from those who reported thinking, but did not go on to act, by any impulsivity facet. More work may be needed to unpack the impulsive processes involved in the progression from thought to act.

Implications for the next chapters

(1) Emotion-based impulsive behaviour and deficits in conscientiousness increase the risk of self-harm behaviour in young adolescents. A consideration of how these facets interact with the wider cognitive context (e.g. the ability to tolerate and control emotion) may help to clarify the conditions in which impulsive tendencies are expressed (Chapters 7, 8).

- (2) In light of discordance between cross-sectional and prospective findings, further examination of how rash impulsive behaviour influences self-harm over time is required. A nuanced examination which considers the influence of impulsivity in the days, hours and minutes up to a self-harm act could provide novel information about proximal and distal influence (Chapter 8).
- (3) Given the response bias associated with self-report methods, approaches in which interpretations can be substantiated and discussed (such as within interview designs) may offer important clarification, and additional insight into complex processes (Chapter 8).
- (4) Study 1.1 and 1.2 delivered outcomes in accordance with the research aims of each study, but to what extent did the delivery of these studies impact on the young people involved? Can any additional or ethical impact be measured? (Chapter 6.)

Chapter 6: What do young adolescents think about taking part in longitudinal self-harm research?

6.1 Overview

Research about self-harm in adolescence is imperative given the high incidence in youth, and strong links to suicide and other poor outcomes. Clarifying the impact of involvement in self-harm studies on young school-based adolescents is an ethical priority given heightened risk at this developmental stage. This chapter is based on a published paper⁴ in which the impact of involvement in the SHIP-SHAPE school studies described in Chapters 4 and 5 was examined using a multi-method approach. The chapter begins by considering the ethical challenges involved in researching sensitive topics with youth. It then describes Study 2 which examined change in mood following completion of surveys at baseline and follow-up, ratings and thoughts about participation, and responses to a mood-mitigation activity. Responses were analysed to assess impact on participants as a whole and according to gender and self-harm status.

6.2 Introduction

6.2.1 Background

Adolescence - the developmental period spanning 12-25 years of age – is an important time to focus research on self-harm as these years are likely to include the onset (12 to 14 years), peak (15-24 years) and start of remittance of the behaviour (Moran et al., 2012; Morey, 2016; Whitlock, 2010). Rates of self-harm behaviour are also higher in adolescent than adult populations (Ogle & Clements, 2008). Much self-harm research to date has focused on mid to late adolescence. This approach is important given high rates of self-harm in this group (Whitlock, Eckenrode, & Silverman, 2006), but this focus may also be a consequence of the increased ethical and procedural challenges involved in research with younger age groups, and a reluctance on the part of ethics committees and Institutional Review Boards (IRBs) to sanction self-harm research in those perceived to be at heightened vulnerability. Yet, research at earlier

⁴ Lockwood, J., Townsend, E., Royes, L. et al (2018) What do young adolescents think about taking part in longitudinal self-harm research? Findings from a school-based study, *Child Adolesc Psychiatry Ment Health* 12:23. (See Appendix F-2.)

stages of adolescence is important to understand how and why self-harm first develops (Stallard et al., 2013). Moreover, recent reports suggest that increasing rates of self-harm across adolescence show the steepest rise in girls under 16 years of age (Morgan et al., 2017), suggesting that early adolescence is a period of particular concern in adolescent self-harm. Most young people who self-harm do not seek clinical support (Madge et al., 2008), and this is particularly the case in young adolescents (aged 12-14 years) where community based cases of self-harm outnumber hospital presentations by up to 20 times (Geulayov et al., 2017). School-based studies thus provide a vital opportunity to engage with an early adolescent population at risk of self-harm who may otherwise remain hidden. Work which strengthens the evidence base for the ethical suitability of self-harm studies in younger age groups in school-based samples can help to reframe the calculation of risk for future research in this critical area.

6.2.2 Ethical challenges – overstated risks?

For researchers and regulatory bodies rightfully mindful of the need to balance the delivery of research objectives against ensuring participant wellbeing (Lakeman & Fitzgerald, 2009a, 2009b), a key concern is that asking participants about self-harm/suicidality may introduce, reinforce or exacerbate such acts, or cause undue psychological distress (Lakeman & Fitzgerald, 2009b). In fact, reviews of the evidence, which have pooled findings across adult and adolescent populations, have suggested that asking about such issues is not associated with negative outcomes (Dazzi, Gribble, Wessely, & Fear, 2014; DeCou & Schumann, 2017) and may, in fact, confer benefits for those at most risk (Gould, Marrocco, Kleinman, Thomas, Mostkoff, Cote et al., 2005). This is necessary for anonymous survey-based studies where a direct gauging of impact is impossible.

6.2.3 Response from school-based youth to self-harm studies

Relatively few studies have sought to understand the impact that being asked specifically about self-harm has on school-based respondents. Hasking and colleagues prospectively examined whether completing a survey about non-suicidal self-injury (NSSI), suicidality, and wider

psychological constructs was perceived as either enjoyable or upsetting/worrying, in school-based students aged 12-18 years (Hasking et al., 2015). Overall, the majority of participants enjoyed participation at baseline and at one-year follow-up with only a minority finding participation to be upsetting/worrying, but those who had thought about or experienced self-harm were more likely to have had this response. Notably, the authors found that girls were more likely than boys to find the survey upsetting, but also more likely than boys to report enjoying participation. There may be a nuanced gendered distinction in reactions to sensitive research that warrants further analysis. It is important, given the increased prevalence of self-harm in girls relative to boys (Morgan et al., 2017), to establish further if this gendered distinction is moderated by the likelihood that an individual has a history of self-harm i.e. whether vulnerability is conferred by self-harm status, by gender, or an interaction between the two. Other school-based studies have similarly found that while overall participation in a research survey is viewed positively there are nonetheless links between increased vulnerability and likelihood of reporting distress (Langhinrichsen-Rohling, Arata, O'Brien, Bowers, & Klibert, 2006; Robinson, Yuen, Martin, Hughes, Baksheev, Dodd et al., 2011). These studies point to factors such as being "interested" in the topic (Langhinrichsen-Rohling et al., 2006) or finding it "worthwhile" (Robinson et al., 2011) which partially mitigate this distress, and similar findings have been found in a study with young adults (Whitlock, Pietrusza, et al., 2013). Notably, one of these studies only included boys from a select-entry school (Robinson et al., 2011) which limits how generalisable these findings are to a general school population; the other (Langhinrichsen-Rohling et al., 2006), gathered reactions to questions on suicide, drug use and sexual abuse, issues which could arguably have a different personal resonance than self-harm in a younger population. Nonetheless these studies suggest that there may be an important distinction when making a judgment of impact in self-harm research, between having an emotional response and a cognitive evaluation of that response, but more evidence, particularly in female samples is now needed.

6.2.4 Establishing short-term risk

Not all studies have found that those at highest risk are more likely to experience distress. In suicide research (Gould et al., 2005), high risk students with raised depressive symptomatology who answered survey questions about suicide were less likely to report distress or suicidality immediately afterwards and two days later than high risk participants in a control group who were not asked these questions. Hence, asking about suicidality apparently conferred short-term benefits to those at most risk. In support, Mathias and colleagues in a sample of adolescents aged mainly 14 years of age with experience of in-patient psychiatric care reported a dose-response effect where those with greater severity of suicidal ideation reported greatest reduction in ideation in repeated assessments over 6-month intervals (Mathias, Michael Furr, Sheftall, Hill-Kapturczak, Crum, & Dougherty, 2012). These studies are useful in establishing the impact of participation in research over time for young samples, albeit in research focused on suicide or with clinical groups. Notably, within self-harm research, the potential salutary effects of study participation over time for the most vulnerable was supported in a University-based sample over a three week period (Whitlock, Pietrusza, et al., 2013), but not in a school-based sample over a one-year period (Hasking et al., 2015). Within the school sample, Hasking and colleagues demonstrated that a deterioration in psychological functioning over time (i.e. increased vulnerability) was associated with a change in evaluation of study participation from a positive to a negative valence at one-year follow-up. Given recent recommendations which support the use of short-term follow-up studies (hours, days and weeks) to improve the clinical relevance of study data (Franklin et al 2016), it would be important to test the prospective impact of participation in a self-harm study with a school-based population using a short-term design. Such prospective examination will also be important in establishing if school-based youth with and without self-harm experience differ in their response to repeated assessment. Of note, in their University-based online study, Muehlenkamp and colleagues found that participants without self-harm experience were less amenable to repeat participation (Muehlenkamp, Swenson, Batejan, & Jarvi, 2014) .

6.2.5 Current study

The current study sought further understanding of how school-based adolescents with and without experience of self-harm felt about taking part in a longitudinal study about self-harm. Specifically, the impact of study participation on early adolescents (aged 15 years and under) was sought. Other self-harm/suicide studies that have included youth at this age have targeted youth across a broad span of adolescence (e.g. Gould et al., 2005; Hasking et al., 2015; Mathias et al 2012). Given evidence that the pattern of risk for adolescent self-harm may differ in early, mid and late adolescence it is important to distinguish between these developmental stages (Morgan et al., 2017; Guelayov et al., 2017). As male and female respondents have been shown to differ in response to research participation (Hasking et al., 2015), and are known to differ in prevalence of self-harm (Guelayov et al., 2017) a nuanced examination of responses to participation based on gender and self-harm status was also sought. Given that prospective studies with short follow-up phases are recommended for clinically relevant research (Franklin et al., 2016) this study examines the impact of asking young people to take part in longitudinal studies over a short time period (10-12 weeks) which may be sufficiently short as to offer greater clinical relevance, and sufficiently spaced in time to be accommodated within a dense school timetable.

Recent research has recommended taking steps to reduce any potential negative impact of study involvement on youth (Muehlenkamp et al 2014; Lloyd-Richardson et al., 2015). Mood elevation techniques have been employed following lab-based self-harm research (Arbuthnott et al., 2015) and studies using other methods (Townsend, Ness, Waters, Kapur, Turnbull, Cooper et al., 2016; Wadman, Clarke, Sayal, Armstrong, Harroe, Majumder et al., 2017) and are also recommended in online settings (Lloyd-Richardson et al., 2015; Whitlock, Pietrusza, et al., 2013).

An additional aim of the present study was to evaluate the use of a simple mood elevation tool that can easily be incorporated into a paper-based survey. A multi-method exploratory approach combined quantitative and qualitative analysis to augment understanding and maximise interpretation of findings (Leech & Onwuegbuzie, 2010). Specifically the present research asked

(1) Does participation in a longitudinal self-harm survey have an immediate impact on participant

mood? (2) How do young people rate and describe their experience of participation? (3) Do young people engage with a simple mood elevation device following participation in a self-harm survey? As our multi-method examination is largely exploratory no testable predictions were made. Responses across these outcomes (mood impact/survey rating/survey description/engagement with a mood elevation device) were compared for the sample overall and according to self-harm status and gender.

6.3 Methods

6.3.1 Participants and Procedure

Details of the participants and procedure for Study 2 are as fully described for Study 1.1 and 1.2 within Chapter 4 (section 4.4.1 and 4.4.2) and are therefore not replicated here.

6.3.2 Materials and Measures

In addition to completing the broader survey questions about impulsivity, other psychological correlates, and self-harm which formed the basis for the first two SHIP-SHAPE studies, participants completed a number of specific impact assessment measures (see Appendix B3):

Current mood rating scale

Participants were asked to rate current mood state on a visual analogue scale (VAS) at the start and end of the survey. This approach has been used in qualitative self-harm research with adolescents (Wadman, Clarke, Sayal, Vostanis, Armstrong, Harroe et al., 2016). The VAS had response options ranging from 0 (illustrated by a sad face and additional text “I feel really sad and down in the dumps”) to 10 (illustrated by a happy face and “I feel really happy”). At the midpoint a neutral face and the words “I’m not feeling happy or sad” represented a score of 5. Participants were asked to mark their current mood on the scale. Comparison of pre- and post-survey VAS ratings provided an estimate of the immediate emotional impact of participation.

Survey rating

Participants were asked to rate their experience of taking part in the survey by selecting from provided response options, which were positively-valenced (Interesting, Enjoyable); negatively-valenced (Upsetting, Annoying); or neutral (Fine), or by supplying their own term of reference in an open-response section. Multiple response choices were not prohibited.

Open questions about the survey

An open response question asked participants to “Describe your thoughts about taking part in the survey and any feelings the content may have raised”.

Doodle Activity page

The final survey page contained cute animal images, cartoons, exam howlers, jokes, a space to write a joke, and doodle/colour-in spaces. New doodles and imagery were included at follow-up to maintain interest and novelty. Participants were invited to engage with this page once they had completed the survey, or wished to withdraw, with the following invitation: “The survey has now finished. Thanks for taking part! Time to chill... Check out the following page.”

“Engagement” was regarded as a demonstrable sign of actively engaging with the activities and spaces on the doodle page by drawing/doodling/colouring in/writing on the page etc. This page aimed to recalibrate mood, which may have been lowered through participation. Evidence suggests that looking at cute images of animals, cartoons and emotive texts are effective at eliciting positive mood (Goritz, 2007; Nittono et al., 2012).

6.3.3 Analysis approach

Data were analysed using SPSS v24 for Windows. Paired sample T-tests were used to examining differences in mood scores pre- to post- survey at baseline and at follow-up for the sample overall. Between-subjects ANOVAs were used to examine effects of self-harm Status (yes – a reported history of self-harm vs. no – no reported history of self-harm) and Gender (Boys vs. Girls), and the Gender x self-harm status interaction, for influence on mood-change scores (post VAS score – pre VAS score) at baseline and follow-up. For significant interactions, simple main

effects and pairwise comparisons were examined using a corrected p-value to control for multiple comparisons ($p=.025$). For non-significant interactions, main effects analyses were performed. Chi-square analysis was used to compare distributions of categorical ratings of the survey (positive / negative / neutral) – these were compared for those with and without lived experience of self-harm at baseline and follow-up. Analysis of standardised residuals identified where observed ratings in each category differed from those expected by chance (positive or negative residuals > 1.96).

Qualitative responses were coded using Thematic Analysis (Braun & Clarke, 2007). Thematic Analysis is a flexible form of pattern recognition which allows themes to be derived inductively (from the data) and deductively (from past literature and theory) in order to best capture and summarise a phenomenon of interest. A sample of transcribed responses were independently read and coded inductively by JL and an additional researcher. A coding frame that integrated inductively- and deductively-derived codes was then developed by JL, verified via discussion, and applied to the full data set. The coding frame contained labels, descriptions and examples of codes and themes (Boyatzis, 1998). Themes were identified and refined into main themes and sub-themes. A third researcher blind to study aims independently tested the applicability of data-to-theme allocation from randomly selected extracts with percentage consensus agreement of 83%. Consensus of 70% or above is deemed necessary for themes to be judged as coherent and valid (Boyatzis, 1998).

6.3.4 Reflexivity statement

Research reflexivity relates to an on-going and dynamic practice of reflecting on the influence the researcher may have on the research process. By acknowledging experiences, positions, thoughts and feelings (including documentation within a research diary) researchers seek to counter potential bias. My reflexivity statement outlines my position as a researcher and the assumptions and experiences I bring, which may shape this process and bias my analysis. My position is influenced by a child-rights informed perspective, which suggests that children and young people have a right to be involved in research about them, are the experts in their own lives, and are

capable of forming and articulating views about this process. This position is influenced by training I have received during doctoral studies and through professional experiences gained working and volunteering with children and young people. I am aware, however, that as a researcher I hold considerable power in the research relationship, and also retain ownership and control of the data collection, analysis, interpretation and output. My status (due to profession but also maturity) in comparison to that of my research participants, alongside the fact that my research takes place and is endorsed by educational settings in which most activities are compulsory for young people, flouts any notion of power symmetry, and may have impacted on participants' willingness to engage openly about their experiences. In addition, as a researcher conducting research on self-harm in young people I have an obvious vested interest in not wanting to do harm to participants, and this bias is crucial to note for the interpretation of responses, particularly in study 2. As a mother to two children, and a former child and adolescent counsellor, I bring additional and personal sensitivities to this research topic. These sensitivities have shaped my interest in research in this field, and may colour my interpretations of participant data, fostering a protective instinct, rather than neutral observation. In addition, as a researcher interested in impulsivity and in particular, who recognises the theoretical and methodological advantages of using a multidimensional conception of this construct, and of the potential value of the multifaceted UPPS-P, I am aware I may have a vested interest in providing support for the efficacy of this tool. The keeping of a reflective diary throughout the doctoral work enabled an active and continual reflexive engagement (see APPENDIX E-1).

6.4 Results

6.4.1 Initial analysis

Completers v non-completers

Initial analysis compared the 594 participants who completed both the baseline and follow-up surveys (completers) with the 52 who only provided baseline data (non-completers). Chi-square tests revealed that groups did not differ by gender ($p=.287$) or ethnicity ($p=.497$). However, groups differed according to school ($p<.001$). Groups did not differ in terms of self-harm incidence ($p=.313$); or thoughts ($p=.121$). Nor were they more likely to have rated the survey at

baseline as a negative rather than a positive experience ($p=.734$). Mann-Whitney U tests revealed no difference between groups in the distribution of mood-change scores pre- to post-survey ($p=.367$).

Incidence of self-harm thoughts and behaviour

At baseline, 30.4% of participants indicated having had thoughts of self-harm and 23.6% indicated lifetime self-harm. At follow-up, rates of self-harm thoughts were similar to baseline (30.6%), and reported incidence of lifetime self-harm was 27.6%. Of the additional 29 respondents indicating self-harm behaviour at follow-up, 25 reported first onset of behaviour between the baseline and follow-up assessment.

6.4.2 Did current emotional rating scores change following completion of the survey?

A 2 X 2 between subjects ANOVA revealed a statistically significant interaction between Gender and self-harm Status on mood-change score from pre to post survey completion at baseline $F(1, 467)=4.673$, $p=.031$, $partial \eta^2=.010$. Simple main effects analysis revealed there was no significant overall effect for self-harm Status ($p=.755$), however there was an overall statistically significant difference in mean mood change scores for Gender. Specifically, mood changes scores differed between boys with a self-harm history and girls with a self-harm history, $F(1,467) = 8.189$, $p=.004$, $\eta^2=.017$ (Bonferroni corrected). There was no significant difference between boys and girls who had not self-harmed ($p=.447$). Table 6.1 presents mean mood change scores at baseline and follow-up for boys and girls with and without self-harm, and the complete sample. Findings suggest that completing the survey had a negative impact on mood for girls who had self-harmed (post-survey mood scores were lower than pre-survey scores), but conversely a positive impact on mood for boys who had self-harmed (post-survey scores were higher than pre-survey scores). A second ANOVA compared mood change scores pre-to-post survey for boys and girls across levels of self-harm status at follow-up. This time there was no statistically significant interaction between gender and self-harm status $F(1,427) = .379$, $p=.538$, $partial \eta^2=.001$. Main effects analysis revealed there was no statistically significant main effect of gender

$F(1,427) = 1.278$, $p = .259$, $\text{partial } \eta^2 = .003$; or main effect of self-harm status $F(1, 427) = .021$, $p = .884$, $\text{partial } \eta^2 = .000$. Hence neither gender nor self-harm status influenced mood change scores at follow-up. (See Table 6.1.)

Table 6.1. Mean pre-survey and post-survey mood scores at baseline and follow-up

<i>Self-harm status</i>	<i>Gender</i>	Baseline			Follow-up		
		<i>N</i>	<i>VAS pre-</i>	<i>VAS post-</i>	<i>N</i>	<i>VAS pre-</i>	<i>VAS post-</i>
SH no	Boys	199	7.09(1.82)	7.21(1.99)	176	7.03(1.89)	6.72(2.24)
	Girls	164	6.72(1.86)	6.68(2.15)	138	6.67(1.76)	6.67(2.01)
SH yes	Boys	43	5.93(2.29)	6.35(2.28) ^a	45	6.12(2.22)	5.48(2.44)
	Girls	65	4.97(1.77)	4.79(1.85) ^a	72	5.33(2.13)	4.58(2.24)
Overall		491	6.60(1.97)	6.54(2.18)	489	6.49(1.9)	6.22(2.3) ^b

Note: The table presents means for the VAS (visual analogue scale) ratings provided at the start (VAS pre-) and at the end (VAS post-) of each survey assessment for the sample overall, and by self-harm Status and Gender. Standard deviations are shown in parentheses. "SH yes" denotes lifetime incidence of self-harm. "SH no" denotes no reported history of self-harm.

a. A significant interaction between mean mood-change score for boys and girls at the level of SH yes $F(1,467)=8.189$, $p=.004$, $\eta^2=.017$ which survives Bonferroni correction at $p=.025$,

b. A statistically significant difference between VAS pre- and VAS post- survey scores, $t=3.807$, $p<.0001$.

6.4.3 How did participants rate the survey?

Table 6.2 presents proportions of participants rating each survey in positive (“interesting”, or “enjoyable”), neutral (“fine”), and negative (“annoying” or “upsetting”) terms. Most participants at baseline rated the survey in positive/neutral terms overall (79.7%) and across gender and self-harm status. However, comparing groups by self-harm status: Chi square analysis revealed that the ratings differed between those with and without self-harm $\chi^2 (2) = 37.606, p < .001$. Inspection of standardised residuals revealed that those who did not endorse self-harm had lower levels of negative ratings than would be expected by chance; while those with self-harm experience had higher levels of negative ratings, and lower levels of positive ratings than would be expected by chance. The most common negative responses cited by those without lived experience of self-harm were “annoyance” (n=17, 4.3%) and “boring/pointless” (n=13, 3.3%). By contrast, the most common response for those endorsing self-harm was feeling “upset” (n= 23, 16%) with a few respondents reporting finding the survey annoying (n=9, 6.3%) or “boring/pointless” (n=4, 2.8%). However, it is important to note that most participants did not report negative responses. Comparing ratings by gender did not reveal a significant difference in response ($p=0.184$).

At follow-up, the survey was again rated in positive/neutral terms by the majority overall (73.5%) and across self-harm status and gender. However, an increased percentage of respondents gave the survey a negative response at follow-up, compared to baseline, and this was driven in part by an increase in those finding the survey “boring” or “pointless” (8.7% v. 3.1% at baseline). Chi-square analysis revealed that the distribution of positive, negative and neutral ratings did not differ according to self-harm status ($p = 0.071$). The most common negative response cited by those without self-harm was “boring” (increased to 10.4% from 3.3%) with “annoying” selected by an increased 6.9% compared to 4.3% at baseline. Similarly, the most common response for those with self-harm was now “annoying” (14.2%) with feeling “upset” reduced from 16% to 10.3%. Notably, for those endorsing self-harm the percentage of negative evaluations was lower at follow-up than at baseline while positive evaluations were proportionally higher at follow-up; the opposite pattern of response was reported in those without self-harm experience for whom positive ratings decreased and negative ratings increased in comparison to baseline. Of the 25

participants who revealed a first incidence of self-harm between assessments, most rated the survey as a positive/neutral experience at baseline (83%) and follow-up (60%), although again the response pattern reflected an increase in negative ratings by follow-up, and the highest proportion of negative response for any category of respondent. Again, when comparing ratings by gender, no significant difference in response was observed at follow-up ($p=0.545$).

Table 6.2 Proportions of participant ratings for Positive, Neutral and Negative evaluation of the survey at baseline and follow-up

	Baseline					Follow-up				
	<i>N</i>	<i>Positive (%)</i>	<i>Neutral (%)</i>	<i>Positive/Neutral (%)</i>	<i>Negative (%)</i>	<i>N</i>	<i>Positive (%)</i>	<i>Neutral (%)</i>	<i>Positive/Neutral (%)</i>	<i>Negative (%)</i>
Overall	582	170 (28.6)	309 (52.0)	479 (79.7)	103 (17.3)	578	136(23.5)	300 (51.9)	436 (73.5)	142 (23.9)
SH yes	119	25 (18.5) –	64 (47.4)	183 (60.6)	46 (34.8) +++	155	30 (19.4)	77 (46.5)	107 (69.0)	48 (31.0)
SH no	439	145 (32.6)	240 (55.3)	391 (86.1)	54 (12.1) – –	423	106 (25.1)	223 (51.3)	329 (77.7)	94 (22.2)
Girls	273	73 (26.7)	147 (49.0)	220 (76.2)	53 (19.4)	270	60 (22.2)	148 (54.8)	208 (77.0)	62 (23)
Boys	293	96 (32.8)	153 (52.2)	249 (84.3)	44 (15.0)	292	74 (25.3)	147 (50.3)	221 (76.0)	71 (24.3)

Note: – / + Standardised residual score of >1.96; – – /++ standardised residual score of >2.58; – – – / +++ standardised residual score of >3.29 at $p < 0.01$ (0.05/5).

“SH yes” denotes lifetime incidence of self-harm, “SH no” denotes no reported history of self-harm.

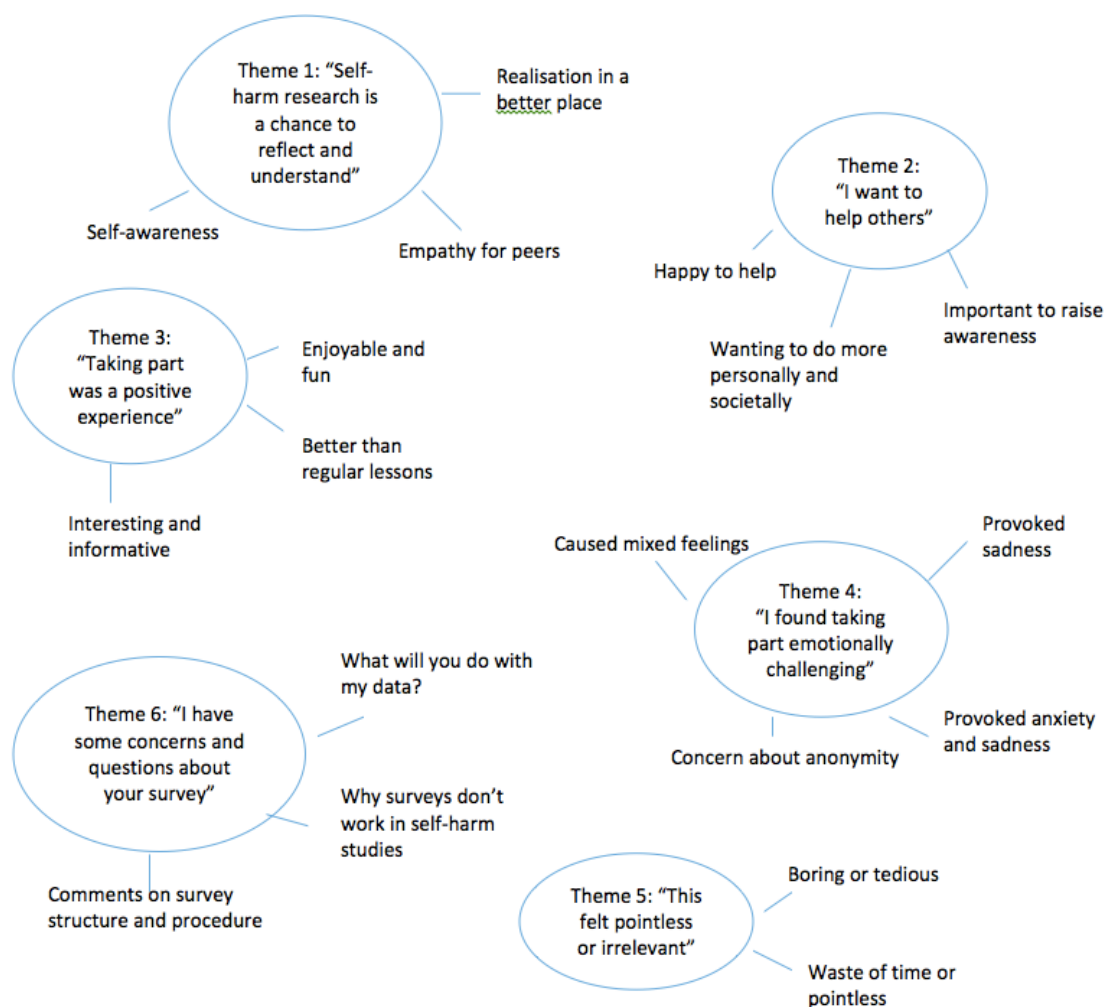
6.4.4 What did participants think about taking part in the survey?

Responses to the item “Please share your thoughts about taking part in the survey, and any feelings the context may have raised” were refined into six themes (three positive, two negative and one neutral) using

Thematic Analysis (Braun & Clarke, 2006) . No main thematic differences emerged between time-points.

Main themes, subthemes, and frequencies of endorsement are shown in Figure 6.1.

Figure 6.1. Thematic map showing main themes and subthemes reflecting participant views on taking part in the research.



6.4.5 Theme 1: “Self-harm research is a chance to reflect and understand”

Young people valued the greater self-awareness and understanding gained from participation: *“It’s a really good and interesting way to gain information and think about your life.”* (F, aged 14, SH). Participants felt that they “knew themselves better” from the experience and enjoyed the opportunity for self-reflection: *“I think it [taking part] brings you more in touch with your feelings and allows you to get presence and really think.”* (M, aged 13, no SH). For some it was greater understanding of others that was important: *“It makes me more aware of the emotional health of my peers.”* (F, aged 13, no SH.) Taking part was a chance to offload and also provided relief: *“It’s made me feel relieved that I have let out how I feel”* (F, aged 13, SH). Some found value in realising they were in a good place: *“I realise now that I enjoy lots of things and I am a better and happier person than I used to be.”* (F, aged 13, SH); *“It’s just reminded me how much happier I am now than when I was so sad, so that’s good.”* (F, aged 15, SH). This theme was the most consistently endorsed overall with endorsement from 50 participants at baseline (28% of responses) and 30 participants at follow-up (18% of responses). Overall, a slightly higher numbers of girls (n=44) than boys (n=36) described this theme.

6.4.6 Theme 2: “I want to help others”

Being able to help others was a source of value: *“I hope my input will help people for the better.”* (F, aged 13, no SH); *“It’s ok, and didn’t upset me and I’m happy to help.”* (M, aged 13, SH). The benefits were often linked to contributing to research: *“I feel happy I have taken part in some useful research.”* (F, aged 13, no SH). Students felt it was important to raise awareness of mental health: *“I think that it is good that people are recognising that mental health in young teenagers, especially students, is a big deal.”* (F, aged 14, SH). Some wanted further opportunities and support to discuss such issues: *“I think we should get lessons in PSHE [Personal, Social and Health Education] about self-harm and depression and suicide as it is a bit of a stigma topic and it shouldn’t be.”* (F, aged 14, no SH). A number of students felt that schools could do more to facilitate peer support: *“I don’t know how to help people who self-harm and feel that this is something that schools should teach.”* (F, aged 13, no SH). This was the second most consistently endorsed theme overall, endorsed by 33 participants at baseline (18.5% of responses) and 28

participants at follow-up (17% of responses). Endorsement was similar overall between boys (n=31) and girls (n=30).

6.4.7 Theme 3: "Taking part was a positive experience"

For some participants the process of taking part in the research was enjoyable in itself: *"I thought it was quite fun, like Christmas!"* (F, aged 13, no SH). *"It was good, I would do it anytime"* (M, aged 13, SH). For others there were additional perceived benefits, like missing class: *"Don't mind, gets us out of lessons."* (M, aged 13, no SH). Students felt happy to have been asked their opinions: *"I think it is good that people are researching our age group and giving us a say."* (F, aged 14, SH). Some were pleased to be involved with a University study: *"I think it is cool that the University is asking us."* (F, aged 13, no SH). Participants reported enjoying the survey in similar numbers at baseline (n=26, 15%) and follow-up (n= 27, 16%). More girls than boys endorsed this theme at baseline (n=17 vs n=9), a pattern reversed at follow-up (n=12 girls vs. n=15 boys).

6.4.8 Theme 4: "I found taking part emotionally challenging"

Some students indicated that thinking about self-harm in others made them feel sad: *"I find it quite upsetting to know that people can feel some of the options."* (F, aged 15, no SH). For some, the survey was a difficult reminder of past actions: *"It made me feel upset, because I remembered that time."* (F, aged 13, SH). However, this was often a mixed emotional response: *"I felt upset because it reminded me of what I used to do, but happy because I have passed that stage in my life."* (F, aged 13, SH). Some voiced feelings of anxiety, particularly about anonymity and confidentiality: *"I feel really anxious and in a panic because anyone could read this."* (F, aged 13, SH). This theme was endorsed in similar numbers at baseline (n= 24, 13 % of responses) and follow-up (n=23, 14% of responses). Notably, at both time points, more girls endorsed this theme than boys with (n=22 vs n=2) at baseline and (n=17 vs n=6) at follow-up.

6.4.9 Theme 5: *“This felt pointless or irrelevant”*

Some participants simply found the survey to be “pointless” or a “waste of their time”. Feelings that the survey was “boring”, or “repetitive” were increasingly cited at the follow-up assessment: *“Boring because we have already done it.”* (M, aged 13, no SH). For some, the lack of personal relevance was a source of annoyance: *“It’s annoying as it is not relevant and depressing.”* (F, aged 14, no SH). A smaller number of participants endorsed this theme with 6 participants at baseline (3% of responses) and 12 participants at follow-up (7% of responses). This response was predominantly a male phenomenon with all but two references to boredom or irrelevance coming from boys.

6.4.10 Theme 6: *“I have some concerns and questions about your survey”*

Participants showed they were critically engaged with the research process. They offered thoughts on how the research could be improved. Some suggested that the survey did not go far enough: *“The questions were very clear, but needed more depth.”* (M, aged 14, no SH), or had, *“surprisingly little content about self-harm”* (M, aged 13, no SH). Others felt the survey should have included broader questions on “drugs and alcohol” or “sexuality”. Some queried what would happen with their data: *“It would be interesting to see what research you would do with the results, or what solutions you would have to problems.”* (M, aged 13, no SH). Some questioned the validity of a survey: *“I think that people who have self-harmed wouldn’t say it on a survey because if you self-harm you don’t tell anyone.”* (F, aged 13, no SH). Others wondered whether participants would be able to adequately assess their responses: *“People may not be able to evaluate what they think.”* (F, aged 13, SH). This final theme was the most consistently identified response at follow-up overall with endorsement rising from 17 participants (10% of responses) at baseline to 34 participants (21% of responses) at follow-up. More boys endorsed this theme than girls overall, although numbers were similar at each time point (n=10 boys and n=7 girls at baseline; n=19 boys and n=15 girls at follow-up).

6.4.11 Did participants engage with the final doodle page?

A slim majority of students (55% baseline and 60% follow-up) chose to tangibly engage with the doodle page (e.g. doodled, filled in speech bubbles, offered a joke). At baseline a higher proportion of participants with self-harm engaged (76%) than those without (55%), but this was not a significant difference $\chi^2 (2) = 2.303, p = .129$. At follow-up, by contrast, a significantly higher proportion of those without self-harm (63% v 50%) tangibly engaged with this page, $\chi^2 (1) = 8.045, p = .005$. There were no differences in proportions of interactions with the doodle page between boys and girls. The distribution of mood-change scores (pre- to post-survey) differed between those who did and did not complete the final activity page at baseline (Mann-Whitney $U = 26139.5, z = -2.570, p = .010$). Those engaging with the page reported a small decrease in emotional rating (mean change in score -0.19), while those not engaging reported a small increase in emotional rating (mean change in score $+0.05$). However, distributions did not differ at follow-up ($p = .294$). Students commented on the final doodle page in the open response section: *"I'm rating the survey a 10 because of the cats"* (Did not say, aged 13, no SH). *"I love doing these surveys. I feel relieved to write down how I feel and I love the doodle page at the end!"* (F, aged 13, SH thoughts). A number of young people suggested that the final page had made them feel better: *"I feel strange, nervous, also confused and hurt, but relieved. Thanks for the doodles – it helped calm me down"* (F, aged 13, SH).

6.5 Discussion

Overall, the present findings suggest, that for the majority, participation in research on self-harm was not perceived as a negative experience by young adolescents and did not impact negatively on mood. Participants described important benefits such as increased self-awareness, a chance to off-load, and helping others. However, subtle differences were observed according to gender, self-harm status and across time-points. Firstly, emotional rating (VAS) scores indicated that, following participation, respondents largely rated their mood at the positive (happy) end of the scale. But there were notable differences between the most vulnerable boys and the most vulnerable girls in their immediate emotional reaction to participation as indicated by the VAS. For boys with self-harm, participation led to an immediate improvement on mood; whereas for

girls with self-harm, participation led to an immediate deterioration in mood. That high-risk boys found a mood-based benefit from involvement resonates with some previous studies (Gould et al., 2015; Mathias et al., 2012; Whitlock et al., 2013) which indicate that participation can confer benefit for those at greatest risk. Although notably, this pattern of findings was not supported at follow-up. These findings suggest however, that in terms of immediate emotional reaction, conferred benefits are less likely to be found for girls who self-harm. As such, studies may need to be particularly alert to the immediate emotional impact of research participation on vulnerable girls.

The survey rating data revealed that the majority of participants judged taking part as a positive/neutral experience at both baseline and follow-up. Positive/Neutral evaluations far outweighed negative evaluations for boys and girls and those with and without self-harm at both time points. Closer analysis at baseline revealed significant differences in the pattern of emotional responses felt between those with and without self-harm experience: a higher proportion of those endorsing self-harm found participation to be a negative experience and a smaller proportion rated the survey positively compared with those who did not self-harm. This suggests an increased vulnerability in response for those with lived experience of self-harm. However, differences in response distributions between these groups were not observed at follow-up. In most cases, at the second assessment, participants reported fewer positive/neutral evaluations and more negative reactions to the survey (which may be in line with the overall VAS follow-up findings) but there was one notable exception. For those endorsing self-harm, a larger proportion found the survey to be a positive or neutral experience at the second compared to first time of assessment, and negative reactions to the survey for this subset actually decreased over time. This resulted in a smaller percentage point difference in positive/neutral ratings and negative ratings between those who had and had not self-harmed. The finding of an increased positive outcome over time for those at higher risk of self-harm again chimes with previous research (Mathias et al., 2012; Muehlenkamp et al., 2014) suggesting that those at greatest vulnerability may gain greatest long-term benefit from on-going participation.

The contrasting responses found from those with and without self-harm experience across VAS and survey ratings may relate to the perceived relevance of the survey for individual respondents. At follow-up, an increased number of negative reactions to participation for those not endorsing self-harm related to boredom, a lack of personal bearing and annoyance at being asked to complete a survey twice - findings which were supported in the qualitative analysis. These reactions featured far less for those with lived experience of self-harm. Relevance may drive the benefit gained from longitudinal engagement with this topic, although this does not rule out finding the survey emotionally impactful (as demonstrated by lower VAS scores). Qualitative findings suggest the increase in positive ratings at follow-up in part may relate to a possible therapeutic benefit derived from an on-going opportunity to “offload” and self-reflect. This may be particularly important for groups typically unlikely to have disclosed their behaviour (Madge et al., 2008) or lacking opportunity to discuss and describe it. It could also be argued that exposure to the topic at baseline may have desensitised participants for the follow-up assessment. The effects of this could be greatest for those with lived experience who may have felt a greater emotional response to the topic at the outset. The sharp increase in negative evaluations of the survey for those without lived experience at follow-up suggests it will be important for future research to explore the impact of research participation for those who are psychologically healthy, as well as those at greater risk, over repeated assessment, particularly where follow-up is relatively short. In particular, increased rates of annoyance mainly for those not endorsing self-harm behaviour (see also Muehlenkamp et al., 2014), but also across the sample overall, should be recognised and mitigated where possible.

The findings also highlight the varied nature of individual response to participation. Engaging with a sensitive topic may cause understandable distress for some (such as the immediate lowering of mood found for girls with self-harm), but it does not necessarily follow that this is evaluated as a “negative” outcome. Markedly, many participants coupled positive and negative ratings, separating emotional responses from a cognitive evaluation (e.g. *nervous yet interesting; uncomfortable, but fine; difficult yet worthwhile*). Given the complexity of the behaviour, it is not surprising that respondents selected multiple categories to describe their response. This suggests

that it is important for ethical guidelines around self-harm research to recognise that potential benefits and potential risks from involvement are not necessarily mutually exclusive.

Although there was no statistical distinction between boys and girls when comparing survey ratings, analyses indicated differences in emotional response to survey participation according to both VAS scores and thematic analysis, where a qualitatively different reaction to survey participation from girls, who did describe feeling upset, was found to boys, who broadly did not. Further qualitative research may help to clarify these gender differences in response to participation. The qualitative findings largely support those found by Hasking and colleagues (2015) in their school-based sample. A novel thematic finding in this study was the large endorsement for a critical engagement in the research process indicating that many young people are interested in research endeavour and have considered opinion to share.

This study also provides insight into the use of a simple mood recalibration doodle page. A small majority (55%) of participants chose to engage with this page, though rates of engagement varied across groups. At baseline, those whose mood decreased the most (participants endorsing self-harm) had a higher rate of engagement with the page. At follow-up, those who reported an increase in negative survey ratings (participants not endorsing self-harm) were more likely to demonstrably engage. It could be argued that those feeling the greatest negative impact from participation may more readily seek out recalibration, but more work should seek to evaluate the impact of such mitigation tools in community samples using longitudinal designs. The present study did not provide an experimental test of mitigation or specifically elicit participants' reactions to the doodle page. We cannot know to what extent the page was helpful for those who nonetheless left no physical indication of engagement. However, large numbers of participants did demonstrably engage and many chose to reference this in open responses. Undoubtedly for some, the page helped to calm emotions. Moreover, the study's advisory youth panel strongly endorsed the doodle page (see Chapter 4 section 4.4.5). Importantly, the page brought an additional and unexpected ethical advantage. The self-penned jokes, doodles, or direct comments written directly on the survey script by participants who also used the page to

offer reassurance to the research team that they were feeling all right, had a positive impact on researcher wellbeing. Collecting data on self-harm has an inevitable impact on researchers but the evaluation of this impact is under-researched. The need to better document and discuss harm minimisation for researchers has been discussed elsewhere (Lloyd-Richardson et al., 2015; Mckenzie, 2016) and sharing potential practical solutions is advocated.

Key strengths of this study include the focus on a community-based sample of early adolescents (aged 13-14) for whom self-harm risk is heightened (Geulayov, 2017), and the additional insight offered on how both male and female participants, with and without self-harm experience, respond differentially to study involvement. Given recommendations for short-term prospective examinations of self-harm risk in youth (Glenn & Nock, 2014; Franklin et al., 2016), the study provides ethical encouragement, via multiple and converging methods, that short-term assessment does not confer added risk to the majority of participants. In addition, novel insight is provided into the role of a simple mood enhancement tool. The low attrition (8%) compares favourably with previous school-based research (Hasking et al., 2015). High willingness to complete a follow-up survey may be seen as an additional marker of a study's acceptability. Nonetheless, the influence of the school-based setting must be recognised. Schools, as an "adult-owned territory" (Morrison, 2013) hold an inherent power asymmetry within which children generally participate in compulsory activities (Morrow & Richards, 1996). As a researcher, backed by this education setting, I am reinforcing this power differential. Clear efforts to emphasise participant rights to withdraw (including assemblies about research participation, and a discussion before each data collection session) were made. Nonetheless a learned compliance can compromise the voluntary principles of participation (Gallacher & Gallager, 2008) and may call research findings into question where participants feel they have no choice but to take part (see Reflexivity Statement, Section 6.3.4).

There are limitations to the conclusions that can be reached from this study. We did not explicitly ask participants at follow-up how they felt after completing the baseline assessment and we cannot examine if reported reactions were transitory. Neither did we explicitly ask participants if

they found the research to be worthwhile. A small number of students (4%) indicated initiating self-harm behaviour between assessment points. This compares with rates reported in other prospective school-based studies of 2.6% and 6.0% (O'Connor, Rasmussen, & Hawton, 2009; Stallard et al., 2013). While the development of self-harm observed here may follow the natural trajectory of self-harm, the design of the study does not allow us to rule out any causal iatrogenic link. These questions would be usefully addressed in future studies. The present study largely assesses self-harm in terms of a lifetime presence of behaviour. While this broad indicator of self-harm status was adequate in distinguishing differences in response, meaningful information about the impact of study involvement is likely to be gained from a finer grained analysis of self-harm status in which the recency or frequency of behaviour is accounted for. Notably, those indicating the most recent onset of self-harm (i.e. first time behaviour occurring between assessment points) recorded a high proportion of negative responses at the follow-up assessment (40%). Those with current versus historical self-harm may differ in both emotional response and cognitive appraisal of that response. Further research should explore these ideas.

6.5.1 Conclusions

This study contributes important information on the impact of research participation on young adolescents using quantitative and qualitative data to augment understanding. Participation was, for the most part, reported to have been a positive and beneficial experience, and many valued the chance to critically engage with the research process. Those with self-harm experience, and in particular girls who self-harm, displayed an increased vulnerability compared to those who did not self-harm (lower mood ratings following participation, a larger proportion of negative ratings) but, nonetheless, most evaluated their participation in positive or at least neutral terms. However, further work is needed to understand the impact of repeated assessment on those with and without lived experience for whom research reactions qualitatively differ. Many young people felt that having an opportunity to discuss and describe mental health in school was important and may confer unique benefits for those who self-harm. School settings are well placed to accommodate appropriate response to risk and provide support. Ensuring that any school-based support is appropriate and effective is critical however. Evidence-based school

programmes such as the Signs of Self-Injury Programme (SOSI; Jacobs, Walsh, McDade, & Pigeon, 2009) which are designed to educate about self-harm and offer skills to staff and students to respond to self-harm may be a promising and systematic way forward (Muehlenkamp, Walsh, & McDade, 2010). Prospective research on adolescent self-harm is ethically viable in schools, but the inclusion of a simple mood-elevating tool may be an additional and easily incorporated means of mood elevation, and beneficial to participants and researchers.

KEY POINTS from this chapter

- (1) Self-harm research with young adolescents is feasible in school-settings. Most young people are happy to take part and cite important benefits. However, the impact of participation varies according to gender, self-harm risk, and time of assessment.
- (2) While being asked about self-harm might reduce mood in some cases, this is not necessarily equated with a negative appraisal of participation.
- (3) Reactions to repeated assessment in longitudinal study designs may qualitatively differ between youth with and without self-harm. Those at increased vulnerability may gain unique benefits from participation.
- (4) Simple mood-elevation techniques may help to mitigate distress in sensitive research areas and are a simple and innocuous adjunct within research designs.

Implications for future chapters

- (1) Research in the field of adolescent self-harm can benefit from the involvement of young people who may personally value participation and offer invaluable personal insight (Chapter 8).

Chapter 7: Self-harm, impulsivity and the broader cognitive context: How do distress tolerance, self-control or expectancy influence impulsive self-harm.

7.1 Overview

So far, this thesis has presented empirical findings (Chapter 4 and 5) and review findings (Chapter 3), which have shown that separate emotion-based and cognitive-deficit pathways to impulsive behaviour contribute to self-harm outcomes in youth. The following two chapters discuss the interplay between dimensions of impulsivity and the regulation of behaviour in more detail using an older adolescent sample. Findings are presented from Study 3 - a multi-method study in two phases, conducted sequentially which explored the relationship between impulsivity, self-harm and additional cognitive factors. Study 3.1 used self-report survey data (the focus of Chapter 7) analysed quantitatively. Study 3.2 used face-to-face semi-structured interviews (the focus of Chapter 8) analysed qualitatively. This chapter presents findings from Study 3.1, which examined cognitions relating to self-regulation (perceived tolerance of distress and self-control) and to anticipated self-harm outcomes (expectancies) in relation to self-harm. The sample was adolescents aged 16-22 years based within Further Education College settings.

Chapter 7 begins with a review of the literature relating particularly to distress tolerance, self-control and expectancies in the context of self-harm and impulsivity. First, (to allow comparison with school-based data) results are presented relating to unidimensional facets of impulsivity, affect and emotion dysregulation. Secondly, findings are presented from analyses which examined the influence of distress tolerance, self-control and expectancy on self-harm outcomes.

7.2 Introduction

7.2.1 Establishing a role for multidimensional impulsivity in the self-harm behaviour of college-based adolescents

Given that adolescence is a wide developmental period, and that the lifespan of self-harm typically follows a trajectory of onset, peak and decline which spans these years (Moran et al 2012; Plener et al 2015) a developmental approach which considers the association between impulsivity and self-harm at different stages of adolescence has been advocated for this thesis.

This may be theoretically important given evidence that trait impulsivity may change over this period (Littlefield et al., 2016). Such an approach also recognises the huge biological, social and psychological transitions that occur across the adolescent period, particularly during puberty, and variance in emotional and cognitive control (e.g. Patton, Hemphill, Beyers, Bond, Toumbourou, McMorris et al., 2007) during this developmental stage. As reviewed in Chapter 3, a substantial body of literature has focused on understanding self-harm and multidimensional impulsivity in the context of late adolescence, predominantly within University-based settings (e.g. Glenn & Klonsky et al., 2010, Mullins-Sweatt et al., 2013; Ogle & Clements, 2008; Peterson et al., 2012; Taylor et al., 2012; Rawlings et al., 2015). The SHIP-SHAPE school studies helped to clarify the role of unidimensional impulsivity in self-harm behaviour in early adolescence (13-15 years). There is however, a notable lack of focus in the extant literature, on the experiences of those young people who fall between school and university settings, both in terms of age but also in terms of educational pathways. Study 3.1 examines the relationship between self-harm and impulsivity relationship in a sample of adolescents aged 16+ within Further Education settings for the following reasons:

First, mid-adolescent groups (i.e. aged 16 to 19 years) are not widely represented in the literature examining trait impulsivity and self-harm. There are exceptions where research has recruited youth in High Schools where educational provision continues beyond age 16 (Di Pierro et al., 2012; 2014; Claes & Muehlenkamp, 2013; Garisch et al., 2015; You et al., 2016), or via online platforms (Liu & Mustanski, 2012). In only two of these studies (Claes & Muehlenkamp, 2013; You et al., 2016) was a multi-dimensional measure of impulsivity utilised that incorporated an emotion-based facet). Claes and colleagues found that urgency facets and LPM (but not SS or LPS) were associated with adolescent self-harm. You and colleagues (2016) found a direct relationship between NUR and NSSI, and that NUR and LPM moderated the relationship between negative emotion and NSSI. The conception of impulsivity as a failure to adequately deliberate before acting was also identified as important by Di Pierro and colleagues (2012) in youth aged predominantly 17 years old. The broad utility of NUR in particular in predicting lifetime self-harm has been established across adolescence in general (as identified in the Systematic Review in

Chapter 3) and now specifically in young adolescence (as identified in the SHIP-SHAPE study Chapter 4). Establishing the role of multidimensional impulsivity in a community based mid-to-late adolescent group would help to complete the developmental picture.

Second, mid-adolescent community-based youth who are not following a traditionally academic pathway are largely absent from the self-harm literature. It should be noted that the influence of academic performance is not a primary research focus for this thesis. While targeting a school sample, the SHIP-SHAPE school studies did not investigate the contributory influence of school or school performance on self-harm. Instead they sought to achieve a sample broadly representative of youth in the community, and capitalised on a compulsory education system as a means of accessing this population. For research with older age groups, University-based studies may offer similarly effective means of access. Yet, a University based sample is unquestionably not representative of a late adolescent cohort in general, given a bias towards high academic achievers and higher SES (social and economic status) in general. A focus on a Further Education sample offers access to a wide student body following vocation-based pathways (apprenticeships/ traineeship) as well as traditional academic routes, and therefore may be considered broadly representative of the population.

In addition, while the selection of a Further Education based sample was chosen for the theoretical and pragmatic reasons outlined above, college-based data nevertheless offer an opportunity to capture academic performance data from participants, given that all students will have completed compulsory examinations at school-leaving age (16 years). Evidence has linked poor academic performance to self-harm and suicidality (e.g. Jablonska, Lindberg, Lindblad, Rasmussen, Östberg, & Hjern, 2009; Kosidou, Dalman, Fredlund, & Magnusson, 2014). For example, in a large-scale cohort study in Sweden, Jablonka and colleagues (2009) found that students with lower academic results at compulsory school-leaving age (16 years) were significantly more likely to experience self-injury resulting in hospital admission by age 28 than those with higher grade averages. These findings do not necessarily establish a direct causal link between school performance and self-injury, and academic performance may be a broad marker

for other factors, such as cognitive function, which could predispose individuals to self-harm.

Nevertheless, a Further Education-based sample in which students are following academic and vocational pathways will potentially include individuals across a spectrum of academic achievement and offer the possibility of measuring the association between an overt index of cognitive capability and self-harm.

A first line of examination for Study 3.1 is thus to examine the relationship between unidimensional facets of impulsivity and self-harm in a Further Education College-based sample with the aim of (a) establishing the relevance of multi-dimensional impulsivity for youth in mid to late adolescence; and (b) enabling a direct comparison with the SHIP-SHAPE school-based findings presented in Chapter 4. Additional comparison is sought between these groups in terms of method, motivation and premeditation associated with self-harm which may provide further context for discussion. Evidence will also take into account potential differences in self-harm outcomes according to academic attainment.

7.2.2 Exploring the broader cognitive context of impulsive self-harm

A second line of examination for the present study explored the hypothesis that a combination of high NUR coupled with low self-control or poor distress tolerance would more comprehensively describe risk for self-harm in youth, than impulsivity alone. That is to say, it sought to examine if youth who react impulsively when under conditions of distress are at increased vulnerability for self-harm when in addition they perceive themselves as unable to tolerate that distress, or when they generally display difficulties in controlling their behaviour. The need for a focus on the interaction between NUR and the wider cognitive context has been identified in previous chapters (Chapters 3-5). Given the wealth of evidence supporting links between NUR and self-harm in adolescence, such an approach to modelling risk which considers the interaction between NUR and cognitive regulatory processes may advance theoretical understandings of how and when NUR relates to self-harm in adolescence.

7.2.3 The transaction between Negative Urgency and distress tolerance in self-harm

7.2.3.1 Distress tolerance and self-harm

Distress Tolerance (DT) is broadly defined as an individual's capacity to endure negative internal states (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Individuals who are low in distress tolerance are purported to perceive themselves as less able to withstand negative affect and to react to it with aversion and avoidance. Hence such individuals will have difficulty persisting in goal-directed behaviour in the face of distressing feelings (Leyro, Zvolensky, & Bernstein, 2010). Emotion regulation theories of self-harm suggest that how an individual subjectively experiences and manages negative affect, rather than the simple presence of negative affect, is a critical explanatory factor in the development of self-harm. Unsurprisingly therefore, poor tolerance of emotional state is a central component in models of self-harm (Chapman et al., 2006).

Importantly, individual differences in distress tolerance reflect a cognitive response to distress i.e. it is the *perceived ability* to tolerate distress, and not the experience of distress per se, which is intolerable. As such, trait-based accounts of distress tolerance can be seen as distinct from behavioural accounts of this construct which capture the capacity to withstand aversive stimuli during lab-based tasks. Indeed, studies have found little correlation between self-report and behavioural measures of distress tolerance (Ameral, Palm Reed, Cameron, & Armstrong, 2014) which suggests that these constructs are capturing distinct phenomena. Nonetheless past research has found associations between self-harm and both performance-based distress tolerance (Nock & Mendes, 2008) and self-reported distress tolerance in adolescent groups (Anestis, Pennings, Lavender, Tull, & Gratz, 2013; Horgan & Martin, 2016; Lin, You, Wu, & Jiang, 2017) suggesting this is an important construct in adolescent self-harm.

7.2.3.2 An interaction with Negative Urgency?

As indices of poor regulation in the face of emotion, there is obvious conceptual overlap between NUR and Distress Tolerance. However, these constructs operate as different modes of response to distress: NUR as a behavioural response, and distress tolerance, as represented in scales such

as the Distress Tolerance Scale (DTS; Simons & Gaher, 2005) as a cognitive ‘perceived’ response (Kaiser et al., 2012). It is argued that individuals high in NUR may be disposed to rash behaviour in response to intense negative affect as a ready means to regulate that affective sensation – an instrumental response. Yet the behavioural outcome may also derive from disruption between negative affect and regulatory processes (such as distress tolerance), the consequence of which is that this instrumental response is insufficiently checked to avert behaviour (Kaiser et al 2012). Moderation models in fields of psychopathology such as substance abuse, addiction, and eating disorders have examined the simultaneous influence of impulsive and regulatory factors on outcomes. For example, Anestis and colleagues found that undergraduates with both elevated urgency and low levels of distress tolerance were at heightened risk of dysregulated eating. The additive effects of this interaction were stronger than the individual predictive factors alone (Anestis, Selby, Fink, & Joiner, 2007).

Few studies to date have considered how the combination of impulsivity and distress tolerance explains risk for self-harm. In a sample of 884 undergraduates, Peterson, Davis-Becker and Fischer (2014) examined links between NUR, distress tolerance and depression in predicting frequency of self-harm, and lifetime presence/absence. They found that students with a combination of low distress tolerance, high NUR and high depressive symptomatology were most likely to endorse a lifetime history of self-harm, and this interaction accounted for significant, unique variance in frequency of self-harm. Interestingly, they found that distress tolerance alone did not predict self-harm behaviour – only in transaction with other risk factors. Further work is now needed to examine interactions between NUR, distress tolerance and self-harm to support and extend these findings. Evidence that depressive symptoms influence the relationship between distress tolerance and self-harm (Peterson et al., 2014), suggests accounting for the influence of mood-based correlates would be important in clarifying this relationship. Given SHIP-SHAPE school-based findings highlighting the relevance of anxiety symptomatology in young adolescence, the influence of both anxious and depressive symptomatology is advocated. It could be argued that those with elevated urgency and low levels of distress tolerance will be at

heightened risk of self-harm behaviour as a means of avoiding emotional distress, and this relationship will hold over and above the influence of other emotion-based covariates.

7.2.4 The transaction between Negative Urgency and self-control in self-harm

7.2.4.1 Self-control as distinct from impulsivity

Myriad conceptions and definitions of self-control exist in the literature (see Duckworth & Kern, 2011 for an overview) but broadly the construct relates to the ability to alter dominant responses and to regulate behaviour, thoughts and emotions (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2011). At a trait level, self-control has been defined as the dispositional capacity to resist short-term temptation, as well as to refrain from acting upon inappropriate or undesired behavioural tendencies (Tangney, Baumeister, & Boone, 2004). Hence, the behaviour of those low in self-control may be more strongly influenced by impulses and the pursuit of immediate reward, than that of individuals high in self-control who may be better able to act in accordance with long-term goals (Friede & Hofmann, 2009). Given that self-control inherently involves the overriding of impulse, some theorists have argued that the constructs of self-control and impulsivity simply represent conceptual opposites – i.e. impulsiveness and self-control are two ends of the same impulsivity dimension (Duckworth & Kern, 2011). Evidence has indicated however that these constructs may stem from different neurological bases (Lieberman, 2007; Steinberg, 2008). Moreover findings from community based undergraduate samples have found that individual differences in self-control demonstrate only moderate negative correlations with various measures of trait impulsivity. These include facets of the UPPS-P scale, (Dir et al., 2013; Brevers, Foucart, Verbanck & Turel, 2017) ; the Eysenck I₇ Impulsivity Scale (Friede & Hofmann, 2009) and the Barratt Impulsivity Scale (Mao, Pan, Zhu, Yang, Dong, & Zhou, 2018). Hence, the overlap between self-control and impulsivity facets does not suggest complete conceptual redundancy (Mao et al., 2018). Moreover, Johnson et al (2017) used exploratory factor analysis to confirm that despite significant correlations between trait self-control and UPPS-P facets, self-control was differentiated from multidimensional impulsivity by distinct factor loadings (Johnson, Ashe, & Wilson, 2017).

7.2.4.2 Impulsivity, self-control and self-harm

In fact, evidence points to interplay between self-control and facets of impulsivity when determining the likelihood of maladaptive behaviour. Johnson and colleagues (2017) showed that the inclusion of self-control to a model predicting alcohol dependence improved the predictive utility of LPS. Thus a combination of low self-control and high impulsivity increased risk for alcohol dependency in an undergraduate sample. Dual-systems models of self-control have accounted for the interaction between self-control and impulsivity in determining behavioural outcomes. For example, in their Reflective-Impulsive Model of behaviour (Hofmann, Friese, & Strack, 2009) Hofmann and colleagues proposed that maladaptive behaviour results from an ineffectual balancing between impulsive and regulatory control processes. Just one study to date has examined trait self-control and UPPS-P facets in the context of self-harm. Using structural path analysis with data from an undergraduate sample, Dir and colleagues (2013) found that low self-control (measured using the Brief Self-Control Scale (BSCS; Tangney et al 2004) and NUR were directly associated, and that self-control and self-harm were indirectly associated via NUR. On the basis of these limited findings, there may be merit in further examining the relationship between NUR, self-control and self-harm within a moderation model. It could be hypothesised that adolescents with elevated NUR and low self-control will be at heightened risk for self-harm.

7.2.5 The transaction between Negative Urgency and expectancy in self-harm outcomes

A final line of examination for Study 3.1 addresses whether the risk of self-harm in those high in NUR may be less the result of a depletion in cognitive resources, and more about motivational factors i.e. it is less that young people lack the capacity to resist the urge to act in the presence of negative affect but more that they lack the motivation to do so. Or, perhaps, in a position of cognitive depletion following the effort of trying to control the impulse to self-harm, young people fall back on other response heuristics – such as the expectancy associated with self-harm.

Expectancies are the anticipated outcomes that an individual associates with a behavioural choice (Hasking & Rose, 2016) and which are gained directly via personal experience with the behaviour or from indirect modelling of the behaviour of others. Given that a primary reason

people report engaging in self-harm is to regulate intense emotions (Klonsky, 2007), it may plausibly be expected that individuals who self-harm will hold expectations that this behaviour will facilitate affect regulation. In their recent cognitive-emotional model of non-suicidal self-injury (CEM-NSSI; Hasking et al., 2017), Hasking and colleagues suggest that cognitions about self-harm (which include expectancies about the outcome of self-harm and individual ability to perform the behaviour) form a core role in determining whether self-harm is available to an individual as a means of emotion regulation. The authors suggest that these core cognitions interact with stable *interpersonal vulnerabilities* (such as the propensity to emotional reactivity) in creating the context for risk of self-harm.

To date, studies have yet to explore the interaction between NUR - as one form of interpersonal vulnerability - and self-harm cognitions in determining risk for self-harm. Yet, within the broader field of adolescent psychopathology and risky behaviour such examinations are extensive. For example, Fischer and colleagues (Fischer, Peterson, & McCarthy, 2013) found that adolescents with high levels of NUR engaged in the most frequent binge eating when they also endorsed the expectancy that eating alleviates negative affect. Similar results have been found in alcohol-related studies with undergraduate and school-based students (Adams, Kaiser, Lynam, Charnigo, & Milich, 2012; Jones, Chryssanthakis, & Groom, 2014). In articulating the relationship between NUR, eating expectancy and disordered eating, a transactional model for risk has been described in which individuals high in NUR who are exposed to learning experiences that involve eating when distressed, are biased to form expectancies associating eating behaviour with the negative reinforcement of distress relief (Combs, Smith, Flory, Simmons, & Hill, 2010; Fischer et al., 2008). This risk-process draws on Acquired Preparedness theory (Smith & Anderson, 2001) which suggests that individuals are differentially prepared to acquire expectancies as a function of their personality traits. It is suggested that individuals who are impulsive may be biased towards selective attention to immediate reward-related information. Hence, according to this conceptualisation, those who have difficulty inhibiting impulsive behaviour during distress, may be more readily susceptible to the adoption of a behaviour that they have learnt is an easily obtainable quick-fix solution to reducing their negative affect, disregarding alternative and less

immediately rewarding courses of action. Thus, trait NUR influences the formation of an individual's outcome expectancies, and these expectancies in turn become proximal risk-factors (quick go-to options) which maintain the behaviour over time (Pearson, Combs, Zapolski, et al., 2012). Research has yet to extend this explanatory model of behaviour to self-harm, but it is plausible that the adoption of self-harm provides just such an immediate fix solution for individuals high in NUR who have derived the expectancy that self-harm will alleviate affect. (Of note, subsequent to the design and implementation of the present study a new outcome expectancy measure for self-harm was published – the (NEQ) Non-Suicidal Self-Injury Expectancy Questionnaire (Hasking & Boyes, 2018). The NEQ is a 49-item questionnaire, which asks about the anticipated consequences of self-harm, measured on a four-point Likert scale.) The present study seeks to offer an initial examination of the interaction between NUR and expectancies relating to the affect-regulating properties of self-harm, in the frequency of self-harm behaviour in adolescents. Such an examination may be useful in pinpointing proximal risk for self-harm among those with heightened impulsivity.

7.3 Key aims of Study 3.1

1. To establish the role of multidimensional impulsivity on self-harm in FE students. This reflects a novel examination of impulsivity facets in a population of mixed academic/vocational nature, and importantly allows a comparison with the school-based data for developmentally-focused insight.
2. To examine the relationship between emotion-based impulsivity and self-harm within the context of wider cognitive capabilities – such as the ability to tolerate distress and the capacity for self-control. This would add to understanding of how intrapersonal vulnerability factors (associated with self-regulation generally, and in relation to emotion), may interact with levels of impulsivity to lead to self-harm.
3. To consider how cognitions about self-harm (e.g. the expectations that it will achieve affect-regulation) influence pathways between NUR and self-harm.

It is hypothesised that:

1. SUPPS-P facets, predominantly Urgency facets and LPM will be associated with lifetime self-harm above and beyond other mood-based correlates (Claes et al., 2013).
2. The relationship between NUR and lifetime self-harm, or frequency of self-harm will be moderated by levels of self-reported distress tolerance and self-control, adjusting for the influence of depressive and anxiety symptomatology (Peterson et al., 2014; Dir et al., 2013).
3. The relationship between NUR and self-harm frequency will be moderated by the expectation that self-harm will achieve a positive result (regulate affect) or a negative result (not regulate affect). Drawing on findings in adolescent populations from the wider field of maladaptive behaviour (Fischer et al., 2013) tentatively it is suggested that there will be an interaction between NUR and self-harm expectancies in predicting increased frequency of self-harm. Specifically, it is anticipated that individuals high in NUR who endorse the expectation that self-harm will achieve affect regulation will be more likely to endorse frequent self-harm than those who do not endorse this expectation.

7.4 Method – Phase one: Study 3.1

7.4.1 Design

Study 3.1 employed an online survey. The methodology largely replicated the SHIP-SHAPE school paper-based survey with the additional incorporation of cognition-based measures. The online mode of delivery was necessary in practical terms given the wide geographical spread of the participating colleges and the split-site nature of a number of vocational courses. In addition, it brought the advantage of programming logic, which can reduce participant burden where questions are not relevant, by allowing students to skip questions, or exit the survey quickly via managed safeguarding routes. Originally, a longitudinal follow-up collection had been planned for this phase of the study, and thus, following the model of Study 1.2 (Chapter 5), follow-up data were captured 12 weeks following the initial baseline assessment. However, response to the

repeated survey was very low (n=45). Thus, main analyses are presented using baseline survey data only. (See section 7.5.3 for further discussion about study completion rates and Chapter 9 for discussion about the challenges of recruitment.)

7.4.2 Participants

Participants were students aged 16 to 25 years of age recruited from Further Education settings in the East Midlands from February 2017 until June 2017. Four settings were recruited: two inner-city; one suburban; one semi-rural. A range of academic and vocation-based pathways are provided across these establishments including A-Levels, Access to Higher Education courses, BTECS and apprenticeships in areas such as Engineering, Catering, Hairdressing. The potential student body approximated 8,700 students. As specified in the study's ethics protocol, the survey was administered during tutor-facilitated lab-sessions, which afforded opportunities to verbally reinforce information regarding anonymity, participant rights and signposting, as well as additional safeguarding checks. Thus, the potential reach of the study was limited to those who joined timetabled sessions during the study period. It was not possible to obtain a complete record of student participation numbers in these lab-sessions. The target minimum sample size was 500, based on endorsed self-harm of 15-20% and a minimum of 10 participants per parameter for regression analysis (Norman & Streiner, 2003).

7.4.3 Measures

The online survey replicated the SHIP-SHAPE school survey as outlined fully in Chapter 4 and full details of measures are described (section 4.4.3). Additional items captured:

7.4.3.1 Qualification and Course characteristics

Participants were asked to indicate their Qualification history (obtained number of GCSEs A*-C / D-G); Current course title (open response with prompt e.g. A' Levels, Hairdressing, Car Mechanics) and current course Level (open response with prompt) e.g. Entry Level (no requirement for GCSEs required) / Levels 1-2 (e.g. GCSE level or equivalent) / Levels 3-5 (e.g. A and AS level, Higher National Certificate).

7.4.3.2 Ability to tolerate distress

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is a 15-item self-report designed to assess the extent to which an individual believes they can accept and withstand distressing emotional states. A five-point Likert scale rates responses from 1 (strongly agree) to 5 (strongly disagree) across four subscales (Tolerance, Absorption, Appraisal, Regulation). Subscale scores are averaged to produce a total Distress Tolerance score with higher scores indicating higher tolerance. Individuals with low distress tolerance, as indicated by the DTS, are more likely to perceive distress as intense, unacceptable and uncontrollable (Simons & Gaher, 2005). The DTS has demonstrated sound psychometric properties (Simons and Gaher, 2005) and excellent internal consistency for total DTS in community based adolescent samples ($\alpha=.91$) (Peterson et al 2014). Within the current study internal reliability was excellent ($\alpha=.92$).

7.4.3.3 Self-control

The Brief Self-Control Scale (BSCS; Tangney et al., 2004) is a 13-item scale which assesses individual differences in the ability to control one's behaviour. The BSCS has demonstrated similar psychometric properties (good internal reliability and test-retest reliability) to a longer version of the scale (36 items) developed by Tangney and colleagues (2004) and is the more consistently employed measure (Morean, DeMartini, Leeman, Pearlson, Anticevic, Krishnan-Sarin et al., 2014). Summed BSCS scores reflect a unidimensional total self-control trait which represents the tendency to be disciplined and resist impulses – high scores represent greater self-control. The total self-control has shown good internal reliability in a university-based sample (Tangney, 2004). More recent psychometric testing has proposed that a two-factor structure for the BSCS, reflecting impulsivity and restraint as two distinct but related factors, is a more appropriate structure for the scale (Maloney, Grawitch, & Barber, 2012; Morean et al., 2014). However, in an empirical test of these models (Lindner, Nagy, & Retelsdorf, 2015) it was found that the two-dimensional solution did not substantially improve predictive power regarding outcome variables. In the current study internal reliability for the aggregated scale was good ($\alpha=.84$).

7.4.3.4 Expectancies of self-harm

Four statements were included in the survey to capture expectancies about the affect-regulating properties of self-harm. Given the lack of prior research exploring self-harm related expectancies, these questions draw from the wider self-harm and affect-regulation literature. Statements 1-3 were based on the three items which comprise the affect-regulation function scale of Section II of the Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009). The ISAS has good reliability and validity established in samples of mid to late adolescents (Klonsky and Olino, 2008). Participants were asked to indicate the extent to which they agreed with the following four statements: (1) When I self-harm I expect to feel ...calmer; (2) When I self-harm I expect to feel ...a release of emotional pressure; (3) When I self-harm I expect to feel ...less anxious, frustrated, angry or other emotions; (4) When I self-harm I expect to feel ...better. Participants were asked to indicate their response to each statement by choosing one of four options: two framed as a positive expectation that self-harm will achieve an affect regulation effect (Yes/ Yes, for a while), and two framed as a negative expectation (No / Yes, but it won't last for long).

7.4.3.5 Internal reliability for repeated measures in the survey

Pathways to impulsivity – Internal reliability for the SUPPS-P subscales (Whiteside & Lynam 2001; Lynam et al., 2006) in the present study were good to acceptable: NUR $\alpha = 0.84$; LPM $\alpha = 0.84$; $\alpha = 0.88$; LPS $\alpha = 0.74$; SS $\alpha = 0.73$.

Difficulties regulating emotion – Internal reliability for the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) total subscale was excellent $\alpha = 0.91$.

Recent (past week) Depressive and Anxiety symptomatology – Internal consistency for the anxiety and depression subscales of the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) in the present study were good to acceptable: Anxiety $\alpha = 0.82$; Depression $\alpha = 0.78$.

7.4.4 Procedure

Ethical approval for Study 3.1 was obtained from the Division of Psychiatry and Applied Psychology Research Ethics Sub-Committee at The University of Nottingham. As Study 3.1 replicates and extends the SHIP-SHAPE school-based survey an amendment to the ethical

approval granted for Study 1.1 and 1.2 was sought and obtained (Ref 202. Amendment, see Appendix F2).

Invitations to participate were sent by email to designated Heads of Student Safeguarding within Further Education settings, and followed up with telephone calls and face-to-face meetings. Once settings confirmed participation, group sessions were held with tutors who would be facilitating data collection during tutor-led sessions. At these, tutors were provided with a copy of study materials and a PowerPoint presentation for students. The presentation included talking points regarding participant rights and details of how to access the online survey housed on individual college portals. During tutor-led sessions held over the study period students were introduced to the study, and invited to access the link to the online survey. At the end of the tutor-sessions signposting information was verbally reinforced.

The survey was produced using the Bristol Online Survey (BOS) programme. Once the link to the survey was accessed, participants were provided with general information about the research and asked to provide consent. Participants declining consent were directed to a “chill out” page, which incorporated mood enhancing funny animal GIFS (Graphics Interchange Format) and additional signposting information. Otherwise participants proceeded through the stages of the survey before reaching the chill out/signposting information. Animal GIFS were incorporated at the end of each section to make progression through the survey more stimulating. Participants proceeded through three survey sections. Section One: “All About Me” included demographic questions; Section Two: “Is this like me?” included psychological measures; Section three: “Self-harm” included questions on self-harm behaviour and thoughts on help-seeking. (As in study 1.1, help-seeking questions were included in the survey which explored if young people would feel able to talk to someone in college about difficulties they were having with self-harm, who they would feel able to talk to, or the reason they would not feel able to do so. These questions were included to establish good relations with colleges and support local pastoral care provision. Findings from this data were not included in the thesis.). Three “Quick exit” buttons were also included within the self-harm section. Clicking on these immediately took participants to the

chill-out/signposting page. These aimed to ensure that participants who chose to withdraw were guided to signposting and mood enhancement pages, and did not simply exit the survey without support messages. Resource sheets and signposting information were additionally made available on individual campuses and on the college intranet. At the start and end of the survey participants completed a Visual Analogue Scale (VAS) gauge of their current mood (see Chapter 6 for further discussion of this tool). At the end of the survey students were thanked for their participation. Finally, students were invited to indicate interest in taking part in a further research study about self-harm by providing a personal email address. (Sample pages from the online survey which include items not included in the SHIP-SHAPE school survey are included in Appendix C2). Completion of the survey took between 20- 30 minutes.

Participants were not asked to include their names on the survey, but to provide their Student Identification code. This enabled student responses which indicated cause for concern, and which necessitated confidentiality to be breached, to be flagged with the college-designated contact who could instigate college safeguarding procedures. Survey responses were scrutinised by JL within 24 hours according to the ethics protocol to determine risk. Subjective judgments of risk were made by the researcher on the basis of mood, open indication of suicidality, or other disclosure of concern. In two cases, this resulted in discussion with supervisors and referral to the college-designated safeguarding officer.

7.4.5 Data analysis

The IBM Statistical Package for the Social Sciences (SPSS) version 24.0 for Windows (SPSS, IBM) was used for all analyses. Moderation analyses were performed using the PROCESS macro v 2.15 for SPSS (Hayes, 2012). Missing data analysis revealed that there was less than 1% of missing data for all predictor variables. Little's MCAR test was not significant (Chi-Square 16.518 $df=19$, $p=.623$) indicating that data could be presumed to be Missing Completely at Random. Analysis proceeded using pairwise deletion. Each predictor variable was checked for normality. Three variables were not normally distributed (depressive and anxiety symptomatology and PUR) as judged by reference to histograms/Q-plots and z-skew scores larger than ± 1.96 . Continuous

variables that were not normally distributed were presented by reporting the median and interquartile range (IQR) and compared using Man-Whitney U tests. Otherwise, means and standard deviations and t-tests are presented. Chi-square tests were used to explore categorical variables. Associations between variables were explored using Pearson's product-moment correlation coefficient (r) or Spearman's rank-sum correlation coefficient (r_s). Assumptions of normality are not required for logistic regression. Data met the assumptions required of logistic regression i.e. there was a linear relationship between the continuous predictor variables and the logit transformation of the dependent variable confirmed by the Box-Tidwell procedure (Box, 1962). Outliers were removed for multivariable analyses. Data did not show problematic multicollinearity: specifically, there were no tolerance value less than .1 and no variance inflation factor value greater than 10 (Menard, 1995).

To establish the relationship between SUPPS-P facets and lifetime self-harm (Question 1), first a series of univariable binary logistic regression models established bivariate associations. Then, hierarchical logistic regression (using a stepwise method) established if the independent predictive utility of multidimensional impulsivity held when adjusting for the influence of mood-based correlates. The lifetime self-harm variable was dichotomised into 0 (no self-harm) and 1 (self-harm).

To establish the interactional effects of measures of cognitive appraisal (distress tolerance and self-control) and NUR on self-harm outcomes - lifetime self-harm, frequency of self-harm, (Question 2), moderation analyses were performed. Predictor variables and their interaction were included in a logistic regression model, and conditional effects scrutinised. Direct effects and interactions were assessed using the PROCESS macro with a 95% confidence interval and 5,000 bootstrap resamples. Bias-corrected bootstrapping does not make assumptions of normality (MacKinnon, Lockwood, & Williams, 2004). Ahead of moderation analysis scores were mean centred before the computation of the interaction term (Dawson, 2014) to prevent multicollinearity and allow greater interpretability (Hayes, 2013). Frequency of self-harm was specified as: low frequency (1-4 times) high frequency (more than 5 times).

To establish the interactional effects of cognitions about self-harm (Expectancies) and NUR on frequency of self-harm (Question 3) a series of moderation analyses were performed. NUR and each Expectancy outcome in turn, and their interaction, were included in a logistic regression model and conditional effects scrutinised using the PROCESS macro (Hayes, 2013). Each expectancy outcome (feel calmer / feel a release of pressure / feel less emotional / feel better) was dichotomised (positive expectancy i.e. self-harm would achieve affect regulation = 1, negative expectancy i.e. self-harm would not achieve affect regulation = 0).

7.5 Results

7.5.1 Sample demographics

Three hundred and seventy-nine participants completed the baseline survey. However, five stated they were older than 25 years of age and were removed, leaving a sample size for analysis of 374 participants. Participants were aged 16 to 22 years, with a mean age of 17.18 years ($SD=1.120$). The mid-adolescent category (16-17 years of age) accounted for a larger overall proportion of respondents (73.3%) than the late-adolescent category (26.7%). Female respondents (59.1%) outnumbered males (39.6%) and five participants chose not to indicate a gender (1.3%). Respondents mainly identified as white British (75.7%) with 9.4% of Asian heritage, 6.1% Black/Afro-Caribbean, 6.7% mixed ethnicity, 0.5% Arabic, and 1.6% other. The majority of respondents (78.4%) indicated that they had achieved five or more G.C.S.E.s at A*- C grade. Academic courses were being undertaken by 68.2% of the sample, and 31.8% were enrolled on Vocational courses.

Table 7.1. Demographic information, and scale scores for Study 3.1

		Total sample N=374(%)	No self-harm N=243(%)	Self-harm N=131(%)	T-test, χ^2 - Kruskal -Wallis	Significance
<i>Demographics</i>						
Age						
	N 16-17 years (%)	274 (73.3)	179 (65.3)	95 (34.7)	$\chi^2 = 0.057$	p=.812
	N 18-22 years (%)	100 (26.7)	64 (64.0)	36 (36.0)		
Gender						
	N Male (%)	148 (39.6)	104 (70.2)	44 (29.7)	$\chi^2 = 2.406$	p=.121
	N Female (%)	221 (59.1)	138 (62.4)	83 (37.5)		
Ethnicity						
	White (%)	283 (75.7)	172 (60.8)	111 (39.2)	$\chi^2 = 8.998$	p=.003
	Non-white (%)	91 (24.3)	71 (78.0)	20 (21.9)		
<i>Qualifications</i>						
	N more than 5 GCSEs A*-C (%)	291 (78.4)	195 (67.0)	96 (32.9)	$\chi^2 = 2.493$	p=.114
	N fewer than 5 GCSEs A* - C (%)	80 (21.6)	46 (57.5)	34 (42.5)		
	N Academic pathway (%)	255 (68.2)	167 (65.4)	88 (34.5)	$\chi^2 = 0.094$	p=.759
	N Vocational pathway (%)	119 (31.8)	76 (63.8)	43 (36.2)		
<i>Setting</i>						
	College 1	31 (8.3)	16 (51.6)	15 (48.3)		
	College 2	155 (41.7)	92 (59.4)	63 (40.6)		
	College 3	178 (47.8)	127 (71.3)	51 (28.6)		
	College 4	8 (2.2)	8 (100)	-		
<i>Study variables</i>						
SUPPS-P						
	Mean Negative Urgency (SD)	9.41 (3.15)	8.49 (2.9)	11.12 (2.9)	t=-8.428	p<.0001
	Mean (lack of) Perseverance (SD)	7.84 (2.34)	7.83 (2.2)	7.85 (2.6)	t=-.060	p=.953
	Mean (lack of) Premeditation (SD)	7.97 (2.25)	7.65 (2.1)	8.55 (2.4)	t=3.604	p<.0001
	Mean Sensation-Seeking (SD)	10.61 (3.00)	10.93 (2.8)	10.02 (3.31)	t=2.679	p=.008
	Median Positive Urgency (IQR)	8.00 (5)	7.00 (2.9)	8.00 (3.38)	z-3.318	p=.001
HADS						
	Median HADS- ANX (IQR)	5.00(5.75)	7.00 (5)	11.00 (6)	z=-8.010	p<.0001
	Median HADS -DEP (IQR)	8.00 (7)	4.00 (5)	7.00 (6.25)	z=-7.031	p<.0001
DERS						
	Mean Total score (SD)	48.06 (13.72)	43.52 (17)	57 (18)	t=-9.443	p<.0001
Self-control						
	Mean Total score (SD)	40.43 (9.43)	42.65 (9.06)	36.31 (8.71)	t=6.542	p<.0001
Distress tolerance						
	Mean Total score (SD)	3.17 (2.56)	3.41 (.79)	2.72 (.91)	t=7.293	p<.0001

Notes: K-W = Kruskal-Wallis. HADS = Hospital Anxiety and Depression Scale, DERS = Emotion Dysregulation Scale; Self-control = Brief Self-Control Scale; Distress Tolerance = Distress Tolerance Scale. IQR (interquartile range) SD (standard deviation)

7.5.2 Descriptive and correlational analysis

7.5.2.1 Prevalence and frequency of self-harm thoughts and acts

Thirty-five per cent of young people indicated a lifetime history of self-harm ($n=131$). Of the remaining respondents $n=40$ (10.7% of the total sample) indicated that they had thought about self-harm but not acted on the thought. A higher proportion of girls reported self-harm acts (37.5%) than boys (29.7%), see Table 1. Girls were also more likely than boys to endorse thinking about self-harm but not acting on their thoughts (13.1% v. 6.8%). These were not statistically significant differences. Of those endorsing behaviour, $n=50$ (13.5%) described not having self-harmed for over a year, $n=60$ (16.2%) described having self-harmed in the past 6 months, and $n=20$ (5.3%) described past month behaviour. (One participant did not indicate an answer.) Frequencies of behaviour were evenly spread (see Table 7.2). Groups with and without a history of lifetime self-harm did not differ according to age group, gender, educational attainment (achieving 5 GCSEs at A*-C), or education pathway (academic v vocational). However, groups differed according to ethnicity with respondents identifying as white being more likely to endorse self-harm compared to those of non-white heritage ($OR=1.785$, 95% CI 1.180 – 2.698, $p=.003$). Kruskal-Wallis tests revealed there was also a statistical difference in the proportions of those indicating self-harm relative to no self-harm among the four college settings. Pairwise analyses indicated that the two large inner city colleges did not differ from one another, however they each differed in relation to the other two colleges. This finding may reflect a difference in the distribution of ages or vocational profile between colleges 1 and 2 (16-22 years, mixed academic and vocational) and colleges 3 and 4 (16-19 years, academic). Groups with and without self-harm differed on all psychological variables at $p<.05$, with the exception of the LPS subscale of the SUPPS-P impulsivity scale.

Table 7.2. Frequency of self-harm behaviour

Frequency of self-harm	N (%)
Rarely 1-2 incidences	45 (34%)
Sometimes 3-5 incidences	34 (26%)
Often 5-10 incidences	21 (16%)
Very often >10 incidences	30 (23%)

Notes: Number of participants providing a response to this item = 130/131

7.5.2.2 Acting on the urge to self-harm

Of those endorsing self-harm, a total of 67.2% of young people reported acting on the urge to self-harm within an hour of the first thought, with 40.5% indicating acting within 10 minutes of the first urge. Of the remaining respondents, 14.5% acted between 1 and 12 hours; 18.3% did not act for over a day from first thinking about self-harm.

7.5.2.3 Methods and reason for last act of self-harm

Young people indicated that cutting was the most common self-harm method used in their last incident (Table 7.3). Of those indicating self-harm, 47.9% endorsed one method – the remainder endorsed between two and six methods. Feelings of sadness and being angry or upset were the main reasons for self-harm (see Table 7.4)

7.5.2.4 Correlational analysis of continuous variables

Correlations between study variables are reported in Table 7.5. There were weak to moderate significant relationships between NUR and other mood related correlates (, emotion dysregulation, depressive and anxiety symptomatology) and measures of cognitive appraisal (self-control, distress tolerance). The strongest correlations were between anxiety symptoms and emotion dysregulation ($r_s = .67$).

Table 7.3. Main methods for last incidence of self-harm

Method of self-harm	N	%
Cutting	64	(24)
Punching something	53	(20)
Severe scratching	44	(17)
Biting	28	(11)
Banging /Hitting self	31	(12)
Pinching	22	(8)
Swallowing dangerous substances	12	(5)
Burning	8	(3)

Notes: Number of participants providing a response to this item =123

Table 7.4. Main reasons for last incidence of self-harm

Reasons for self-harm	N	%
Feeling sad	78	(22)
Feeling angry	68	(19)
Feeling upset	66	(19)
Feeling anxious or worried	55	(16)
Family arguments/problems	41	(12)
Friendship issues	34	(9)
Can't remember	12	(3)

Notes: Number of participants providing a response to this item =123

Table 7.5. Correlation matrix showing the association between continuous study variables

	1	2	3	4	5	6	7	8	9
1 Negative Urgency									
2 (lack of) Perseverance	-.07								
3 (lack of) Premeditation	.27**	.31**							
4 Sensation-Seeking	-.07	.24**	-.12						
5 Positive Urgency (r_s)	.48**	-.032	.32**	.21**					
6 Emotion Dysregulation	.63**	.09	.33**	-.19	.41**				
7 Depressive symptoms (r_s)	.49**	.15**	.24**	-.12	.28**	.62**			
8 Anxious symptoms (r_s)	.52**	-.03	.14**	-.13	.31**	.67**	.59**		
9 Total self-control	-.54**	-.15**	-.46	-.03	-.51**	-.61**	-.44**	-.42**	
10 Total Distress Tolerance	-.51	-.02	-.10	.18**	-.29**	-.58**	-.47**	-.56**	.36**

Notes: Significance: ** $p < .01$. The table presents Pearson product-moment correlations (r), unless specified as Spearman rank-order correlation coefficients (r_s). Strength of association is indicated as r/r_s : ± 0 -.3= little or no relationship; ± 0.3 -.5 = weak relationship; ± 0.5 -.7 = moderate relationship; ± 0.7 -.9 strong relationship.

7.5.3 Study completion rates

The research design for study 3.1 had originally intended a cross-sectional and prospective analysis in line with the SHIP-SHAPE school studies, but high levels of attrition (78%) in the college sample following baseline assessment meant only the cross-sectional analyses were completed. A brief comparative analysis of data from the 45 participants who completed surveys at both time points (completers) and the 329 who were lost to follow-up (non-completers) was performed. Chi-square analysis revealed that completers and non-completers did not differ according to age-group ($p=.480$), gender ($p=.562$), ethnicity ($p=.861$) or setting ($p=.622$). However, they did differ according to educational attainment ($p=.003$). Those achieving fewer

than five GCSEs at A*- C were less likely to complete the follow-up survey. T-tests and Mann-Whitney U tests revealed that completers and non-completers did not differ in terms of psychological variables (NUR, PUR, LPS, SS, anxious or depressive symptomatology, emotion dysregulation, self-control, or distress tolerance). However, they did differ in terms of LPM ($p=.036$) with those lost to follow-up having higher deficits in Premeditation (mean 8.06, $SD=2.27$) than those who completed both surveys (mean 7.31, $SD=1.95$). Completers and non-completers did not differ in terms of reported self-harm history at baseline ($p=.281$).

7.6 Key Research Questions

7.6.1 Question 1: *Is impulsivity associated with lifetime history of self-harm, over and above the influence of mood-based correlates?*

A series of univariable logistic regression analyses indicated that gender, age, educational attainment, and LPS did not have a significant relationship with lifetime history of self-harm. All other predictors were significant at $p<.0001$, apart from SS which was significant at $p=.005$ levels (See Table 7.6)

Table 7.6. Univariable logistic regression of the association between SUPPS-P facets, additional covariates and lifetime self-harm

	b	se	Wald	OR	95% CI	sig
Negative Urgency	.309	.043	51.383	1.362	1.252 - 1.482	<.0001
(lack of) Perseverance	.003	.046	.004	1.003	.916 - 1.098	.950
(lack of) Premeditation	.182	.050	13.189	1.200	1.087 - 1.324	<.0001
Sensation-Seeking	-.102	.037	7.708	.903	.840 - .970	.005
Positive Urgency	.126	.035	12.823	1.134	1.059 - 1.215	<.0001
Emotion Dysregulation	.084	.011	61.289	1.088	1.065 - 1.111	<.0001
Depressive symptoms	.220	.033	45.216	1.246	1.169 - 1.329	<.0001
Anxious symptoms	.234	.031	55.645	1.263	1.188-1.343	<.0001
Age	.058	.244	.057	1.061	.657 - 1.710	.812
Gender	-.352	.227	2.197	.703	.451 - 1.098	.122
Educational Attainment	.406	.258	2.476	1.501	.905 - 2.491	.116

Notes: Odds ratios represent the increase in likelihood of reporting lifetime self-harm relative to no self-harm per one unit rise in predictor variable. Gender reference category = boys. Numbers in bold remain significant after adjusting for multiple analyses at $p<.005$.

The results of the hierarchical binary logistic regressions are presented in Table 7.7. In the first model, gender, age and educational attainment were entered. Overall the model was not significant ($\chi^2 5.079$, $p=.166$, Nagelkerke $R^2 = 0.02$) and no variable predicted category membership at a statistically significant level. All five SUPPS-P variables were included in Model 2, which was significant and accounted for an additional 25% of the variance in lifetime self-harm ($\chi^2 73.240$, $p<.0001$, Nagelkerke $R^2 = 25.9\%$). Only two variables, NUR and LPM, were statistically significant predictor variables in this model increasing the likelihood of lifetime self-harm by 34.0% and 16.5% for each one-unit rise. The univariable influence of PUR and SS were attenuated and no longer significant. Model 3 adjusted for the influence of mood-based correlates and was an improvement on Model 2 accounting for 36.1% of the variance in lifetime self-harm ($\chi^2 106.908$, $p<.0001$). NUR retained its predictive utility although its influence was attenuated ($OR, 1.137$, 95% $CI 1.011$ to 1.279 , $p=.032$). In addition, Emotion Dysregulation was a significant predictor, increasing the likelihood of lifetime self-harm relative to no self-harm by 5.8% per one-unit rise.

In sum: College-based students aged 16-22 who engage in self-harm are best characterised by a tendency toward rash action in the face of heightened negative emotion, and more broadly by difficulties regulating emotion. To a lesser extent, acting without due regard to the consequences of behaviour may also lead to rash behaviour. This pattern of findings is similar to that found in school-based samples where NUR, Emotion dysregulation and anxiety symptomatology were multivariable correlates of lifetime self-harm. Unlike in the younger school-based sample, anxiety symptomatology appears to be a less important indicator of risk for older adolescents.

Table 7.7. Hierarchical logistic regression analyses examining multivariable associations with lifetime self-harm

	Model 1			Model 2			Model 3		
	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig
Age	0.931	.533 to 1.562	0.783	0.654	.362 to 1.168	0.153			
Gender	0.632	.394 to 1.008	0.055	0.669	.395 to 1.134	0.171			
Educational Attainment	1.497	.862 to 2.602	0.152	1.285	.686 to 2.408	0.433			
Negative Urgency				1.344	1.210 to 1.484	<.0001	1.137	1.011 to 1.279	.032
(lack of) Perseverance				0.949	.843 to 1.069	0.821			
(lack of) Premeditation				1.165	1.023 to 1.328	0.022			
Sensation Seeking				0.932	.849 to 1.023	0.136			
Positive Urgency				0.997	.906 to 1.097	0.952			
Emotion Dysregulation							1.058	1.021 to 1.096	.002
Depressive symptoms									
Anxious symptoms									

Note: Gender reference category = Male; Age reference category = 16-18 years; Educational Attainment reference category = ≥ 5 GCSE at A*-C

Model 1 adjusted for age, gender and educational attainment

Model 2 adjusted for Model 1 and UPPS-P facets

Model 3 adjusted for Model 2 and emotion dysregulation (DERS), anxious symptomatology (HADS-A) and depressive symptomatology (HADS-D)

7.6.2 Question 2: Is the relationship between urgency and self-harm influenced by measures of cognitive appraisal?

Logistic regression analyses were used to investigate the conditional effects of two measures of cognitive appraisal: Distress Tolerance and Self-Control on the relationship between NUR and the presence/absence of lifetime self-harm, or the frequency of self-harm (low: 1-4 incidences / high: 5 or more incidences). Each predictor variable was included in separate logistic regression models and conditional effects were scrutinised. Results are presented in Table 7.8.

First the moderating influence of Distress Tolerance was examined. Results revealed that Distress Tolerance and NUR were associated with lifetime self-harm at the $p < .001$ level. However there was no significant interaction ($p = .578$). NUR was significantly associated with self-harm frequency ($p = .04$), but Distress Tolerance was not, and there was no significant interaction between the independent variables ($p = .730$).

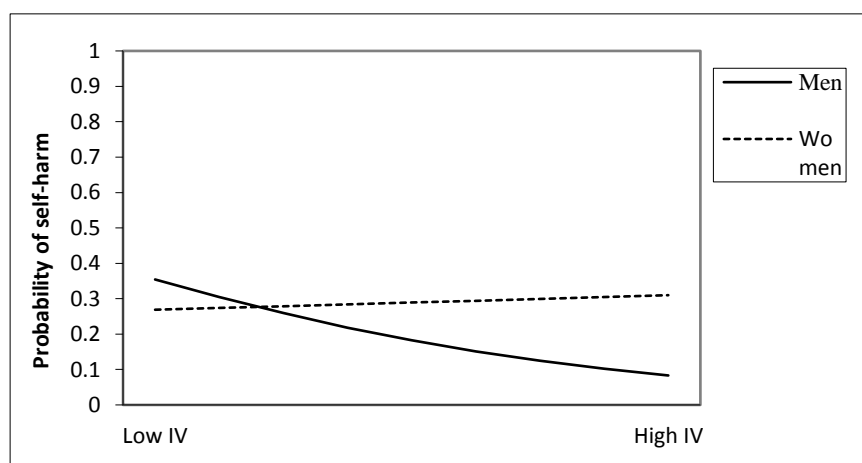
Further models were run in which depressive and anxiety symptomatology were included as covariates. In terms of lifetime self-harm, neither the inclusion of depressive symptomatology or anxiety symptomatology made any substantive difference to the findings. In terms of frequency of self-harm, the inclusion of depressive symptomatology resulted in a non-significant association between NUR and self-harm frequency. There were no other substantive changes. The same pattern of findings was found when anxiety symptomatology was included as a covariate.

Next, analyses considered the interaction between total self-control and NUR on endorsement of lifetime self-harm. Results are presented in Table 7.7. Each predictor variable was independently associated with lifetime self-harm at $p = .015$. However, there was no overall moderation effect ($p = .874$.) Finally, analysis examined the interaction between NUR, Total Self-Control and self-harm frequency. The results indicated a significant interaction ($OR\ 0.975$, $95\%\ CI\ 0.960 - 0.990$). Simple effects coefficients were computed at three levels of self-control (high, average, low) and exponentiated to produce odds ratios. Examining the interaction revealed that at low and mean levels of self-control an incremental rise in NUR increased the risk of high frequency self-harm,

relative to low frequency of self-harm by 59% and 28% respectively. There was no significant moderation at high levels of self-control ($p=.755$). Figure 7.1 charts the change in probability of high frequency self-harm for NUR at levels of self-control at -1 and +1 standard deviation from the mean.

Further models were run in which depressive and anxiety symptomatology were included as covariates. In terms of lifetime self-harm, the inclusion of depressive symptomatology and anxiety symptomatology resulted in the direct influence of self-control on self-harm no longer being significant, but made no other substantive difference to the findings. In terms of frequency of self-harm, the inclusion of depressive symptomatology resulted in a non-significant direct relationship between self-control and self-harm ($p=.69$). The interaction between NUR and self-control remained significant controlling for depression ($b=-.0235$, $SE .0081$, $p=.003$ $CI -.0395$ to $-.0076$). Including anxiety symptomatology resulted in non-significant direct effects between NUR and self-control on self-harm, but their interaction remained significant ($b=-.0227$, $SE.0081$, $p=.005$, $CI -.0386$ - $.2349$).

Figure 7.1. Change in expected probability of frequency of self-harm (low versus high) by NUR



Notes: SC = self-control; Frequency of self-harm (1-4 episodes=0, more than 5 episodes =1)

In sum – Mid to late adolescent self-harm is associated with low tolerance of emotion, but this vulnerability does not interact with rash emotional reactivity (NUR) in exercising its effect. Broader difficulties in self-regulation associated with low self-control do however influence the relationship between NUR and self-harm. Having little self-control increases the risk of more frequent self-harm in impulsive individuals. These findings hold over and above the influence of depressive and anxiety symptomatology.

Table 7.8. Logistic regression summary and conditional effects predicting lifetime self-harm and frequency of self-harm (high versus low) from Negative Urgency, Self-control and Distress Tolerance

Model	Lifetime self-harm (n=371)					Frequency self-harm (n=130)				
	<i>b</i>	<i>se</i>	<i>p</i>	<i>OR</i>	<i>95% CI</i>	<i>b</i>	<i>se</i>	<i>p</i>	<i>OR</i>	<i>95% CI</i>
<i>Regression summary</i>										
Negative Urgency	0.238	0.048	<.0001** *	1.269	1.154 to 1.395	0.156	0.078	0.04*	1.169	1.004 to 1.362
Distress Tolerance	-.582	0.164	<.0004** *	0.559	0.405 to 0.771	-.4708	0.241	0.051	0.625	0.389 to 1.002
<i>Negative Urgency * distress tolerance</i>	-.027	0.050	0.578 ns	0.973	0.882 to 1.073	-.027	0.078	0.736 ns	0.973	0.835 to 1.136
<i>Conditional effects of interaction on outcome</i>										
Low distress tolerance (1SD below mean)	0.263	0.062	<.0001	1.301	1.153 to 1.467	0.181	0.098	0.064	1.198	.989 to 1.450
Average distress tolerance (mean)	0.238	0.048	<.0001	1.269	1.154 to 1.395	0.156	0.077	0.044	1.169	1.004 to 1.361
High distress tolerance (1SD above mean)	0.213	0.070	0.002	1.237	1.078 to 1.420	0.132	0.114	0.247	1.141	0.912 to 1.426
<i>Regression summary</i>										
Negative Urgency	0.261	0.049	0.015*	1.298	1.178 to 1.429	0.247	0.088	0.004**	1.281	1.079 to 1.520
Self-control	-.039	0.016	0.015*	0.962	0.931 to 0.992	-.0213	0.026	0.419	0.979	0.930 to 1.031
<i>Negative Urgency * self-control</i>	-.001	0.005	0.875 ns	0.999	0.990 to 1.008	-.0249	0.008	0.001**	0.975	0.960 to 0.990
<i>Conditional effects of interaction on outcome</i>										
Low self-control (1SD below mean)	0.267	0.063	<.0001	1.306	1.153 to 1.480	0.465	0.128	.0003***	1.592	1.240 to 2.045
Average self-control (mean)	0.260	0.049	<.0001	1.297	1.178 to 1.429	0.247	0.088	.0048***	1.280	1.280 to 1.079
High self-control (1SD above mean)	0.253	0.674	<.0002	1.288	1.129 to 1.471	0.029	0.093	0.755	1.029	1.029 to 0.858

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. SE = standard error, OR = odds ratio, b=simple effects coefficient

Model 1. (Lifetime SH) Nagelkerke = 27.1%, Model 1 (Frequency of self-harm) Nagelkerke = 22.5%

Model 2. (Lifetime SH) Nagelkerke = 24.7%. Model 2 (Frequency of self-harm) Nagelkerke = 14.6%

7.6.3 Question 3: *Is the relationship between urgency and frequency of self-harm influenced by cognitions about the expectancy of self-harm?*

Moderation analyses were performed to establish the conditional effects of four different self-harm expectancies on the relationship between NUR and frequency (high or low) of self-harm. Results from all four models are presented in Table 7.9. First the interaction between NUR and the expectancy that following self-harm an individual will feel calmer were examined in Model 1. Results indicated a significant interaction ($p=.035$) which, when probed, revealed that among those with positive expectations of self-harm, a one unit increase in NUR was associated with a 44% increased risk of high relative to low frequency self-harm ($p=.001$). This relationship is charted in Figure 7.2a. There was no significant interaction between positive expectancies of self-harm and NUR ($p=.627$). There was a significant interaction between NUR and the expectation that following self-harm an individual would feel a release of emotional pressure ($p=.030$), as shown in Model 2. Among those with a positive expectation, an increase in one unit in NUR, was associated with a 59.7% increased risk of endorsing low relative to high frequency self-harm ($p=.001$), See Figure 7.2b. Again there was no interaction at negative levels of expectation ($p=.255$). There was also a significant interaction between NUR and the expectation that following self-harm an individual would be less anxious, frustrated, angry or other emotions ($p=.025$), presented in Model 3. Again, among those with positive expectations of affect reduction, who differed by one unit in NUR, the likelihood of endorsing low relative to high frequency of self-harm was associated with a 50.6% increased risk ($p=.001$). There was no significant moderation between NUR and negative expectancies ($p=.567$).

Finally, in Model 4 the interaction between NUR and the expectation that following self-harm an individual would simply feel “better” was examined. There was a significant interaction between NUR and this expectancy ($p=.028$). Again, among those with positive expectancies that they would feel better, a one unit increase in NUR, was associated with a 45.9% increased risk of endorsing low relative to high frequency self-harm ($p=.001$), but there was no interaction between NUR and the negative expectation of feeling better ($p=.671$).

Table 7.9. Logistic regression analyses examining the conditional effects of self-harm expectations on Negative Urgency in predicting frequency of self-harm

Frequency of self-harm					
Model 1 ($n=122$, $NR^2=13.6\%$, $p=.005$)					
Regression summary	<i>b</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>95%CI</i>
Negative Urgency	0.203	0.074	0.006	1.226	1.061 to 1.416
Expectancy 1 (to feel calmer)	0.203	0.392	0.605	0.816	0.378 – 1.761
<i>Negative Urgency * Exp 1</i>	-.3154	0.150	0.036	1.371	1.022 – 1.840
Conditional effects of interaction					
at Positive Expectation	0.363	0.113	0.001	1.440	1.151 - 1.795
at Negative Expectation	0.048	0.099	0.627	1.049	0.864 - 1.272
Model 2 ($n=121$, $NR^2= 16.8\%$, $p=.001$)					
Regression summary	<i>b</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>95%CI</i>
Negative Urgency	0.221	0.074	0.003	1.247	1.079 to 1.442
Expectancy 2 (a release of pressure)	0.493	0.391	0.208	1.637	0.760 to 3.526
<i>Negative Urgency * Exp 2</i>	-.370	0.170	0.030	1.448	1.037 to 2.021
Conditional effects of interaction					
at Positive Expectation	0.468	0.147	0.001	1.597	1.198 to 2.129
at Negative Expectation	0.098	0.087	0.225	1.103	0.931 to 1.307
Model 3 ($n=121$, $NR^2= 14.9\%$, $p=.003$)					
Regression summary	<i>b</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>95%CI</i>
Negative Urgency	0.208	0.074	0.005	1.232	1.065 to 1.424
Expectancy 3 (to feel less emotion)	-.128	0.388	0.741	0.879	0.411 to 1.883
<i>Negative Urgency * Exp 3</i>	-.355	0.158	0.025	1.426	1.045 to 1.946
Conditional effects of interaction					
at Positive Expectation	0.409	0.127	0.001	1.506	1.174 to 1.931
at Negative Expectation	0.054	0.095	0.567	1.056	0.876 to 1.272
Model 4 ($n= 120$, $NR^2=14.7\%$, $p=.003$)					
Regression summary	<i>b</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>95%CI</i>
Negative Urgency	0.206	0.074	0.005	1.229	1.064 to 1.420
Expectancy 4 (to feel better)	-0.021	0.397	0.959	0.980	0.450 to 2.135
<i>Negative Urgency * Exp 4</i>	.336	0.152	0.028	1.399	1.038 to 1.887
Conditional effects of interaction					
at Positive Expectation	0.378	0.116	0.001	1.459	1.163 to 1.832
at Negative Expectation	0.042	0.099	0.671	1.042	0.859 to 1.267

Note: $NR^2=$ Nagelkerke R^2

Figure 7.2a. I expect to feel better

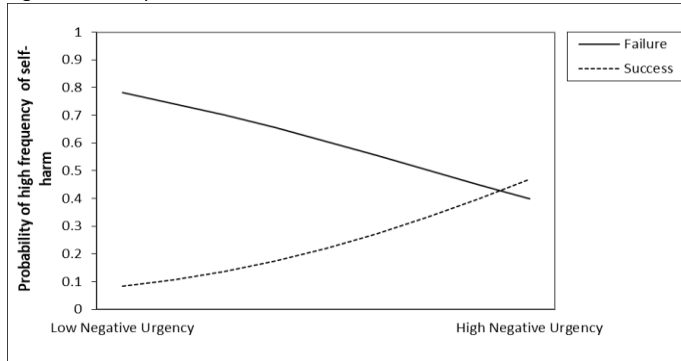


Figure 7.2b. I expect to feel a release of pressure

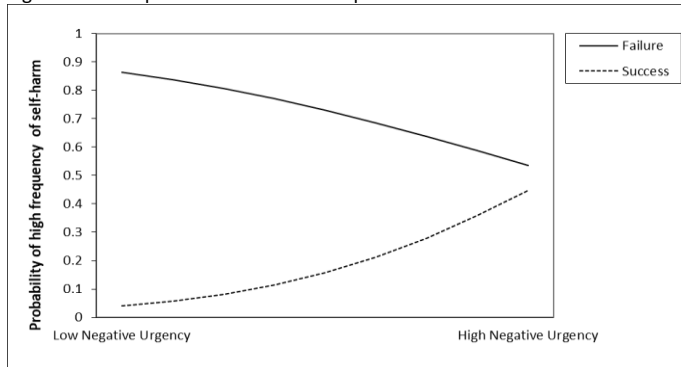


Figure 7.2c. I expect to feel less emotion

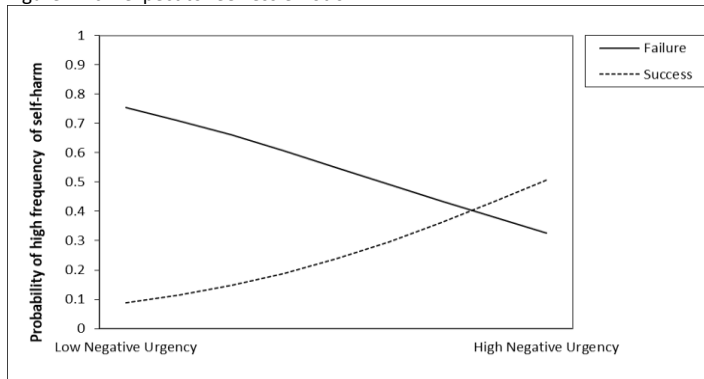


Figure 7.2d. I expect to feel better

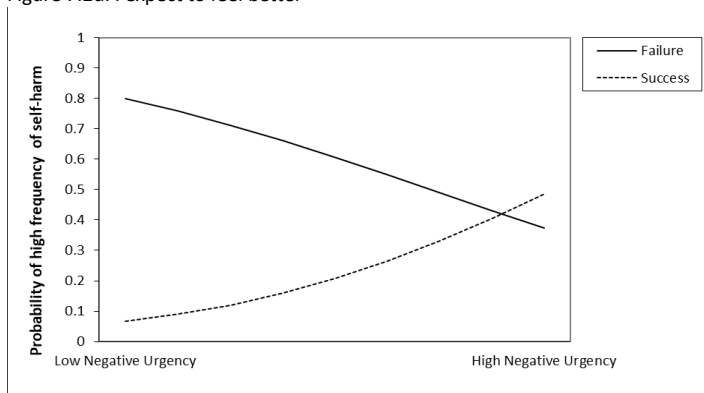


Figure 7.2. a-d Charts show the interaction between Negative and Positive Expectancies, NUR and the likelihood of endorsing high (more than 5 incidences) of self-harm. Success = self-harm would achieve a positive outcome; Failure = self-harm would not achieve a positive outcome.

In sum: The relationship between rash reactivity to negative emotion and the frequency of self-harm is influenced by cognitions that individuals have about the affect-regulating qualities of their self-harm. Across a range of different affect-related expectancies a similar pattern of findings were found. These suggest that among those with positive expectations that self-harm will achieve affect regulation, being impulsive may be an important factor in determining higher levels of self-harm. However, these factors in interaction are less important in determining risk where negative expectations that self-harm will achieve affect-regulation hold.

7.7 Discussion

This study aimed to establish the role of multi-dimensional impulsivity in a mid to late adolescent sample, and offer comparative data to the SHIP-SHAPE school study with early adolescents.

Further it aimed to examine the role of emotion-based impulsivity on self-harm within a broader cognitive processing and expectation context.

In regards to the first aim, the study adds support to a growing body of literature that is identifying a differential role for distinct facets of trait impulsivity in adolescent maladaptive behaviour (Claes, Islam, Fagundo, Jimenez-Murcia, Granero, Aguera et al., 2015; Claes & Muehlenkamp, 2013). In support of posed hypotheses, two facets of impulsivity - rash reactivity to emotion (NUR) and a tendency to act quickly without planning or forethought (LPM) - were identified as the most relevant to understanding lifetime self-harm for adolescents. Given that NUR and LPM remained significant over and above the influence of the other SUPPS-P facets, and when accounting for age (16-18 years or 19-22 years), gender and academic attainment, these facets appear to be consistent correlates of self-harm in this population. However, it is important to recognise that effect sizes were not large and need replication.

NUR retained significance over and above the influence of the remaining mood-based correlates. As such it would appear that it is the component of behavioural enactment in response to negative emotion, over and above emotionality, that seems pivotal to understanding impulsive risk profiles for self-harm. This finding is consistent with the conclusions reached in the SHIP-SHAPE school study, in which NUR at a single time-point was a significant predictor of lifetime self-harm over and above all other correlates. It is also in line with other research which has identified NUR as the UPPS-P facet most consistently associated with lifetime self-harm in late adolescent University-based samples (Glenn & Klonsky, 2010; Dir et al., 2013; Peterson & Fischer, 2012; Riley et al., 2015; Arens et al., 2012; Ogle & Clements, 2008) and High school youth (Claes et al., 2013). The current findings provide support for Urgency Theory and its importance in understanding self-harm across early, mid and late adolescence.

A clear picture of the emotional context of self-harm behaviour for young adolescents was revealed in the SHIP-SHAPE school data in which young adolescents who endorsed lifetime self-harm were best characterised by NUR, Emotion Dysregulation and anxiety symptomatology. While the emotional context of impulsive behaviour was also important in the college-aged sample, there were differences. Anxiety was not a correlate of self-harm beyond univariable analysis for this older group, although average rates of anxiety symptomatology were significantly higher for college students with self-harm history than those without. In fact, depressive symptomatology appeared more important to understanding the context of self-harm for this sample. Notably 'feeling sad or depressed' was the most frequently selected reason for a recent episode of self-harm in the college sample, with 22% of youth indicating they last self-harmed because of sadness, compared to 9% of adolescents in the school sample.

Associations between lifetime self-harm and the remaining impulsivity facets are worth considering. In contrast to findings presented elsewhere (Mullins-Sweatt et al., 2013; Arens & Gaher, 2012 Taylor et al., 2012) study 3.1 reported no significant association between LPS and self-harm. This finding is consistent with results from the SHIP-SHAPE school data and may indicate, as was the case with the early adolescent sample, that a more nuanced examination of

self-harm beyond lifetime history is required to reveal an association with this facet of impulsivity. Again, as with the school sample, PUR was a univariable predictor of lifetime self-harm in the college data, strengthening the conclusion that this facet of impulsivity, while moderately correlated with NUR ($r=.48$), nevertheless captures unique variance in self-harm behaviour not accounted for by NUR. Few studies have examined PUR in relation to self-harm (for exceptions see Rawlings et al., 2015; Dir et al., 2013; Mullins-Sweatt et al., 2013; Claes et al., 2013). The present findings are interesting in building a picture of the relevance of rash response to emotion – however valenced – as important in risk profiles for self-harm and suggests that PUR as a contributory factor in self-harm warrants greater investigation.

Sensation-Seeking, which reflects the tendency to seek out novel and exciting experiences, and a willingness to take risks associated with them (Berg, 2015) was a significant univariable predictor of self-harm in the college sample. Notably, higher levels of SS were associated with a reduced risk of endorsing lifetime self-harm. These results are hard to interpret. Where evidence of an association with self-harm has been reported in the literature (and broadly this has not been the case, see Lockwood et al., 2017; Hamza et al., 2015) findings have revealed moderate positive relationships, i.e. more risk-taking was related to higher risk of self-harm (Glenn & Klonsky, 2012; Liu & Mustanski, 2012; Knorr et al., 2013). SHIP-SHAPE school-based data supported this association in cross-sectional (Study 1.1) and longitudinal (Study 1.2) analyses. Evidence has suggested that heightened levels of SS is normative in early to mid-adolescent groups, indicating a peak around 11-13 years (Littlefield et al., 2017), or slightly later around 15-17 years (Steinberg et al., 2008; Romer & Hennessy, 2007). As such developmental stage can skew the interpretation of this variable. Arguably, the nature of the relationship between SS and self-harm may be qualitatively different once levels of SS start to level off. Plausibly, heightened excitement seeking or risk-taking tendencies in older adolescents groups (with increased resources at their disposal) may be satiated in other, less maladaptive ways. Given the small effect size and lack of association in multivariable analyses for SS these speculations are cautious, but further discussion about the influence of SS across adolescent groups is warranted.

Overall, 35% of this sample of college students reported a lifetime history of self-harm, with no significant gender differences. Prevalence was higher than reported in Study 1.1 (23%) and Study 1.2(27%). However, higher rates in community-based samples at comparable ages have been shown (e.g. Baetens, Claes, Willem, Muehlenkamp, & Bijttebier, 2011; Garisch & Wilson, 2015; Gratz, Conrad, & Roemer, 2002). The percentage of college participants reporting thoughts of self-harm but not acting on those thoughts was lower than the rate of self-harm endorsement (10.7%). This finding is consonant with the pattern of response in the school-based data (Chapters 4 and 5) and underlines that adolescents who think about self-harm are likely to act upon these thoughts.

There were other similarities in the pattern of self-harm described by college students and school-based students. Again, a high proportion of participants indicated acting within 10 minutes of first having the urge to self-harm (40.5%). This is slightly lower than the 47.6% of younger adolescents who selected this response option in the school-based study, which again could point to marginal differences in reflective processing in the older sample. As with the school-based youth, those aged 16-22 were most likely to endorse 'cutting' or 'punching something' as methods of self-harm for their most recent episode. Results suggest broadly similar patterns of self-harm thinking and acting across adolescent stages. Notably, youth with low academic attainment did not differ from those with a high academic record in terms of lifetime self-harm. Thus, as far as educational attainment is a marker of cognitive capability, this was not reflected as a risk factor at a broad level of self-harm. Relatedly, those with lower GCSE grades were less likely to complete the follow-up survey than those with higher grades. This finding may relate to academic capability, but may reflect the likelihood that those with lower educational attainment may be more likely to be undertaking non-academic pathways which involve increased off-campus commitments such as work placements/apprenticeships. (See methodological discussion Chapter 9, section 9.5.1).

The second key aim of Study 3.1 examined the relationship between NUR and self-harm within a broader cognitive context. Firstly, consistent with hypotheses, results indicated that college-aged

adolescents with low levels of self-control and elevated levels of NUR were at heightened risk of endorsing high frequency self-harm behaviour. This interaction remained significant over and above the influence of both depressive and anxiety symptomatology. Hence those who are highly motivated to respond quickly in the face of strong emotion, and who tend to be most strongly influenced by impulses and the pursuit of immediate reward, may be more likely to act in such a way as to immediately ameliorate this heightened emotional state, resulting in increased risk of more frequent behaviour. While NUR displayed a main effect on self-harm in the moderation model, individual differences in self-control did not. Thus, deficits in self-control alone may be insufficient to lead to a maladaptive behaviour such as self-harm, but when combined with NUR, may lead to self-harm as a means of alleviating heightened arousal and without adequate regard for the long term negative impact of such behaviour. Importantly, the inclusion of an interaction with self-control in the model improved the predictive utility of NUR. Hence, the simultaneous assessment of self-control with impulsivity allowed for a more comprehensive identification of risk for behaviour than a focus on impulsivity alone. There is a paucity of studies examining the conditional effects of self-control on impulsivity in the self-harm literature, however, these findings do support the risk profile identified in other maladaptive behaviours in late adolescent samples, such as alcohol dependency (Johnson et al., 2017). Moreover they support the path analysis findings of Dir and colleagues (2012) which found an indirect effect of self-control on self-harm via NUR. In addition, results indicated a moderate correlation between self-control and NUR ($r_s = -.54$) in this sample, supporting the position that while modestly overlapping, these constructs are distinguishable (Mao et al., 2018). As such, the rationale for examining impulsivity and self-control as discrete constructs is justified.

While both NUR and self-control were positively associated with lifetime self-harm, these main effects did not interact significantly. This null finding may relate to lack of statistical power. One explanation may be that difficulties in controlling impulses are heightened for youth exhibiting more severe patterns of self-harm behaviour. Arguably, lifetime self-harm may have been too broad a marker of behaviour to signal this interaction. Alternatively, examining the contribution of other trait pathways (such as low Premeditation) may have provided a different pattern of

findings. Depletion theories of self-control may help to explain why the interaction of impulsivity and self-control increased the risk for high frequency over low frequency self-harm. The strength model of self-control (Baumeister et al., 2007) posits that excessive efforts at self-control overly tax finite regulatory resources – rendering the capacity for self-control depleted and overstretched. By this account, maladaptive behaviour such as self-harm in those with a tendency to respond rashly to negative affect may derive not just from an inability to sufficiently cognitively regulate behaviour in the first instance, but from the wearing down of cognitive resources which increases vulnerability. In support for these theories, neural models using fMRI (functional Magnetic Resource Imaging) have revealed that individuals high in NUR show a more intense recruitment of inhibitory brain regions in the prefrontal cortex when they attempt to control their responses in a negative mood induction condition, than when in a neutral condition (Chester, Lynam, Milich, Powell, Andersen, & DeWall, 2016). Those displaying NUR traits have also been found to use inhibitory brain regions inefficiently and to excess resulting in eventual self-regulatory failure. Hence, in conditions of high frequency self-harm it could be expected that a low self-control x high NUR response pattern has most currency. However, it is recognised that trait-based measures of self-control do not allow a direct examination of depletion models of self-control.

In terms of distress tolerance, contrary to hypotheses there was no significant interaction between distress tolerance and NUR on lifetime self-harm or frequency of self-harm behaviour. The lack of interaction is perhaps surprising given previous findings across maladaptive behaviours. For example, low distress tolerance and high levels of NUR combined to increase vulnerability to dysregulated eating (Michael D. Anestis et al., 2007). In an undergraduate sample, Peterson and colleagues (2014) found that a combination of low distress tolerance, high NUR and high depressive symptoms increased risk for endorsing lifetime self-harm. Notably, the authors did not find any significant two-way interactions in their study. Importantly, the current analysis may have been underpowered to find an overall significant effect in the population. Evidence was found of a direct main effect for distress tolerance on lifetime self-harm behaviour i.e. those better able to tolerate distress were at lower risk of self-harm and this association held

over and above the influence of depressive and anxiety symptomatology. Thus, perceiving oneself as unable to tolerate distress is an important correlate of self-harm behaviour in youth and supports emotion regulation models of self-harm which suggest that how an individual subjectively experiences distress is an explanatory factor in the development of self-harm (e.g. Chapman, Gratz, and Brown, 2006; Linehan, 1993).

A final aim of study 3.1 was to examine if outcome expectancies surrounding the affect-regulation properties of self-harm interacted with tendencies towards emotion-based impulsivity in more comprehensively predicting likelihood of self-harm behaviour. As this was a novel exploration, hypotheses were tentative and not directional. Evidence in support of a significant interaction was found between NUR and each affect-regulation expectancy. Thus, for those individuals who held the expectancy that self-harm would produce sustained affect regulation, be that feeling calmer, a release of pressure, less emotional, or better, having elevated NUR increased the likelihood of more frequent self-harm. This finding supports evidence from the eating disorder literature which suggest that adolescents with elevated NUR engage in more frequent binge eating when they also endorse the expectancy that eating alleviates negative affect (Fischer et al., 2013; Fischer & Smith, 2008). A similar pattern of results is found in the literature relating to drug and alcohol use (e.g. Jones et al 2014; Adams et al., 2012). The findings provide support for a pattern of maladaptive thinking and acting in which difficulties inhibiting the impulse to act in response to emotion, may lead young people to select a quick behavioural response that they have come to expect will quickly reduce negative affect. After repeated negative reinforcement, self-harm thus becomes an ingrained behaviour. Avoiding this response may be less about being able to deal with negative emotion and more about being able to deal with the initial urge. Such ideas would be usefully explored in qualitative work with young people (see Chapter 8).

Not all young people endorse affect-regulation as a primary motivator for self-harm, nevertheless affect-regulation is a well-documented and commonly cited function (Klonsky, 2007; Nock, 2009). These results help to extend affect-regulation accounts of self-harm, by

indicating the conditions under which this function may perform. The findings sit logically within the explanatory framework provided by the cognitive-emotional model of non-suicidal self-injury (CEM-NSSI; Hasking et al., 2017). This model combines functional affect-regulation accounts of self-harm and cognition, and specifically articulates a role for outcome expectancies in the development of self-harm. Importantly, expectancy risk models can potentially help to explain why an individual chooses to self-harm, over another affect-regulating act, as well as explaining variability in self-harm over the life-course. Challenging problematic expectancies could offer a useful pathway for altering behavioural outcomes (Hasking et al., 2017) and be a useful clinical target. While the CEM-NSSI does not explicitly account for the role of impulsivity, theorists in the wider field of psychopathology have drawn on Acquired Preparedness theory (AP; Smith & Anderson, 2001) to account for the transaction between NUR, expectancy and maladaptive behaviour. AP models suggest that individuals are differentially disposed to acquire expectancies as a function of their personality traits (Smith & Anderson, 2001). Hence elevated urgency, which leads to selective attention towards immediately rewarding behaviour, may bias an individual towards a learned association that a rash response to heightened arousal will achieve a quick-fix solution. This expectancy will then become an immediate go to option when the individual next encounters intolerable emotion. The present findings are in line with these interpretations, but questions remain about how other regulatory processes identified as important – such as broad levels of cognitive control, or state level depletions in cognitive resources, combine with expectancy and impulsivity to heighten risk.

The present findings should be considered in light of a number of limitations. Study 3.1 relied purely on self-report data, which, as discussed in relation to Study 1 and 2, may be susceptible to the response and recall biases associated with this form of data collection. More problematically, the study is cross-sectional which precludes an examination of how impulsivity traits are associated with self-harm behaviour over time, and rules out the inference of causality. This is disappointing given an original intention to include this temporal element to the design (see Chapter 9 for further discussion), and recognition of evidence that cross-sectional correlates of self-harm/suicidality are not always predictive of the longitudinal course of behaviour (Glenn &

Nock, 2014). Future prospective studies are now required to address these temporal issues.

Nevertheless, the study approach offers a useful cross-subjects examination of the relationship between multidimensional impulsivity and self-harm at different stages of adolescence, which is important in light of evidence that the expression of a trait – and thus arguably its association with an outcome – may alter as a function of development (Littlefield et al., 2016; Steinberg et al., 2008).

Other methodological limitations are also noteworthy. The sample size was relatively small and may have been underpowered to identify significant associations and detect interactions. As such findings should be interpreted with caution. Expectancies were each measured with a single question and binary response, which is a crude gauge of outcome expectation, and asks young people to generalise about a complex and potentially fluid cognition. Nevertheless, the expectancy focus of the present study is an important and useful initial step in more comprehensively examining the cognitions surrounding self-harm. Present findings have underscored the role of impulsivity in lifetime self-harm within a college-based sample, but as discussed within the Systematic Review (Chapter 3) this is a broad indicator of behaviour. Further examination of the influence of unidimensional facets of impulsivity on the recency and frequency of self-harm is needed to clarify the differential influence of this trait across more nuanced accounts of self-harm. These examinations were not included in the present study given the broader cognitive scope of interest. (Of note, study 3.1. captured similar measures as those used in the school-based survey in study 1.1. This was because the school and college studies ran concurrently, and study 3.1 was in some degree an extension of study 1.1 within an older population. Limitations of measures (e.g. failing to capture an indication of self-harm behaviour in the past 6 months to a year) apply therefore to study 3.1. Although analyses were not performed using recency data for the college dataset, nonetheless there may have been inaccuracies in the descriptive reporting of recency characteristics. Future studies should utilise a more comprehensive capturing of recency data.) Finally, the study used trait-based measures of psychological constructs which help to explicate dispositional risk but do not necessarily speak to the state-based influences on behaviour that determine an individual act in the moment. Studies

have examined the relationship between NUR and self-control using performance-based measures which tap inhibitory control and regulatory performance (Billieux et al., 2010; Chester et al., 2016). Findings suggest that rash reactivity to negative emotions is more likely to take place when the experience of intense emotions interferes with inhibitory control and deliberative processing (Billieux et al., 2010). Hence negative affect impairs cognitive control, which in turn heightens rash response. The broad support for the transactional approach across quantitative methods, would be further enriched using qualitative methods.

Notwithstanding these limitations, the study has a number of strengths. First, the study corroborates evidence from the SHIP-SHAPE school-based study that facets of impulsivity have a differential relationship with self-harm, and, as such, supports the discriminative utility of the SUPPS-P measure. The study also provides a first test of the SUPPS-P measure in a mid-to-late adolescent non-university based sample often missing from the literature and thus fills an important developmental gap in understanding of self-harm in adolescence. Second, the study contributes novel information about how the relationship between NUR and self-harm is influenced by cognitive factors. This focus is important in extending Urgency Theory (Cyders & Smith, 2008) and explicating the cognitive conditions under which urgency heightens risk for self-harm. This transactional focus between impulsivity and cognition brings the self-harm literature in line with theoretical developments regarding impulsivity across the field of maladaptive behaviour (e.g. risk models in eating disorders, Pearson et al 2012). Situating the examination in the context of emerging psychological models e.g. the (CEM-NSSI; Hasking, et al., 2017) helps to advance theoretical development. Finally, the study findings have implications for clinical work. For example, a focus on regulatory processes relating to self-control, may be important in impulsive individuals who repeat self-harm. Therapeutic work to identify and challenge ingrained expectations may help to interrupt impulsive risk profiles.

KEY POINTS from this chapter

- (1) Adolescents at mid to late stages of development who have a history of self-harm are best characterised by rash action in response to negative emotion (NUR). This finding is consistent with the risk profile of youth in early adolescence, and confirms the discriminative utility of the SUPPS-P in self-harm research.
- (2) Older adolescents reported more sadness and depressive symptoms than younger youth, for whom anxiety symptoms appeared more problematic.
- (3) Findings helped to clarify the conditions under which NUR influences self-harm outcomes. Difficulties in self-regulation associated specifically with low self-control increased the risk of more frequent self-harm in impulsive individuals, but perceived tolerance of distress did not influence impulsive self-harm. Impulsive individuals who believed that self-harm would achieve affect regulation were more likely to endorse frequent self-harm.
- (4) Identifying the transaction between cognitions and cognitive processes and impulsivity can help to clarify heightened risk for self-harm. This may be clinically useful for better targeting treatment areas. This approach may also contribute to theoretical understanding of why some impulsive individuals may choose to self-harm, and help explain changes in risk profile.

Implications for Chapter 8

- (1) The relationship between emotion and cognition is important in understanding how risk for self-harm manifests. Greater understanding of how this risk relates directly (proximal influence) or indirectly (distal influence) is needed.
- (2) Studies that explore the temporal dynamics of emotional-cognitive pathways to self-harm will extend understanding of proximal and distal effects.
- (3) The greater depth of examination afforded by qualitative methods of enquiry in which processes involved in self-harm can be discussed and explored would bring novel insight.

Chapter 8: Impulsivity, emotion and internal processes of self-management. Understanding pathways to self-harm in college-based young people.

8.1 Overview

Chapter 8 further investigates how risk for self-harm behaviours in adolescence is associated with emotion, impulsivity and self-regulatory behaviour. Findings from Study 3.1 presented in Chapter 7 indicated (in line with school-based findings highlighted in Chapter 4) that links between impulsivity and lifetime self-harm are best described in terms of an impulsive response to heightened negative affect, and that difficulties in the regulation of emotion are additional important contributory factors in self-harm outcomes. Findings revealed that this emotion-driven context of impulsive self-harm was influenced by broader dispositional processes relating to the management of emotion and self-control, and to cognitions relating to the expectation that self-harm will deliver affect-regulation. Chapter 8 presents findings from Study 3.2 which sought to gather idiographic perspectives on the relationship between impulsivity, emotion, self-regulation and cognition in the trajectory of self-harm (or broader risk-taking behaviour) as understood and explained by young people. Fifteen college-based students, who had previously completed Study 3.1, took part in Study 3.2, completing two exploratory card-sorting activities and a face-to-face semi-structured interview. While a growing body of qualitative literature is now examining self-harm in community-based youth, interview-based studies that seek to understand adolescent self-harm specifically within an impulsivity-framed context are sparse in the literature. Study 3.2 seeks to fill this gap – using novel methods to facilitate discussion – to explore if and how the context of impulsivity, emotion and cognitive factors is meaningful to individual self-harm stories. Knowledge gained from this study, integrated with the patterns of behaviour identified in Study 3.1, will provide a more comprehensive understanding of the impulsive context of adolescent self-harm in college-based youth. Chapter 8 begins with a brief overview of relevant qualitative research findings. It then presents and discusses findings from this study.

8.2 Introduction

Research examining the influence of psychological factors on adolescent self-harm has drawn heavily on quantitative analysis and statistical methods to summarise and predict the association between variables - a quantitative bias which is reflected across the field of suicidology (Hjelmeland & Knizek, 2010; Kral, Links, & Bergmans, 2011). The present thesis makes a contribution to this body of empirical work, yet also recognises that a more comprehensive understanding of the psychological processes which influence a phenomenon such as self-harm is to be gained by reflecting not only methods of inquiry which seek to objectively quantify generalisable patterns of thinking and behaviour, but also those which seek subjective interpretations. An approach which draws on the strengths of separate quantitative and qualitative methods, can facilitate a more robust analysis of complex phenomena than can be offered by single approach designs (Johnson & Onwuegbuzie, 2004). Consequently, mixed approaches are increasingly advocated in the field of suicidology (Kral et al., 2011)

8.2.1 Existing qualitative literature

There is an emerging body of qualitative literature which is now seeking to capture the ways in which self-harm is understood by adolescents in clinical (Crouch & Wright, 2004) and community-based settings (Adler & Adler, 2007; Chandler, 2017; Hill & Dallos, 2012; Klineberg, Kelly, Stansfeld, & Bhui, 2013; Wadman et al., 2016). While extant studies have not directly examined mechanisms relating to multi-dimensional impulsivity and self-harm using qualitative interview techniques, findings to date have nonetheless identified modes of thinking and behaving of relevance to the present examination. For example, Adler & Adler (2007) conducted eighty in-depth interviews over a number of years with adolescents and adults, documenting the sociological and psychological ways in which participants described the practice and process of self-harm. They found that some participants described difficulties controlling the impulse to self-harm and thus feeling at the whim of the urge – an irresistible-impulse model of self-harm. Hill and Dallos (2012) interviewed six young people aged 13-18 to explore how they saw self-harm as fitting within the broad narrative of their lives. Again, self-harm emerged via individual accounts as a quick response to negative moods, a “short-way round of feeling better”, in which, crucially

there was no necessity to “think everything through” (Hill and Dallos, 2012, p.467). Importantly, in these accounts, the experience and management of emotional distress was an antecedent to the impulsive act of self-harm. In fact, consistently in the extant literature, young people have articulated the emotional dynamics that underlie pathways to self-harm. Intense, mounting and overbearing emotions, relating typically to distress and to anger, are a common precipitant of self-harm, with self-harm outcomes providing a temporary resolution to heightened emotional state (Curtis, 2016; Edmondson et al., 2016; Wadman et al., 2016). For example, Curtis (2016) examined the narratives of 22 community-based young women with a history of self-harm and suicidal behaviour. Participants described self-harm as a quick method of bringing unmanageable emotional distress under control. Notably however, for some adolescents the processes driving self-harm behaviour appear to be conscious and rational, rather than impulsive. Adler and Adler (2007) describe accounts of intentional, planned behaviour in which the decision to self-harm follows a process of thoughtful deliberation. In an extreme example, one young participant described being able to delay self-harm, saving the urge to be performed later, on demand. Paradoxically then, a quick response to an urge, could also be a product of earlier thought-through deliberation. The dichotomy between impulsive and consciously-thought-through notions of self-harm within narrative accounts is thus not unproblematic.

8.2.2 The momentary versus distal contribution of impulsivity to self-harm

The conceptions of irresistible impulse-driven behaviour described by Adler and Adler (2007) or Curtis et al (2016) are consistent with state-based momentary accounts of impulsivity which tap the tendency towards immediate action or an inability to refrain from behaviour (e.g. see Chapter 1, section 1.5) . As such, these accounts largely emphasise the proximal relevance of impulsivity, and inadequate cognitive restraint, in the immediate moments prior to a self-harm act, rather than a general contribution conferred by being prone to impulsive tendencies, or poor tolerance and management of emotion or self-control. The literature has engaged in debate over the direct versus distal influence of impulsivity and self-harm or suicide in psychological models. Notably, Anestis and colleagues argued that proximal accounts which model suicidal acts as impulsive are unconvincing given that such acts are unlikely to occur in the absence of any

planning, even if that planning occurs at an earlier point (Anestis et al., 2014). They suggest that impulsive dispositions, specifically focused on NUR, are likely to relate to suicidality distally, via the increased painful or provocative life experiences that being prone to impulsiveness creates. Further, this latter conceptualisation offers greater opportunity for targeted interventions than the narrow window afforded by proximal accounts. While specifically referencing suicide, these arguments are nonetheless relevant to self-harm. Other models have described a proximal role for impulsivity in self-harm aetiology, for example as a volitional moderator of self-harm (IMV; O'Connor, 2011). In their cognitive model of suicidal behaviour, (Wenzel & Beck, 2008) suggest that dispositional vulnerability factors (which include impulsivity) confer non-specific risk distally (e.g. by increasing life stress), but also serve to increase immediate proximal risk by distorting cognitive processes at the acute moment of distress. Such distortions include attentional fixation (i.e. narrowed focus on a course of action). They propose that a suicidal act follows when the culmination of suicide-relevant cognitive processes passes a 'threshold of tolerance' and that impulsivity may contribute to the faster activation of this process. Qualitative examinations offer the possibility of contributing to these debates by drawing out individual interpretations of the dynamic relationship between facets of impulsivity, and other self-regulatory or cognitive processes and self-harm at both an individual (trait) level and an individual act (state) level. To date, such examinations are outstanding.

Relatedly, a new method of enquiry has sought to capture a nuanced understanding of how various distal and proximal risk factors interact in the moments leading up to and following individual acts of self-harm. In a recent quantitative study Townsend and colleagues describe the development of a systematic tool for investigating the dynamic interplay of factors that lead to self-harm in young people – the Card Sort Task for Self-harm (CaTS; Townsend, 2016). Forty-five adolescents aged 13-21 years were presented with a bank of 117 cards which described potential thoughts, feelings, events and behaviours relating to self-harm derived from theoretical and empirical evidence and in collaboration with a youth advisory panel. Sample cards included items such as "I couldn't solve a problem I faced", "I felt anxious and worried". Participants were asked to select those items which they felt relevant initially to their first self-harm act, (and in a second

examination, to their most recent self-harm act) and to place these in order along a timeline with markers at 6 months before, 1 month before, 1 week before, 1 day before, 1 hour before, I self-harmed, and Afterwards. Participants were also able to write their own factors onto blank cards and insert these into the timeline. Using lag sequential analysis Townsend and colleagues identified significant patterns between selected items (i.e. pairings between items that occurred more times than would be expected by chance). They found that negative emotions, impulsivity and the availability of means were significant factors proximal to self-harm, but the only item to directly precede an act of self-harm was “I did it on impulse without planning”. These findings are theoretically relevant to the present enquiry signalling that among multiple potential risk factors, broadly specified impulsivity is considered the most salient immediate precursor to behavioural enactment for youth who self-harm. Notably, in Townsend and colleagues’ examination the temporal sequence specified by the CATS did not allow for the capturing of factors prior to self-harm that were salient during the hour leading up to an act. Given evidence from the school and college studies (Chapters 4, 5 and 7), which reveal that the majority of those endorsing self-harm act within 10 minutes of first thinking of self-harm, rich information about the impulsive processes leading to self-harm may be gained from examining the interplay between factors in the minutes and moments prior to engagement in behaviour.

While utilised as a tool to systematically gather data for sequence analysis in Townsend and colleagues’ original study (2016), at its core the CaTS permits individuals to construct a personal representation of their unique experience by choosing factors influential in their own personal journey to self-harm. As such, this tool reflects broader experience-sampling methods that support idiographic approaches in personality research such as ecological momentary assessment approaches. That is to say, it can provide an understanding of ‘within-person’ patterns of cognitions, emotions and behaviour, as well as clarifying the structure or relationships between variables that may occur across people (a nomothetic approach). Researchers in personality psychology have argued that a combined idiographic-nomothetic design offers a way of integrating the variables that may influence how an individual acts in a moment (state-based), with distal (trait-based) approaches which broadly index consistent

patterns of behaviour and look for differences between people (Conner, Tennen, Fleeson, & Barrett, 2009). Tools which can flexibly incorporate proximal and distal influences on individual behaviour may help to unpick how impulsivity relates to self-harm at a dispositional and momentary level.

8.2.3 A modified card-sort task

It is proposed that the adoption of a modified version of the CaTS using items more specifically focused on impulsivity would provide three important methodological advantages: (1) Performing a task based on the CaTS would provide a structured springboard for dialogue i.e. by discussing the thinking behind card selection and the interpretation and subjective meanings ascribed to items and their relationships, a nuanced picture of the critical elements in individual pathways to self-harm over time may emerge. (2) Crucial to the present body of research is the starting point that young people have sufficient understanding – or conscious awareness – of the internal processes involved in their thinking, feeling and action such that they can identify and describe how such processes relate to self-harm. Janis and Nock (2009) articulated the tension involved in this assumption, questioning if the mental processes involved in thinking about, planning and carrying out an act of self-harm may be outside of conscious awareness. The wealth of findings from the literature suggests that participants can recall and have insight into their own behaviours and are able to articulate this in research settings (Sinclair, 2005; Wadman et al., 2017; Wadman et al., 2016). Nonetheless, methods of data collection which facilitate this understanding may be particularly useful when discussing a complex and multifaceted phenomenon such as self-harm. This may be especially important for young people for whom the processing and describing of their own thinking, emotions and responses may still be developing (Braet, Theuwis, Van Durme, Vandewalle, Vandevivere, Wante et al., 2014). Qualitative interviews in health research have commonly used tools (e.g. photographs/mind maps) as a stimulus to trigger responses, or prompt memory and discussion (Gibson & Riley, 2010). A strength of a card-selection based process such as the CaTS, is that it enables participants to visually and physically review and manoeuvre cards, creating patterns between items, at once helping youth to pinpoint and describe personally salient factors, while clarifying personal

understanding. (3) It is argued that co-produced tasks within research designs help to establish rapport between researcher and participant, and, importantly, to reduce power differentials, by providing a task in which the participant can control the direction of the discussion (Gibson & Riley, 2010) or may be the expert. This power differential may be particularly pertinent in research with young people within educational settings that flout the nature of power symmetry (Morrison, 2013). Given these collective advantages, the present research incorporated two card-based tasks modified from the original CaTS. (Modifications are described fully in section 8.3.2).

8.2.4 Aims of the qualitative study

Study 3.2 has two broad aims: (1) to understand the experience of self-harm for young people in relation to impulsivity and additional emotion and self-regulation factors; and (2) to explore the influence of these factors over time. This temporal focus aimed to enable young people to zoom in and reflect on the relevance of impulsivity to the short-term antecedents and consequences of an individual self-harm act; but also to zoom out and discuss their views of the influence of impulsive processes conceived more generally across the lifespan of different self-harm episodes. As such, Study 3.2 sought to examine the influence of impulsivity, emotion and self-regulation over the short and long term; and to reflect on developmental processes that might be involved in changes to these dynamics. The research utilised a qualitative interview design to facilitate an in-depth analysis of the nuance and complexity of pathways to self-harm as described by young people. In addition, it incorporated co-produced tasks to stimulate reflection and facilitate and structure discussion.

8.3 Method

This study draws on qualitative interview data gathered in one-to-one sessions with college-based participants. This approach is framed by an epistemological stance (i.e. a position on the nature of knowledge) that assumes that individual knowledge and understandings are meaningful properties of the reality being explored (individual experiences of self-harm), and that access to this knowledge can be gained through dialogue (Mason, 2002). In order to gain understanding of the internal thoughts and feelings of young people concerning a non-

observable action, interviewing is considered an optimal method of data collection (Murphy, Dingwall, Greatbatch, Parker, & Watson, 1999). However it is recognised that interview accounts are produced within an active frame of reference (e.g. setting, relational dynamics) that should also be articulated. For the present study interviews are chosen in preference over other approaches (e.g. focus groups) given that a one-to-one format may facilitate frank expression and lessen the risk of a dominant voice skewing data, or peer pressure on responses (Bucknall, 2014).

8.3.1 Participants and recruitment

Fifteen participants took part in Study 3.2. Each was recruited following their participation in the SHIP-SHAPE college survey (Study 3.1). All participants who took part in the online survey were invited to indicate their interest in participating in further research with the SHIP-SHAPE team and asked to provide a contact email address. One-hundred and nineteen students (32% of the survey respondents) had expressed an interest in further participation and were sent an acknowledgment email at the close of study 3.1. Three accounts returned the email as non-deliverable. One-hundred and sixteen students were sent a Study Information Sheet (Appendix D1) and asked to reply to the email directly indicating if they would like to arrange an interview date. A maximum of two further recruitment emails were distributed. In total interviews were arranged for 19 participants. Two students indicated wanting to reschedule their interviews, but were subsequently un-contactable. Two further students for whom arrangements had been made, did not attend their interview on the specified date, and did not respond to further contact. The final sample therefore included 15 participants aged between 16 and 22 years (mean age 17.40). In all cases, except one, participants were female. Ten (67%) described their ethnicity as white, with the remainder having a mixed ethnic heritage. Twelve out of the 15 participants had indicated a history of self-harm during the online survey. In two cases, those who did not endorse self-harm indicated having thought about self-harm but never acted upon that thought. Characteristics of this sample based on their survey responses to key psychological constructs in Study 3.1 are presented in Table 8.1. (See Chapter 7 for details of survey measures.)

8.3.2 Data collection

Interviews were structured around two initial card-sorting activities (Tables 8.3 and 8.4) and a semi-structured interview schedule (see appendices D2 and D3) which collectively aimed to provide access to adolescents' experiences and understanding of impulsivity, and the emotional and cognitive context of self-harm. Where individuals did not self-harm, the study sought to understand the interaction between these ideas and other potentially risky, or harmful behaviours as identified by young people themselves. Data were generated from the card-sort tasks and the interview schedule by the use of open-ended questions, follow-up probing, prompts and clarification-seeking throughout. As such, though semi-structured, the design enabled a flow of conversation throughout the entire interview session.

8.3.2.1 Card Sort Task 1 - "All about Me"

The first card-sort task facilitated discussion of the ways in which trait-based items relating to multidimensional impulsivity, emotion dysregulation, distress tolerance and self-control were perceived by individuals to be characteristic of their own personality. The "All about Me" task consisted of 25 cards with items selected from psychological measures examined quantitatively in Study 3.1 printed on them. Specifically these included: 11 items from SUPPS-P (Cyders et al., 2014); 7 items from the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004); three items from the Distress Tolerance Scale (Simons & Gaher 2005) and four items from the Brief Self-Control Scale (Tangney et al., 2004). High mean score items from each measure were selected which represented strong endorsement of the criterion of interest. (See Table 8.4 for a full list of included items). Participants were given the full set of cards, a "Me" card, and additional blank cards onto which they could write their own item. They were instructed to place the "Me" card onto the table and arrange remaining cards (as many or as few as considered relevant) around it, with those most characteristic placed nearest to the "Me" card. Participants were informed that this task was not a test, but just a way to explore some of the ways we might think and feel, and that there were no right or wrong answers. Once the selection had been made the researcher facilitated a discussion around the choice and position of cards, and a photograph of the final card positions was taken with permission (see Photograph 1).

8.3.2.2 Card Sort Task 2 - “My experience”

The second card sort activity was a short, modified version of the CaTS (Townsend et al., 2016) and facilitated discussion about the factors considered relevant in the moments leading up to and following a self-harm episode, or other impulsive action. Consistent with the CaTS, participants were provided with a set of cards with thoughts, feelings, events and behaviours printed on them (see Table 8.5). Given that the present study was focused on the psychological underpinnings of self-harm, items relating to services and support which featured in the original CaTS were not included in the present version. Thirty items from the original 117 CaTS cards, which aligned most closely to the broad focus of study 3.1 and 3.2 (impulsivity, emotion and emotion regulation, self-control, cognition) were included in the task. A further eight items were included which were identified as important in open responses in the SHIP-SHAPE surveys (e.g. “I did it on automatic pilot”, “I felt wound up”, “Afterwards I felt in control”). Finally, five items were included which captured the expectations that might be associated with a self-harm act and again aligned with items included in the SHIP-SHAPE college survey in Study 3.1 (e.g. “I thought I’d feel better”, “I didn’t expect to feel any different”).

Participants were asked to think about a specific time when they had self-harmed and had good recollection of the experience. Where participants indicated no self-harm history they were asked to think about another risky or harmful behaviour. Participants were asked to read through the set of 43 cards and choose those cards they felt were relevant to their experience of self-harm and to place them along a timeline in order of occurrence. Additional blank cards were provided onto which they could write their own item. (One card was added during the study: “It felt like a release”.) The timeline was changed from the original CaTS (which spanned periods between 6 months and 1 hour before action) to reflect evidence from time to engage scores described in Study 1 and 3.1 and anecdotal accounts (e.g. Adler & Adler, 2007) that impulsivity may exert its influence in the minutes rather than hours before an act of self-harm. Hence, the timeline ran from: One day before, 1 hour before, 30 minutes before, 10 minutes before, less than 10 minutes before, 5 minutes before, at the moment of self-harm (or other behaviour), and afterwards. Once the selection of cards had been made the researcher facilitated a discussion

around the choice and temporal position of cards. In some cases participants preferred to discuss choices during the completion of the task. In a number of cases participants moved cards into multiple positions along the timeline during discussion. With permission, photographs of final selections were taken (see Photograph 1).

8.3.2.3 Interview schedule

Interviews used a semi-structured topic guide which included open-ended questions, follow-up questions and additional prompts as a means of facilitating discussion (see Appendices D2 and D3). The topic guide was devised to be used flexibly and reflexively throughout the interview sessions i.e. with the direction of conversation and exploration of issues determined by participant responses. The topic guide included specific questions concerning individual history with self-harm (e.g. “Tell me about the methods you might use to self-harm”); questions relating to the card sort tasks (e.g. “How might your choice of cards differ if you were thinking about the first time you self-harmed?”); and questions relating to impulsivity (e.g. “One way that we can understand impulsivity is that we might act rashly when we are feeling strong emotions. How relevant does this way of responding to emotion seem in your experience?”). A second interview schedule was also devised in which the emphasis of questions was on an alternative behaviour to self-harm. Topics explored in the interview schedule were informed by previous findings (reported in Chapters 4 and 5) about the particular relevance of emotion-based impulsivity and deficits in deliberation and forethought in self-harm outcomes in youth and were informed by open responses which described self-harm behaviour obtained from the SHIP-SHAPE school and college surveys (Chapters 4,5,7). The interview session (including card-tasks) was devised to last no more than one hour.

8.3.3 Procedure and ethical issues

Ethical approval for Study 3.2 was obtained from the Division of Psychiatry and Applied Psychology Research Ethics Sub-committee at The University of Nottingham (Ref: 243. Appendix E3). Fourteen participants took part in a semi-structured face-to-face interview with the lead researcher (JL). One additional interview was conducted by a third year BMedSci student under

the mentorship of the lead researcher. In this instance the interview took place with a participant considered to be at reduced risk (i.e. no indication of self-harm acts or thoughts had been reported during the SHIP-SHAPE survey). Interviews took place in a private room on the student's college campus, or at the Institute of Mental Health (IMH), according to participant preference⁵. All interviews were conducted between September and December 2017. At the start of the interview session, participants were given an opportunity to read the Study Information Sheet and ask any questions. While the research assured participants of confidentiality and anonymity, the limits of this, as set out in the Study Information Sheet, and in line with the study's ethics protocol, were verbally reinforced. Specifically, in the case that a young person disclosed risk to life or serious harm to another, a decision to breach anonymity would be considered and the designated college liaison officer would be approached, thus prompting local safeguarding provision. In these cases, decisions to breach would be based on assessment by the lead researcher and members of the supervisory team. No disclosure during Study 3.2 necessitated a breach of confidentiality.⁶ All participants provided informed, written consent. Interviews were digitally audio-recorded, transcribed verbatim and anonymised. Interviews lasted from 45.13 to 56.02 minutes. All interviews took place during working hours (9-6pm). In most cases (10/15), participants elected to be interviewed at the Institute of Mental Health, Division of Psychiatry and Applied Psychology. At the close of each interview participants were provided with a Debrief Sheet thanking them for their participation and a Resource Sheet detailing sources of support from college and other appropriate agencies (see Appendix B2).

8.3.3.1 Ethical considerations specifically for qualitative interviews

Given the young age of participants and the sensitive nature of the research topic, ethical

⁵ Conducting the research in settings in which the student is familiar and has a home advantage over the researcher may help to redress the power imbalance inherent in the research process. Participants taking part on college sites may however run the risk of being observed by peers or academic staff in engagement with the researcher, hence compromising promised anonymity. A private, discrete and lockable room was provided for the interviews on each site and all arrangements for interviews were conducted directly between researcher and interviewee (i.e. with no involvement from college tutors). The advantages and disadvantages of participation at college or IMH were discussed with each participant at the interview booking stage.

⁶ One interview did result in the instigation of a referral pathway with the College. However, this was in full agreement with the participant and was the result of disclosure to the lead researcher that the individual had struggled to access and adhere to a pastoral support plan. When asked directly, the participant welcomed support from the researcher to re-institute discussions with pastoral staff.

considerations were at the forefront of the design and procedure of Study 3.2. All participants involved had originally participated in Study 3.1 in which survey questions about emotional health and self-harm were explored online. As such, the willingness for continued involvement into Study 3.2 indicated that participants had found it acceptable to explore sensitive issues about self-harm in a research setting. Indeed, findings presented and published from this thesis (Chapter 6) and elsewhere (Muehlenkamp et al., 2016; Whitlock et al., 2013; Hasking et al., 2015) suggest that young people across stages of adolescent development are keen to discuss topics such as self-harm and suicidality, see the importance of talking about mental health, appreciate opportunities to do so, and do not find this distressing (Lockwood et al., 2018). Anecdotally, from discussions with participating colleges, there are few structured opportunities to discuss mental health issues within a Further Education curriculum. Nonetheless, it is conceivable that participants will evaluate the impact of sharing personal information about self-harm in an anonymous survey differently from talking face-to-face with a researcher.

Ethically, an interview brings the advantage that researchers can check and respond to the impact the research is having on the participant on an on-going and momentary basis and take action if necessary to halt or terminate the interview, or steer the conversation away from areas of distress. The possibility remains however that talk will follow avenues unanticipated by the participant or researcher and that the close nature of the qualitative interview may lead to increased disclosure, or to a frankness in discussion which is subsequently regretted.

Furthermore, within interviews, personal self-harm experiences may be explored at length and in much greater depth, increasing the risk that participants find an interview, as opposed to a survey, to be distressing.

Researchers have called for the routine inclusion of pre-and post- interview emotional rating tools in qualitative research as a means of checking participant wellbeing (Wadman et al., 2016). Participants in Study 3.2 (as in previous studies (Study 1, Study 3.1) were therefore asked to rate current mood state on a visual analogue scale (VAS) at the start and end of the survey. (See further details about this tool in Chapter 6). The researcher engaged the participant in conversation about the VAS and any changes (positive or negative) to mood status over the

course of the interview. Participants who indicated a lowering of mood were encouraged to talk about the impact of the research and signposted to further support. As with the SHIP-SHAPE school and college surveys a mood elevating page was provided for participants at the end of the interview and before the presentation of the final VAS scale. This included various funny animal pictures. Participants were invited to comment on the page, vote for their favourite animal etc. Evidence referenced earlier (Chapter 6) has suggested such methods may be effective at eliciting positive moods (e.g. Nittono et al., 2012) and are an appropriate method of terminating a research exchange.

8.3.3.2 Qualitative methodology

Interview recordings were transcribed by JL and two undergraduate students in the Division of Psychiatry and Applied Psychology and checked for accuracy by JL. Participants were identified by an Identification (ID) number (3-17)⁷. They were provided with a pseudonym (with initial letters A through O). Data were analysed by JL using thematic analysis in accordance with published guidance (Braun & Clarke, 2007). Thematic Analysis is primarily a method of describing and organising qualitative data into patterns (themes), which can then be analysed and interpreted in relation to specific research interests. The present analysis sought to identify and interpret themes in relation to the two broad areas of analytic interest: (1) How young people understand and explain self-harm (or other behaviour) in the context of emotion, impulsivity and self-regulation; and (2) How these processes evolve over time. A data set was derived from the overall data corpus (talk during the card-sort tasks and responses to semi-structured questions) which specifically related to these research interests. Transcripts were analysed on a case-by-case basis with themes extracted deductively and inductively. In deductive thematic analysis, themes are pre-defined by the analyst based on past evidence and theory (Braun & Clarke, 2007). In Inductive thematic analysis, themes emerge from the data (Patton, 1990) and do not necessarily fit with pre-existing analytic expectations. The identification of themes followed a “semantic” approach, i.e. themes were identified explicitly from the talk of the young people,

⁷ Identification numbers started at ID 3 so that the first participants did not feel any undue pressure from perceiving themselves as the first study participant.

rather than seeking to examine the “latent” ideas and ideologies that may shape talk for individuals (Braun & Clarke, 2006).

8.4 Analysis

The stages of analysis proceeded as follows. Initially a coding framework was developed which identified conceptual ideas on the basis of theoretical and empirical literature relevant to self-harm, emotion-based impulsivity and other internal processes of self-management. Specifically, four broad areas were specified: *emotion*, *impulsivity-related behaviour*, *processes around self-regulation*, and *time and development*. Each transcript was read in turn and codes were extracted using the framework (see Appendix D:4). Additional codes were included when novel, relevant areas of interest emerged from the data.⁸ Transcripts were read through for a second and third time to ensure all relevant patterns and meanings in the data had been considered. The codes were then organised into potential themes. All relevant coded data extracts were collated according to candidate themes/subthemes. A process of review and refinement took place with themes judged on the dual basis of whether the extracts associated with each formed a coherent pattern within each individual theme (internal homogeneity), and whether themes combined to present an accurate representation of the data set as a whole (external heterogeneity), as described by Patton (1990). The process evolved through a number of further revisions and refinements.

Key revisions are described briefly to show transparency in decisional processes. Changes between the first and last iteration included: An original theme *Strength of Emotion* did not adequately reflect the narrative that the importance of emotion in the corpus related not just to the strength of emotion but to an awareness of the impact of that emotion on cognition and of the potentiating role of this emotional intensity in driving a response. This theme evolved into “How I respond to strong emotions” which encompassed two sub-themes: “*My mind is overwhelmed by the strength of my feelings*” reflecting a cognitive element, and “*I have to do*

⁸ The current approach attempts to steer a line between deductive approaches which could have the effect of narrowing analysis and result in a failure to identify key components of a data corpus (Tuckett, 2005) and inductive analysis which runs the risk of missing subtle and nuanced components identified from engagement with the literature (Braun & Clarke, 2007).

something with all this emotion” reflecting the behavioural consequence. A further original theme *Acting on Impulse* did not give the sense that urge often had its opposite in deliberation i.e. that young people recognised a relationship between self-harm following urge and an absence of thinking. Similarly, the original theme *Reflective Processes* did not adequately reflect that for some the ability to not engage in self-harm reflected the effortful success of deliberation over urge. As such, *Acting on Impulse* and *Reflective Processes* were seen as distinct but also related components within an overarching theme, which became “*How much do I think through what I am doing before I do it? - Impulse and deliberation* and reflected competing processes of behavioural determination. This grouping allowed for an important competitive tension between sub-themes. Re-reading the research data led to refinement of a *Maturational factors* theme. Originally this theme reflected that maturational and developmental changes were identified by many as being instrumental in the change in behaviour from someone who does, to someone who (currently) does not self-harm. A re-reading of the corpus led to the reflection that these processes actually related to how young people were better able to rationalise and deliberate and recruit more effective executive processes with age and experience. Hence these ideas were to some extent subsumed within the other main themes.

Two overarching themes and additional subthemes were thus identified in the final Thematic Map (Figure 8.1) and provided the best representation of the data in relation to the main study aims. Finally, a codebook was created which included a title and definition for each theme and exemplars (see Table 8.3). Sample data extracts coded by an independent researcher using the codebook demonstrated a 77% level of consistency with the coding of the lead researcher. Consensus of 70% or over is seen as sufficient for themes to be judged as coherent and valid (Boyatzis, 1998)

Figure 8.1. Final Thematic map

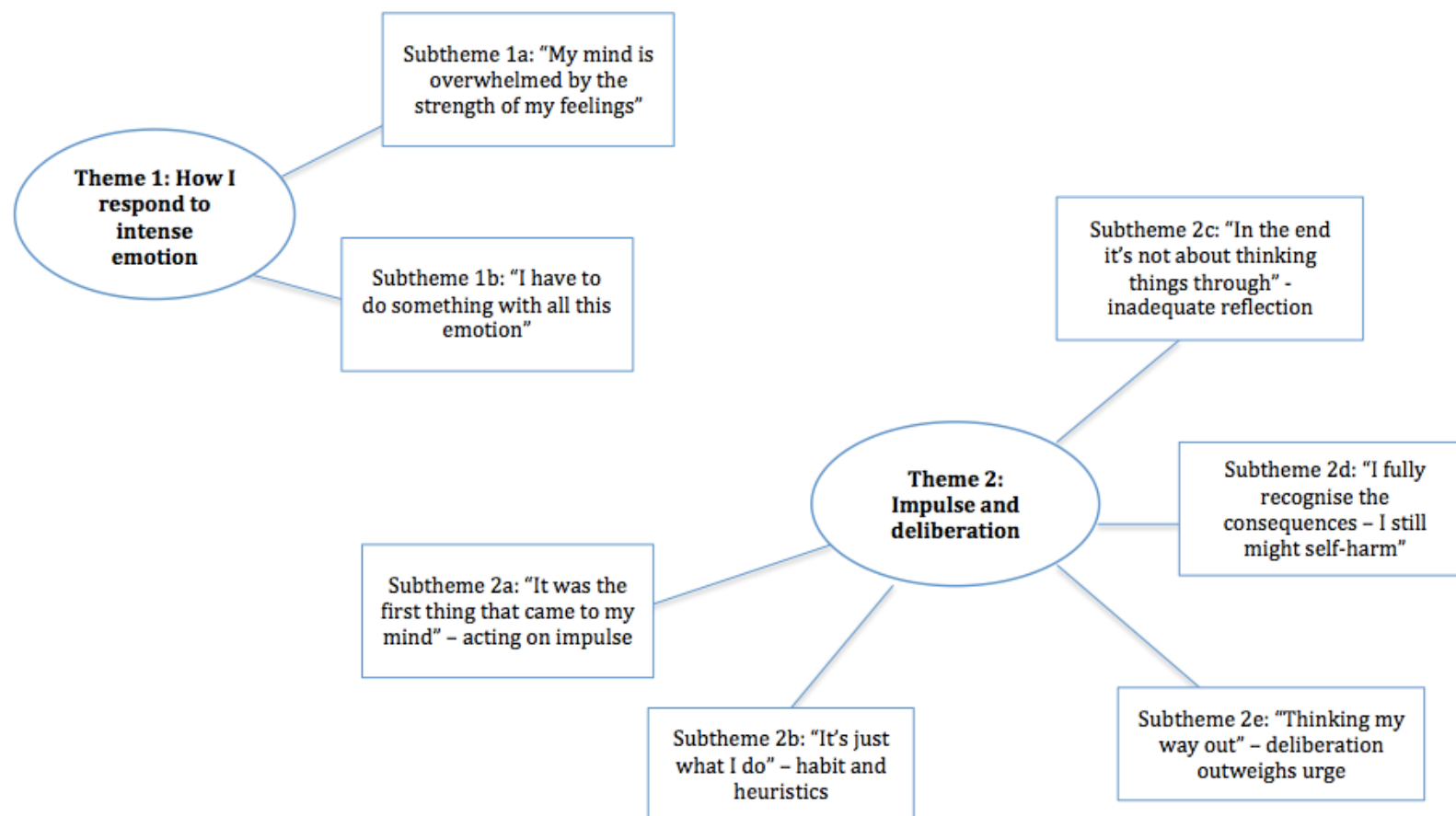


Table 8.1. Demographic and characteristic information about study participants from survey responses provided in Study 3.1

Pseudonym	Age	Gender	UPPS-P mean scores					Total DERS	Total HADS Depression	Total HADS Anxiety	Total BSCS	Mean DT	Lifetime presence Self-harm
			NUR	LPS	LPM	SS	PUR						
Annie	17	Female	11	5	7	12	11	51	7	10	44	2	yes
Bella	22	Female	16	12	8	12	11	62	9	12	23	1.5	yes
Caitlin	17	Female	7	8	6	12	5	56	8	11	55	3	no
Dionne	18	Female	15	7	12	10	8	70	13	19	29	2.5	yes
Elizabeth	17	Female	12	9	10	6	11	65	8	11	47	1.5	yes
Fleur	16	Female	14	10	12	12	11	66	7	17	37	1.9	no
Grace	17	Female	4	7	4	6	4	47	1	5	59	3.4	yes
Helen	16	Female	9	7	5	8	8	37	2	6	43	3	yes
Ivy	16	Female	11	6	7	9	6	57	3	11	50	3	yes
Jen	17	Female	13	6	9	13	8	66	10	15	29	2.4	yes
Karl	17	Male	10	6	6	13	9	58	13	9	44	2.6	yes
Laura	19	Female	15	9	10	10	11	78	11.5	10	31	1.4	yes
Mel	18	Female	9	8	5	13	14	58	7	12	40	3.5	yes
Nicole	17	Female	9	5	6	9	4	59	6	15	41	3	no
Olivia	17	Female	12	8	9	11	8	63	7	18	48	2.8	yes
Group mean	17.4		11.3	7.5	7.3	10.4	8.6	59.5	6.9	12.1	41.3	2.5	
(SD)	(1.5)		(3.7)	(1.9)	(2.5)	(2.4)	(2.9)	(9.8)	(3.5)	(4.1)	(10.1)	(0.7)	-

Notes: UPPS-P Impulsivity scale [Whiteside & Lynam, 2001; Cyders & Smith, 2007] (NUR Negative Urgency subscale; LPS (lack of) Perseverance subscale; LPM (lack of) Premeditation subscale; SS Sensation Seeking subscale; PUR Positive Urgency subscale); DERS Difficulties in Emotion Regulation scale [Gratz & Romer, 2004]; HADS Hospital Anxiety and Depression Scale [Zigmond, 1983]; BSCS Brief Self-Control Scale [Tangney et al 2004]; DT Distress Tolerance Scale [Simons & Gaher, 2005] SD=standard deviation.

Table 8.2. Self-harm characteristics from survey responses provided in Study 3.1 and interview data in Study 3.2

	Self-harm reported in survey					Self-harm reported in interview	
	Self-harm	Frequency	Recency	Method	Time to act	Recency	Method
Annie	Yes	Rarely (1-2 times)	< 4 weeks	Hitting self	< 10 minutes	Current	Punching
Bella	Yes	Often (5-10 times)	< 6 months	Punching	< 10 minutes	Current	Cutting/ biting
Caitlin	no	-	-	-	-	-	-
Dionne	Yes	Often (5-10 times)	< 4 weeks	Severe scratching	< 10 minutes	A few times this year	Severe scratching, punching walls
Elizabeth	Yes	Very Often (>10)	< 4 weeks	Burning	< 10 minutes	Current	Cutting, punching something
Fleur	no*	-	-	-	-	Current*	Swallowing substances
Grace	Yes	Very Often (>10)	> year	Swallowing substances, Pinching, cutting	6-12 hours	Over a year	Cutting
Helen	Yes	Very Often (>10)	> year	Cutting, pinching, burning	1-3 hours	Current*	Cutting
Ivy	Yes*	Rarely (1-2 times)	> year	Swallowing substances	1-3 hours	-	(Disordered eating only)
Jen	Yes	Sometimes (3-5 times)	> year	Cutting	6-12 hours	Over a year	Cutting, (binge eating)
Karl	Yes	Rarely (1-2 times)	> year	Cutting, burning, pinching	> a day	A few times this year	Cutting
Laura	Yes	Very Often (>10)	< 2 months	Hitting self, punching something	1-3 hours	A few times this year	Cutting, burning, hitting
Mel	Yes	Very Often (>10)	< 6 months	Cutting, swallowing substances, pinching, burning, Hitting	< 10 minutes	Over 2 years ago*	Cutting
Nicole	No*	-	-	-	-	Over a year ago*	Punching walls
Olivia	Yes	Sometimes (3-5 times)	< 2 months	Swallowing substances, Severe scratching	< 10 minutes	Current	Scratching

Notes: * indicates that participants reported a qualitative change in behavioural endorsement of self-harm from the survey to the interview

Table 8.3. Codebook of main themes and sub-themes

Main Theme	Definition	Sub-themes	Exemplar
1. How I respond to intense emotion	<p>Emotional intensity precipitates a cognitive response (e.g. has an impact on attentional processes and executive functions)</p> <p>Emotional intensity precipitates a behavioural response (e.g. emotion is tied to action).</p>	<p>1a "My mind is overwhelmed by the strength of my feelings"</p> <p>1b "I have to do something with all this emotion"</p>	<ul style="list-style-type: none"> "I have difficulty concentrating on things other than the fact that I'm really, really upset." (Helen, 16, female) "The only time I would self-harm, I mean an actual physiological harm, it will usually be when I lose my temper and I feel it all building up." (Bella, 22, female)
2. Impulse and deliberation	<p><i>Competing systems of behavioural determination lead to self-harm and other harmful acts.</i></p> <p>These systems may relate to impulse-driven processes which occur the spur of the moment</p> <p>These systems may relate to the idea of a habitual response style and the use of a quick heuristic - "if I feel like <i>this</i>... I will respond like <i>this</i>..."</p> <p><i>Systems may relate to the presence or noted absence of reflective processes.</i></p> <p>Participants will describe failings in deliberation resulting in self-harm</p> <p>Participants will acknowledge negative consequences and suggest deliberation has occurred, but behaviour proceeds in spite of this. Participants may also suggest that self-harm results in positive consequences and is rational.</p> <p>Participants are mindful of consequences of self-harm and feel that this reflection is a buffer in preventing subsequent behaviour.</p>	<p>2a "It was the first thing that came to my mind" – acting on impulse</p> <p>2b. "It's just what I do" - habit and heuristics</p> <p>2c "In the end it's not about thinking things through" - inadequate reflection</p> <p>2d "I fully recognise the consequences ... I still might self-harm"</p> <p>2e "Thinking my way out" - deliberation outweighs urge</p>	<ul style="list-style-type: none"> "I would just go the toilet and punch a wall until my hand was bleeding. I didn't think about it, I just walked out of class and went." (Nicole, 17, female) "It's sort of like an inbuilt thing now. It's like ...I'm feeling like that, so then I'll do this [self-harm]." (Elizabeth, 17, female) "It's usually when it comes to the point like I can't find any reasonable solution, then I just can't stop myself from getting to the point of self-harm." (Karl, 17, male) "I know about the consequences and stuff, but I just do it anyway- the consequences are very much there." (Helen, 16, female) "I'm quite logical, so I think, ok, I'm in this mood, you know, it's late, my parents aren't at home, and I'm quite emotional, and I know that if my emotions sort of dominate the other sort of rational side of me, then I know that's when you've probably got a bit of an issue...so I make myself go outside, or make myself do something." (Caitlin, 17, female)

8.5 Results and Discussion

8.5.1 Sample characteristics and demographic information

Participant responses to psychological measures in the SHIP-SHAPE college survey (Study 3.1) are presented in Table 8.1. Self-harm characteristics reported by the sample during the survey and the interview sessions are reported in Table 8.2. Two participants disclosed self-harm behaviour during the interview but had not indicated behaviour during the survey. One further participant, having indicated self-harm during the survey, reported a history of eating disorders but not self-harm during the interview. Therefore the interview narratives of thirteen out of fifteen participants reflected personal experience of self-harm. These insights were considered broadly informative about the processes underpinning rash behaviour in general and therefore of value for the research. These participants were therefore retained in the sample. In the two remaining cases, participants reflected on processes and mechanisms related to a negative or impulsive behaviour significant to them. For one, this related to an episode of binge eating. For the other this related to an impulsive online outburst that had significant negative ramifications.

The frequency of card selections for the All About Me task and the My Experience task are presented in Tables 8.3 and 8.4. The endorsement of cards in these tasks was primarily used to facilitate discussion and support young people in identifying and describing factors salient to their perceptions of themselves and their behaviour. Nonetheless, the choice of cards selected in each task is revealing of a pattern of thinking and acting which categorises a sub-group of young people who describe risk-taking behaviours and high endorsement of self-harm. Reference will therefore be made to card selections at a group level throughout the Results and Discussion section. It is noteworthy from the outset that the highest frequency items selected in the All About Me task reflected both dispositional difficulties in managing and tolerating negative emotion, but also high Perseverance and Premeditation i.e. low impulsive, controlled and rational behaviour. Some participants commented that perhaps their choice of card also reflected who they wanted to be or how others perceived them. Additionally, young people suggested that they recognised themselves as having multiple, and changing characteristics determined by situations and peer influence.

8.5.2 Theme 1: How I respond to strong emotion

How young people recognised, experienced and responded to strong emotion was a key component of interview narratives. This was reflected in high frequency card-task choices relating to emotionality (see Table 8.4 and 8.5), which underscored that response to emotion was an important characteristic tendency, as well as instrumental in self-harm pathways specifically. This overarching theme encompassed the idea of an emotional build-up that is poorly tolerated and precipitates cognitive and behavioural response, often with self-harm. (Pseudonyms are included alongside quotes. Information on the age and gender of participants is included in table 8.1).

8.5.2.1 Subtheme 1a: “My mind is overwhelmed by the strength of my feelings”

Participants described themselves as being emotional in general, highlighting in particular feelings of anger and annoyance, but also sadness and anxiety. This negative emotional context was complex, characterised by multiple feelings, often simultaneously felt, and ever-present: “*I feel sad and I feel annoyed at the same time, and all the time*” (Annie); “*Before [describing how she used to typically feel], it was a constant sad, a constant anger*” (Dionne). For many these emotions “escalated” or “intensified” until reaching a pressure point. Young people conveyed the difficulties that they had in tolerating this emotional presence. This was not about problems in emotional awareness or identification, but about reaching a threshold of emotional intensity beyond which they felt overwhelmed: “*It’s just when I get overly emotional, it just gets too much*” (Karl).

Young people described cognitive responses to this emotional overload. Some young people described having a narrowed-fixation on their emotionality, “*I have difficulty concentrating on things other than the fact that I’m really, really, upset or angry*” (Helen). “*It’s hard to focus on anything else when I have those feelings*” (Elizabeth). For others, the perceived inability to deal with and contain negative emotion was, in itself, the root cause of further emotional response. Being emotional was perceived as a failure in self-control and thinking about that failure provoked an escalation in negative emotions, generally anger and frustration. “*It irritates me that*

I can't control getting over-emotional" (Grace). Noticeably, during the initial All About Me card task all participants chose the card "I get irritated with myself when I get upset". As such, outside the context of self-harm, young people overwhelmingly identified this as a characteristic of their typical thinking. For Dionne, this self-directed annoyance conveyed an associated anxiety about being unable to prevent the return to previous over-emotionality. Hence, emotionality was tied up with cognitions of how she used to be. She described feeling "wound-up" and "mad" when she gets upset and explained, *"Whenever something does upset me it reminds me of when I used to get really upset and I'm like 'no, no, no!' So I kind of almost start to panic, so whenever I feel anything that's not 'oh, I'm alright today', or 'I'm happy today', I'm a bit like 'Oh God, oh God, oh God'"* (Dionne). This presentation of an emotional response amplified by cognitive processing fits with the Emotional Cascade Model for dysregulated behaviour (Selby & Joiner, 2009) whereby individuals continuously immerse themselves in negative spirals of emotion and cognition associated with their situation. According to this model, self-harm is ultimately a distraction from this unbearable cognitive-emotional vortex. Other studies have found that rumination is related to self-harm in community-based adolescents (Nicolai et al., 2016).

Consistently, the young people in our sample not only experienced heightened emotion but also perceived themselves as having a reduced capacity to "handle" those emotions. *"I don't know if it is about controlling my emotions, or if it is about resisting them, but I find it very difficult to 'deal' with the intensity of my emotions."* (Elizabeth). All participants except one selected the "I can't handle feeling distressed" card - an item from the Distress Tolerance Scale (Simons & Gaher, 2005) - as a characteristic trait in the All About Me task. Therapeutic approaches such, as Dialectical Behavioural Therapy (Linehan et al, 2006), have suggested that holding the perception that one is able to cope with distress is central to being able to successfully implement adaptive ways of managing distress, and a core treatment target for self-harm. Little is known about the developmental trajectory or temporal change of trait distress tolerance, and longitudinal examinations of this trait across adolescence are rare (Cummings, Bornovalova, Ojanen, Hunt, MacPherson, & Lejuez, 2013). In these data, individuals referenced a change in perceived ability to manage distress over time. Mel described past risky behaviour in which she felt so unable to

deal with negative emotions that she would choose to relinquish responsibility for her emotions to others. She described crossing roads with eyes closed to “let someone else decide”. Three years on, she felt able to deal with any emotional build-up, or at least, perceived herself as better able to adopt adaptive ways to deal with distress, *“I’m less emotional than I used to be, because yeah, I don’t know why, but I definitely think I am, because I can deal with it more –[pause] or if it is, or does feel quite strong, I can just, you know, think of ways to deal with it more”* (Mel).

8.5.2.2 Subtheme 1b: *“I have to do something with all this emotion”*

Participants described how a “build-up”, “escalation” or “intensifying” of emotion often reached a pressure point that precipitated a behavioural response. In most cases this response was self-harm, *“The only time I would self-harm, I mean an actual physical harm, it will usually be when I lose my temper and I feel it all building up”* (Bella). Anger was frequently the catalyst for action, with participants describing a desire to take their anger out on something, or someone – typically themselves. In some cases, this reflected a level of “self-hatred” or even “self-punishment”. More often, hurting themselves was about not hurting someone else, *“What I wanted to do to them I couldn’t do to them [the bullies] but I could do to me and I wouldn’t get in trouble for that”* (Grace). Survey findings from the SHIP-SHAPE school and college data sets also signalled the importance of anger and aggression to self-harm, with participants overall selecting this as the first or second most common reason for a recent episode (see Chapter 4 and Chapter 7).

A thread which came out in the narratives, was that this anger was considered likely to result in an immediate behavioural response. Notably, the “I felt angry” or “I felt wound up” items were selected at every time point before self-harm by one or more participants in the My Experience task (see Figure 8.2). As such, this emotional response was recognised as an important proximal trigger at multiple steps in the moments leading up to a self-harm act. Two participants suggested that this anger-related self-harm which drives an immediate reaction may be a qualitatively distinct variant of self-harm. They described an *“explosive angry rage one”* (Laura), or *“the explosive kind...the hair pulling, biting, here, now do something, kind”* (Bella). Earlier qualitative findings with adolescents have also shown that anger is perceived as a common

precursor to self-harm (Crouch & Wright, 2004; Wadman, Armstrong, Clarke, Harroe, Majumder, Sayal et al., 2018). In addition, Nock and colleagues, using ecological momentary assessment techniques, found a close proximal relationship between anger and self-harm enactment in youth (Nock, Prinstein, & Sterba, 2009). The authors captured the daily self-injurious thoughts and behaviours of thirty youth aged 12-19 years over a 14-day period. They found that over the two weeks, the odds of engaging in self-harm acts were significantly increased in the presence of feeling anger towards the self or others, self-hatred and rejection. Yet, interestingly, the odds of enactment decreased in the presence of feeling sad or worthless. Nock and colleagues suggest that the transition from thought to act may be linked to the elevated arousal associated with an anger state. There was some support for a distinction between an anger-related enactment and an inaction related to low emotional arousal in our narratives. For example, Elisabeth stated, *"Sometimes, because of the numbness I sort of can't do it (self-harm), I don't, you know, like I don't have any drive to do it, emotions are dulled."* However, for the most part, and in line with Urgency Theory (Cyders & Smith, 2008) the present narratives linked broadly specified emotionality (feeling upset, feeling sad, feeling bad) to a behavioural response. Associations between anger/aggression, impulsivity and self-harm are documented in clinical and research samples and it has been argued that an additive relationship between anger and impulsivity may serve to intensify the likelihood of quick behavioural response (see Gvion & Apter, 2011). Collectively, these accounts underline the importance of clarifying the specific nature of emotion and its likely behavioural response in order to better understand the aetiology of self-harm.

A number of participants suggested that self-harm functioned as a means of regulating or altering their emotional state and, as such, the narratives provide broad support for the affect-regulation function of self-harm (Klonsky, 2007; Gratz & Roemer, 2004; Chapman et al., 2006). For some, self-harm enabled them to gain relief or release from negative emotions, *"Because you feel very wound up and then it's kind of a release, you know? It's stupid, but it's like, you feel, well less anger and sadness"* (Elisabeth). This emotional shift is consistent with the reported affect-regulation properties of self-harm reported in other qualitative studies (e.g. Nixon et al., 2002; Wadman et al., 2017; Chandler, 2017) and was the most consistently identified function of self-

harm in a recent systematic review (Edmondson et al, 2016). Self-report and lab-based studies have indicated that negative affect is typically elevated prior to self-harm and reduced following self-harm (Klonsky, 2007). Yet, elsewhere, using ecological momentary assessment techniques to capture affect-regulation in a sample of undergraduates, Muehlenkamp and colleagues (2013) found no change in levels of negative affect after self-harm. Accordingly, data from the My Experience task showed that participants in this study commonly felt a mixture of feeling better, worse, and no different in the immediate moments after self-harm. When probed, some suggested that this seeming contradiction related to the complexity of emotions felt. Jen described feeling better that the emotional tension had been removed but sad because she had needed to self-harm to achieve this. Mel suggested that she self-harmed to remove anger and would feel better because of this, but her feelings of sadness or hopelessness would not be affected by the self-harm.

For a number of participants the active process of using self-harm to stem emotional escalation was seen as a protective first step *“I have to do something about it immediately, because if I don’t then it will just drag on and it will make me feel worse” (Jen)*. The process of taking action was therefore logical, *“I’d get frustrated because I was upset, and like, it just seems well, what’s getting upset about it going to help? And then it’s like, well, just get rid of it with that, with self-harm” (Mel)*. Jen articulated clearly the anxiety she felt being in the midst of a spiral of emotion and cognition in the minutes before an act of self-harm in which she was aware she would have to “do something” with the emotional load, *“I was like, what’s the next step, what am I going to do with all these feelings? Am I going to let it go, keep it to myself, am I actually going to do something that I will - not regret, but, ...what I will, like, what would I do to myself?” (Jen)*. Her narrative underlines that while a behavioural response felt necessary to deal with the emotion, self-harm wasn’t inevitable, even at ten minutes before the act. (The treatment implications of this are discussed in section 8.6). Rumination - and notably not about the original trigger but about how to manage “all these feelings”, was the mechanism that drove her to self-harm. Such accounts underscore how emotion and cognition can work in concert to determine behavioural response. The narratives provide support for theoretical models which underline the central role

of rumination in dysregulated behaviour e.g. Emotional Cascade theory (Selby & Joiner, 2009), and in models of self-harm e.g. Cognitive-Emotional Model of NSSI (Hasking et al, 2016). For some participants, the quick removal of emotion with self-harm or another behaviour was a means of regaining cognitive control which would enable them to move on, *“I need to change it [the emotional build-up] quickly, because then I can focus on other things.”* (Nicole). Once emotion had been removed, participants felt they would be more able to deal rationally with their underlying problems and to implement problem solving strategies.

8.5.3 Theme 2: “How much do I think through what I’m doing before I do it?” - Impulse and deliberation

This theme captures the narrative thread that different and often competing systems of behavioural determination were present in young people’s accounts of the processes leading to self-harm or other risk-taking. These systems related to impulse-driven or automatic behaviour, or to processes that were more deliberative, and mindful of potential consequences. Arbitration between these modes of behaviour was evident in the narratives, with outcomes (the presence or absence of self-harm) often indicative of the relative strength or perceived importance of each.

8.5.3.1 Subtheme 2a: “It was the first thing that came to my mind” - acting on impulse

An “impulsive” mode of response characterised by quick action without much, if any, additional thought, was identified at some stage of their personal stories by almost all participants. This was reinforced by the high frequency selection of the “I did it on automatic pilot” and “I did it without really thinking about what might happen” cards in the moment of self-harm during the My Experience task. Annie’s description of the moments before a self-harm act were typical, *“I would just go to the toilet and punch a wall until my hand was bleeding. I didn’t think about it, I just walked out of class and went.”* *“I kind of didn’t think about it, but just wanted to let my anger out and it was the first thing that came to my mind, so I just went for it.”* (Nicole). These accounts correspond to the idea of an irresistible-impulse model of self-harm described in previous qualitative work (Adler & Adler, 2007).

Young people in this sample consistently identified themselves as having an emotional-impulsive response tendency which was a characteristic trait, and not just relevant in the context of an episode of self-harm. This was reflected in the All About Me task in which the NUR item “When I’m upset I often act without thinking” was selected by all except two participants. This response mode was identified as instrumental in a range of acts across the narratives including disorders of eating, outbursts online, and extreme risk-taking in general, which supports the relevance of this trait across psychopathology/problem behaviour (Berg et al, 2015).

In fact, some young people suggested that the impulse to self-harm was so automatic that it took them by surprise. Fleur, who described drinking bleach during one episode of self-harm, explained, *“A lot of things I went through on impulse... even with the bleach, that was completely – I wasn’t even thinking about it two minutes before that. I was washing up.”* (Fleur). *“It would just happen out of the blue”* (Jen). There may be an element of dissociation involved in this account. Relatedly, Escape models of suicide and self-harm (e.g. Baumeister et al., 2010) describe impulsive acts occurring in a moment of cognitive deconstruction where self-awareness is removed (see Chapter 1 section 2.5.1). A lack of consciousness in the moments before and during self-harm is typical of unrestrained impulsive pathological (but also non-pathological⁹) behaviour where the drive for short-term gratification can temporarily override awareness (Hofmann & Strack, 2009). In an extreme example, Annie described this lack of awareness as enduring. Her recollection of punching a mirror at college until her hand was bleeding and the mirror broken, only surfaced when a college tutor questioned the tutor group about it days later. Others similarly described being “confused” to find that they had self-harmed, or unable to remember any details about the act. Arguably, attempts to circumvent an urge to self-harm may then involve overriding this impact on executive resources. The challenge of restraining a behaviour that is being performed outside of conscious awareness is succinctly identified by Fleur, *“Whenever [the urge to self-harm] happens to people, they don’t know what they’re doing... maybe we need to see the warning signs first. Because once it gets to the urge, maybe it’s too*

⁹ Hofmann and colleagues describe realising you have eaten a whole bag of crisps without being aware.

late." Interestingly, this account speaks to the limited window of opportunity that a proximal modelling of impulsivity offers to intervention efforts, as discussed by Anestis and colleagues (2014). Notably, not all accounts of dealing with urges followed this pattern however. For some young people, the impulses they felt were far from intangible but seemed embodied with a "physical sensation", a "presence" or "energy" which they were very much aware of. These were impulses that descriptively "poke at you" until you take notice, *"It's there, always niggling at me"* (Dionne). *"It's always there, at the back of your head"* (Laura). A behavioural response had a sense of inevitability for these participants. *"It's like when you wind up a spring, it does have energy stored in it, it's there, waiting...and I suppose the thing is, it's inevitably got to change, the energy has to come out"* (Bella).

Importantly, some participants indicated a strong capacity for control over their impulses. Three participants described the ability to delay the expression of an urge to self-harm until a convenient occasion arose to gratify it. Elisabeth described not necessarily having the right equipment with her when the urge to self-harm occurred and so "keeping those feelings" until she got home and could act on them. Grace, similarly suggested, *"I think of self-harm as a delayed impulse until I have an appropriate time to act on that impulse"* (Grace). Another participant suggested that she could delay getting overwhelmed until an appropriate time when she could give the urge due attention, *"So I can just sort of put it off... it's that it doesn't matter right now, it's not about me right now... when I'm sitting on my own at home, that's me time"* (Bella). Interestingly, participants did not indicate that the passage of time or the change in environment dampened the desire to self-harm. If anything, the storage, or containment of the urge – in the knowledge that it would be addressed at a later stage – enabled it to be retrieved at its original state of urgency. It is interesting to reflect on the arguments of Anestis et al (2014) in this context who discount that acts of suicide can be 'impulsive' on the basis that such acts are rarely undertaken without any form of planning, and that consideration of an impulsive act of suicide may have occurred in the hours, days, or weeks before an eventual act. The present accounts suggest that there could be a temporal disconnect between thinking about self-harm and acting on that thought, such that thought is subsequently unnecessary before an act. Hence,

despite declaring that at the moment of self-harm the behaviour is carried out on automatic pilot (Bella and Grace) or just happened in response to emotion (Elisabeth), the prior consideration may suggest that these are not in fact impulsive acts. In fact, the behavioural profiles of individuals able to delay an impulse to self-harm could potentially result more from a problematic level of over-controlled behaviour, which suggests a different risk profile to someone acting purely in terms of an irresistible-impulse. Drawing on tentative findings in the college-based survey data (Study 3.1) of an interaction between NUR and low self-control in increasing risk for more frequent self-harm, these qualitative findings present a complex and dynamic relationship between impulsivity and control among those who self-harm whereby a shift from high levels of control in general, but low control in the moment of enaction may exacerbate risk in high frequency self-harm.

8.5.3.2 Subtheme 2b: *“It’s just what I do” - habit and heuristics*

The notion that self-harm was simply a habitual response, a “default” option, was present in several accounts. A number of participants described an antecedent-consequent logic, *“It’s sort of like an inbuilt thing now. It’s like [pause] ‘I’m feeling like that, so then, I’ll do this [self-harm]”* (Elisabeth); *“It’s like Maths – you add ‘this’ and then ‘that’ and it’s equal to self-harm”* (Jen). These narratives give the sense that self-harm had become for many a heuristic – a learnt association, strengthened over time and experience, and easy to access in the moment, *“So I think it’s very much what will help me immediately – oh, I’ve self-harmed before, I’ll do that again.”* (Olivia). The wider literature has suggested that reliance on affect-based heuristics, decision rules based on affect, (see Slovic & Peters, 2006) is a typical adolescent response which may increase risk of maladaptive behaviours (Phillips, Hine, & Marks, 2009; Romer, 2010). The adoption of a simple decision rule – this made me feel better when I felt like this last time, therefore I’ll do that if I feel like that again – does not require careful consideration. As such, this mode of processing information is not compromised by potentially immature cognitive control systems characteristic of adolescence. In addition, it is argued that the more favourable the affect attached to an option, the less risk may be perceived to be associated with it (Romer & Hennessy, 2007) which may help to explain how a maladaptive act such as self-harm becomes

reinforced over time. The notion of “associative clusters” in the Reflective-Impulsive Model of behaviour (RIM; Strack & Deutsch, 2004) is useful in clarifying how impulsivity may underlie such habitual response. The model suggests that impulsive behavioural systems operate in a low-cognitive mode in which automatic responses built via associations learnt and stored in long-term memory, can be reactivated quickly (see Hofman, Friese & Strack, 2009). According to this conception, self-harm behaviour may offer young people a quick and known response option without the cognitive costs of thinking through an alternative course of behaviour, or using cognitive resources to try to inhibit or override a pre-potent response. For two young people in this study, this habitual response had strengthened over time to the extent that the behaviour had become almost compulsive. For Mel, self-harm had become *“Just something that you feel like you have to do, rather than you want to do.”* Laura articulated addictive properties of self-harm, *“I have to do it ... it's like, you miss the feeling of like, you want the feeling of it.”* The habituation of self-harm over time, and the addictive qualities of the behaviour, have been described in other qualitative studies with adults and adolescents (Brown & Kimball, 2013; Wadman et al., 2018) and may be a characteristic feature of established self-harm behaviour. The addictive qualities of self-harm described by Laura also resonate with accounts of self-harm in the literature which have described self-harm as a method of Sensation-Seeking i.e. as a means of generating exhilaration that could be compared to an adrenaline rush (Edmondson et al 2016).

8.5.3.3 Subtheme 2c: *“In the end, it is not about thinking things through”- inadequate deliberation*

Participants directly explored the notion of self-harm occurring – or not – following reflection or consideration of potential consequences. In some accounts, young people articulated that the decision to self-harm was not “planned” and noticeably proceeded in the absence of any deliberation, *“It was kind of like a reaction to let my anger out. It wasn't something like, ‘oh, shall I do it? What will happen afterwards?’ Or, ‘no, I shouldn't do it’...it was just a ‘Yeah, do it.’”* (Nicole). *“I would have done it [self-harm] as soon as I thought of it...I wouldn't have considered any consequences. I would just have done it.”* (Olivia). *“The most important thing is the urge to do what I want to do, as opposed to what could happen if I actually do it.”* (Dionne).

However, others indicated that they did engage in active deliberation, or recognised the consequences of behaviour, and yet they self-harmed nonetheless. For some, this outcome appeared to relate to a failure of top-down processes (executive functioning) to adequately override bottom-up drives. Participants described employing efforts to think of alternative courses of action or problem solve, but ultimately falling short, *“I try and really think about things before I do them. But then it’s like – I find it really hard to resist urges”* (Dionne); *“It’s usually when it comes to the point like I can’t find any reasonable solution... then I just can’t stop myself from getting to the point of self-harm”* (Helen); *“I have a process of thinking about things and when I find something that’s worrying, or I find something that’s problematic, I try and sort it out myself, and I have a process of thinking what I can do and what can happen and such, and when it gets to that point, when I realise there is absolutely nothing I can do about it, is when it gets to the point where I think I have nothing else [other than self-harm] that I can try”* (Karl). These accounts suggest some attempt at effortful control, or executive override i.e. the use of cognitive resources in an attempt to avoid an impulsive reaction, but ultimately thinking falls short.

The competition between emotion-driven systems and reflective cognitive-control networks in determining behaviour is an important concept in the developmental psychology literature. It has been argued that over the period of adolescence there is a shift from a dominant socio-emotional network (which becomes assertive during puberty) and is sensitive to emotional stimuli, to a cognitive-control network (which matures slowly over this period) and is involved in planning, thinking ahead and self-regulation (Steinberg, 2007). Under conditions of heightened arousal the primacy of the socio-emotional network is more likely. These narratives reveal potential deficits in executive functioning during self-harm episodes, which is reflected in the items selected in the card-sort task. The item “I could not think of anything else to do” was the most frequently endorsed in the 10 minutes before self-harm. Other items relating to cognitive components in the moments leading up to and at the point of self-harm (“I couldn’t solve a problem I faced”; “I struggled to make decisions”) were also recognised as proximal risk factors

(See Figure 8.2).¹⁰ In discussions over the timeline, some young people identified that by the moment of self-harm the urge to self-harm had become too strong to outweigh deliberation. One participant described feeling she had license at this point to stop trying to resist the impulse and just go with it, *“I knew that I wanted to and I was like - f***- it, because I'd not done it all year and I was like, I don't care anymore, I'm just going to do it” (Laura)*. This argument resonates with the strength model of self-control proposed by Baumeister and colleagues (2007), which argues that impulsive behaviour can result from depletion in cognitive capacity. That is to say, a wearing down of cognitive reserves through continued attempts at control and resistance results in the eventual dominance of urge over control.

(Interestingly, two participants suggested that the satisfying or controlling of an urge to self-harm was less to do with individual differences in deliberation, and more about other deficits in cognition associated with perseverance and the ability to maintain focus on a task. Indeed, being highly distractible appeared to be protective, actively preventing these young people from acting on their impulses, *“I feel like if I wasn't such an indecisive person then the urge would have been worse” (Fleur)*; *“It's good because when you've got like the whole world around you and you get distracted by every little thing, it's kind of good because even if you're really sad and something bad is happening and you know about it [self-harm] in the back of your mind, you can still, even for a nanosecond, be like, oh look, there's a squirrel over there” (Dionne)*. Notably, the finding that poor focus and attention can be protective, chimes with evidence in the SHIP-SHAPE school survey (discussed in Chapter 4) in which LPS was associated with a lower frequency of self-harm.)

8.5.3.4 Subtheme 2d: *“I know there are consequences - I am still going to self-harm”*

Not all accounts fitted into a pattern of behavioural determination in which inadequate reflection or consideration of long-term consequences, or a failure of these processes, led to self-harm. In some narratives, young people suggested that, at times, they fully recognised and acknowledged

¹⁰ Of note, one participant identified that difficulties in planning and organising herself in general or managing her diary and timetable had prevented from being able to access counselling support at college. Hence cognitive deficits may have multiple ramifications in self-harm pathways.

the consequences of action, but the compulsion to act would override, *“It’s weird because it’s like, you understand the consequences and you know that it’s not right, but you do it anyway”* (Laura). *“I know about the consequences and stuff, but I just do it anyway – the consequences are very much there”* (Helen). High tolerance for negative consequences of behaviour is consistent with trait LPM as conceptualised by the UPPS-P, in which perceived negative consequences may be insufficient to deter behavioural enactment (Berg et al., 2015). For one participant, consequences were pragmatically dismissed, *“I could always see the consequences of what was going to happen, which ultimately was I’d patch myself up, I’d get on with my day, and eventually it would heal. Umm, so there weren’t any consequences that I couldn’t handle”* (Grace). A few participants described positive outcomes of self-harm. For these young people, self-harm was logically motivated and they welcomed the consequences. For example, Annie suggested that self-harm had provided a way of gaining positive attention or support, *“Because for the first few years of school, people were horrible to me and nobody really cared. Umm, and I realised that after a while, as soon as there’s a self-inflicted injury everybody takes you seriously...”* (Annie).

Others articulated that the consequence of self-harm was about being able to feel more in control, or just to feel something *“Self-harm makes me feel [pause] just slightly more, sort of there, or slightly more aware of things”* (Elisabeth). *“Self-harm sort of gave me a bit of a grip on reality”* (Grace). These narratives are consistent with functional accounts of self-harm identified in the literature, which describe the motivation to self-harm in terms of exerting interpersonal influence, or to counteract feelings of dissociation (for a review see Edmondson et al., 2016). Such functional accounts reinforce that in the absence of self-harm an alternative means of achieving this function would be necessary.

8.5.3.5 Subtheme 2e: *“Thinking my way out” - deliberation outweighs urge*

In many instances, where young people were able to avert a self-harm episode or another rash behaviour, they described employing a range of higher order mental operations that could outweigh urge. These included: being able in the moment to focus on the “bigger picture”; to

think about how the decision to self-harm would impact on another; to plan an alternative course of action; to realise that urge and emotion would naturally “subside” and to wait it out; to think about the short-term pain and the inconvenience of caring for wounds; to imagine the long-term physical impact of scars; or to focus on long-term goals such as working towards a career. Two young people revealed that having a workable target – a career aspiration – enabled them to change their mind-set, *“I feel like that's just a thing I need to do [to understand own behaviour] if I want to get to, you know, being a psychotherapist. If I don't know myself or have control over myself I'm never going to get there...”* (Fleur).

Endorsement of protective, reflective processes over emotion-driven impulses were particularly evident in the histories of young people who reported no longer self-harming. Some described a changed emphasis in conscious and deliberative effort over time suggesting that they were now better able to take a step back from the emotional reactivity and recruit effective techniques of internal management. Some suggested that this change in processing was a result of maturity, *“When you get older you just begin to see the world in a bigger light”* (Jen); *“I turned 20 the other week and I'm trying to be like, be an adult, and I'm like, I feel like, I have little tolerance when I'm acting out because I'm like – ‘You're not 16 anymore, like stop!’”* (Laura). For others, the change was about not just getting older but the responsibility that came with this such as the need to hold down a job, *“I'm aware that I'm impulsive and aware that I have all these thoughts and things like that. I think as I'm getting older I'm trying to be rational about things, and trying really hard to be sensible, like you shouldn't just work on impulse”* (Dionne).

These narratives underline that the process of being rational and deliberative is still an effort, but the motivation to succeed in controlling impulses has changed. While epidemiological evidence has shown that most self-harm behaviours in adolescence resolve spontaneously over time (Moran et al., 2012) these personal accounts reveal the personal determination that may be involved in this process. Moreover, they suggest that individual differences in facets of impulsivity relating to low premeditation are not perceived as immutable. Other participants suggested the change in behaviour from someone reliant on self-harm to someone who is not,

was about learnt experience, *"I came to recognise that there's always a pattern with it - it's just you get over-excited or just really upset and then you just, you know, act irrationally. So now I can kind of stop myself and ask, 'ok, why do you feel like that?' and then think about it, rather than just go crazy"* (Mel). This reflective capacity, which conferred a protective influence on behaviour, was noticeably apparent in those who had never acted on the urge to self-harm. Caitlin, who described herself as impulsive, nevertheless articulated how she has been able to keep impulses under control, *"I'm quite logical, so I think, ok, I'm in this mood, you know, it's late, my parents aren't at home, and I'm quite emotional, and I know that if my emotions sort of dominate the other sort of rational side of me, then I know that's when you've probably got a bit of an issue...so I make myself go outside, or make myself do something"* (Caitlin).

8.6 Conclusion

8.6.1 Summary findings

This study sought to gain an understanding of the experience of self-harm for young people specifically in relation to unidimensional facets of impulsivity and broader processes relating to emotion and self-regulation. In addition, it explored how young people describe these processes over time and in relation to individual acts of self-harm. Young people reported that being impulsive was often a defining characteristic of their personalities and a strong behavioural feature in individual pathways to self-harm acts. Most participants saw themselves as having a tendency to behave impulsively in the context of intense emotional state and anger and distress, often in concert, featured strongly in accounts of self-harm enactment. The tendency to act rashly without due regard for consequences intensified the risk of behaviour. While many young people were able to reflect on their self-harm and its consequences, an impulsive response in which quick action occurred in the absence of deliberation was a feature of established self-harm profiles. Here self-harm was an ingrained, habitual act. The ability to gain control over impulse by the recruitment of higher order executive functioning characterised the accounts of those who no longer considered themselves likely to self-harm, or who had never self-harmed. While young people considered themselves to be impulsive and considered their behaviour to be impulsive in the immediate moments before an act, they suggested that impulsive tendencies could be

overridden with effortful control. As such, patterns of behaviour and personality characteristics were judged by young people to be unfixed and targetable. Behavioural change was often associated with maturity, the increased responsibility of adulthood, or learnt experience over time. The active pursuit of goal-directed behaviour was instrumental in changing attitudes towards risk-taking.

8.6.2 Strengths and limitations

The study has a number of strengths. Firstly, rare insight is provided into the links perceived by adolescents (aged 16-22 years) between their own behaviour and psychological processes that specifically focus on impulsivity, emotional response, and self-regulation. The call for more qualitative and multi-method research in the self-harm/suicidology field is increasingly being addressed (Hjelmeland & Knizek, 2010; Kral et al., 2012). Nevertheless, the present focus represents a novel approach to exploring links between self-harm and impulsivity. Moreover, the voices of mid-adolescent (non-University-based) young people do not commonly feature in qualitative approaches. Importantly, the interview approach enabled a richer exploration of concepts identified in surveys and afforded an opportunity to check and prompt participants for a fuller understanding.

Secondly, findings suggest that impulsivity – as delineated by the SUPPS-P model – is a helpful organisational structure for qualitatively exploring self-harm behaviour with adolescents. Young people discretely identified individual facets of impulsivity as meaningful characteristic traits and saw these as relating to self-harm, or other risk-taking. Hence, this work supports the broad discriminative utility of the SUPPS-P model (in accordance with quantitative findings described in Chapters 4, 5 and 7) but extends the analysis to a novel qualitative context.

Third, those with self-harm experience consistently referred to heightened negative arousal in their personal histories, and tied this emotionality to self-harm or other potentially harmful action. Hence, findings underlined the relevance and trans-diagnostic utility of the NUR facet of impulsive behaviour, and provide support for Urgency Theory (Cyders & Smith, 2008) at an

individual level. Narratives provided additional context for the influence of NUR on self-harm specifically. Individuals suggested that a combination of anger and distress, often working in concert and in escalation, and in interaction with cognitive depletion, provided the context of heightened arousal that precipitated a response. Heightened state of anger and distress is consistent with reports in the wider qualitative literature (e.g. Curtis, 2016; Wadman et al., 2018; Hill and Dallos, 2011; Crouch & Wright, 2004; Chandler, 2017). The present analysis draws out the interactive nature of this state with wider cognitive processes.

Fourth, the present design enabled young people to articulate the proximal relevance of impulsivity traits (and other psychological processes) in the immediate moments up to an act of self-harm. This approach to understanding how multi-dimensional impulsivity relates to self-harm in terms of both dispositional and momentary risk is theoretically important given (i) calls for a greater differentiation between trait and state definitions of impulsivity in self-harm research (Liu et al., 2017), and (ii) debate regarding the distal and proximal position of impulsivity in models of self-harm/suicidality (Anestis et al., 2014; Wenzel & Beck, 2008; O'Connor, 2011). Arguments in the literature that proximal risk factors alone provide only a narrow window of opportunity and limited targets of intervention (Anestis et al., 2014) resonate with some present accounts (e.g. “once you get to urge you are too late”). At the same time, targeting the cognitive deficits identified by youth as problematic in the moment of self-harm (failure to think of alternative courses of action, failure to inhibit an impulse, narrowed attentional focus) may offer potential treatment targets.

Fifth, the framework of the card-sort tasks was employed as a device to scaffold interviews and facilitate discussion. The approach was very successful in eliciting conversation and supporting young people to articulate complex patterns of thoughts and behaviours. Methodologically, this approach is important given concerns that individuals may struggle to recognise or identify the cognitive processes which underlie their actions (Janis & Nock, 2009). The tasks were employed to facilitate discussion and personal awareness and the findings support the clinical and research utility of card-sort methods for self-harm particularly in youth (Townsend et al., 2016).

Additionally, the study design provided ethical advantages by (i) helping to reduce the power differential between participant and researcher, something particularly pertinent for research within education-based settings (Gibson & Riley, 2010; Morrison, 2013); and (ii) in line with reports from the original CaTs task (Townsend et al., 2016), providing a research task which young people reported enjoying and valuing.

Finally, the present findings provided support for theories and models discussed in Chapter 2, which have explained self-harm in the context of emotion and cognitive processes. In line with quantitative findings from Study 3.1, present findings indicate a transactional relationship between impulsivity and cognitive processes in which rash reactivity to emotion (as a distal diathesis) interacts with cognitive processes (such as low self-control) to increase risk for self-harm. As such these findings align with an interactional theoretical model of the aetiology and maintenance of self-harm as proposed by the CEM-NSSI (Hasking et al., 2017) in which a dispositional diathesis (here, rash reactivity to emotion) acts in interaction with a wider cognitive context to increase risk. As predicted by the model, these processes were not fixed, but interacted dynamically. The present findings outlined that this process occurred over the course of a single episode, and over a life-course of self-harm. Late adolescence, by dint of increased maturity, responsibility or learning, was associated with greater control over emotional and cognitive processes and the greater likelihood that emotion-driven impulses, while not necessarily abating, could nonetheless be kept in check.

Such accounts are also consistent with developmental dual-systems models, which highlight the tension between established socio-emotional networks and immature cognitive-reflective processes during adolescence (Carver, Johnson, & Joormann, 2008; Steinberg, 2010). Present findings underscore that a developmental approach is key to understanding the nature of the risk from impulsivity and broader emotional and regulatory processes in self-harm. Adolescence, as a developmental period, provides a critical window for prevention and intervention work which targets emotional management and deliberative and goal-directed thinking, tackles superficial heuristic processing, and promotes strategies to better manage and tolerate emotion.

Findings should also be considered in the context of broad developmental patterns in adolescence in which the development of identity and notions of autonomy are likely to be multifaceted, fluid and changing. Identity formation is an important feature of adolescent development and, as articulated by some young people, the selection of cards may have facilitated an alignment with a particular identity. The potential risks involved in living up to negative self-imposed labels (“I am impulsive/indecisive/over-emotional”) must be recognised. Work to support young people in reformulating ‘faulty’ tendencies, instead recognising the potential for self-efficacy in making healthy decisions should be a focus of intervention work.

These strengths should be considered in the light of some limitations. Firstly, the sample represented a small and largely homogenous group i.e. predominantly female, college-based students aged 16-22 years with a history of self-harm. Attempts were made to recruit a larger sample, with more diversity across gender and experience, but despite wide initial interest in participation in the study, recruitment was ultimately challenging. Thus, the present findings may not extend beyond other adolescent groups who share sample characteristics. However, as part of a multi-method approach, the concepts identified in this study resonate with findings from the larger survey-based sample in Study 3.1 and it is anticipated that findings thus have wider applicability. Two participants did not endorse self-harm behaviour in the study and thus were describing qualitatively different experiences in the study. However, as their insight related to impulsive processes underlying a risky/problematic behaviour these accounts were considered to be informative in the wider context of adolescent rash behaviour.

Secondly, qualitative research is inherently subjective and interpretive. While this can be a strength, analyses may also be subject to researcher bias. Measures were therefore put in place to promote the coherency and validity of interpretations (e.g. code checking), key decisions in thematic choices were outlined to aid transparency, and a reflective diary was kept throughout the study. The design incorporated a largely (but not exclusively) deductive approach informed by pre-identified topic areas, which may have had the effect of narrowing analyses and limiting participant responses. In particular, the interview schedule included questions that outlined

facets of impulsivity (NUR and lack of Premeditation in particular), which may have potentially led students to endorse these categorisations of impulsive behaviour. Findings throughout the empirical studies in this thesis have pointed to the importance of these aspects of impulsivity in particular in understanding self-harm. As such, the interview schedule sought further clarification of the relevance of these facets. Nonetheless, as referenced in the Reflexivity Statement (Chapter 6) it is possible that a personal interest in the UPPS-P tool, led to a line of questioning weighted towards corroborating my a-priori assumptions. Thirdly, a temporal disconnect existed for some participants who were asked to describe past behaviour (sometimes more than a year prior) in moment-by-moment detail. However, the saliency of a self-harm act, particularly a first or most recent episode, may have aided recall. Indeed, consistent with other qualitative studies (Wadman et al., 2016), no participants indicated finding recollection of self-harm or other harmful behaviour to be difficult. The semi-structured approach (card task + interview) appeared to facilitate this process. Nonetheless the accuracy of responses may have been compromised.

Interestingly, there were discrepancies between the self-harm experience reported in the survey, and those revealed during the interview. In two cases this related to a first disclosure during the interview. These discrepancies appeared to relate to reduced reluctance to report behaviour in person – an opposite pattern of findings to that reported by Bjarehed and colleagues (2012) who found that almost half of adolescents who disclosed self-harm in a survey did not acknowledge this behaviour in a subsequent interview. This finding may illustrate that the present methodology, which relied upon a researcher-participant rapport, but which also sought to ground discussion in tasks which young people themselves could control and take ownership of, may be a more suitable method of eliciting disclosure and frank discussion for young people than an online survey. It is possible that young people could consider online surveys a riskier option, in that they require the submission of personal, private data to an unknown, online space. The advantage of methodologies that are premised on a connection with an accepted/trusted, actual - as opposed to virtual - researcher may be most pertinent in studies with youth, where the power differential between researcher and participant is overt, and yet notions of privacy and confidentiality and identity are developmentally fore fronted. Discrepancies in reporting between

survey and interview also signal that self-report methods in self-harm studies can be prone to inaccuracies, which stem from multiple motivations. During the card-sort tasks, young people reported multiple, changing and situation specific personality characteristics causing difficulties in the broad interpretation and generalizability of findings. This has potentially significant implications for quantitative research methods which capture data at a cross-section.

Interestingly, face-to-face disclosures and discussions of self-harm and personal distress, were easier to handle on a personal level given that in this context I could to a certain extent manage that disclosure, check that participants were ok, observe how signposting information was processed, and ultimately intervene to ensure support, if necessary, would be provided. (See Reflexivity Statement, Chapter 6).

KEY POINTS from this chapter

- (1) Adolescents at mid-to-late stages of development with a history of self-harm reported experiencing heightened emotionality and expressed difficulties in tolerating and managing this emotion, which led many to impulsive and harmful behaviour. Anger and distress were the common precipitants of this emotional-cognitive spiral towards behaviour.
- (2) Processes associated with rash reactivity and inadequate deliberation were recognised as proximal and dynamic risk factors for self-harm. Increased premeditation potentially as an artefact of age and maturity, was recognised as protective within individual episodes of self-harm and over time, and among those with no history of behaviour. These findings are useful for prevention and treatment approaches.
- (3) Young people were able to describe their behaviours and to articulate the cognitive processes beneath them. The methodology of the study helped to facilitate frank discussion.

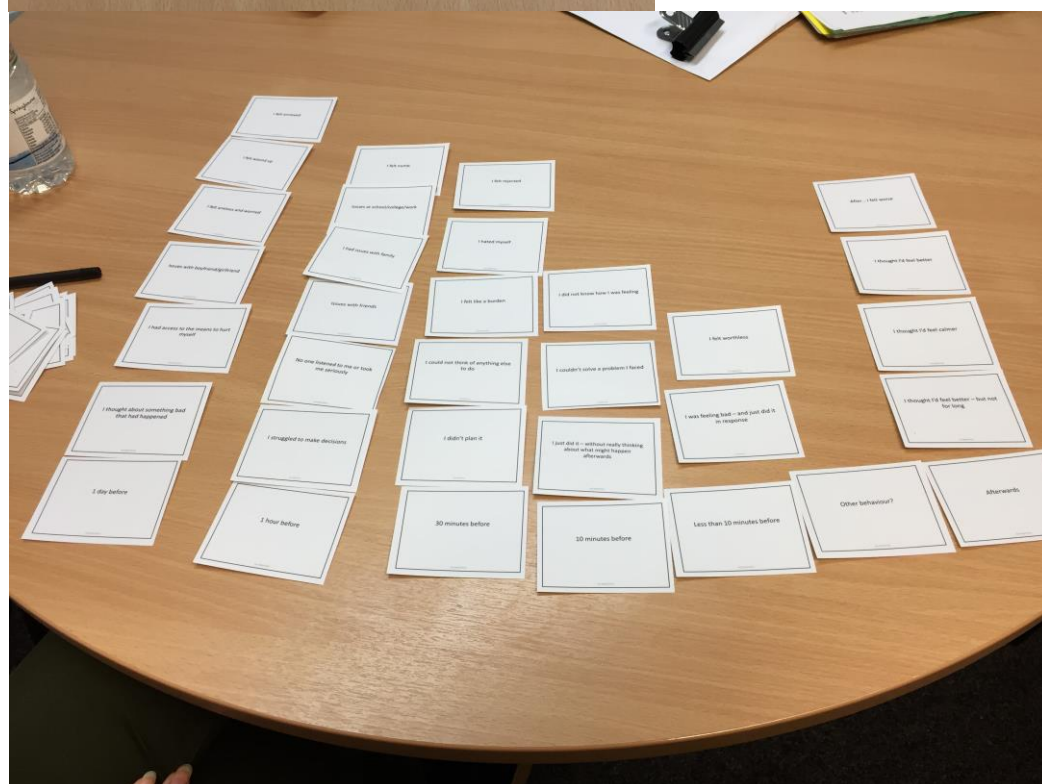
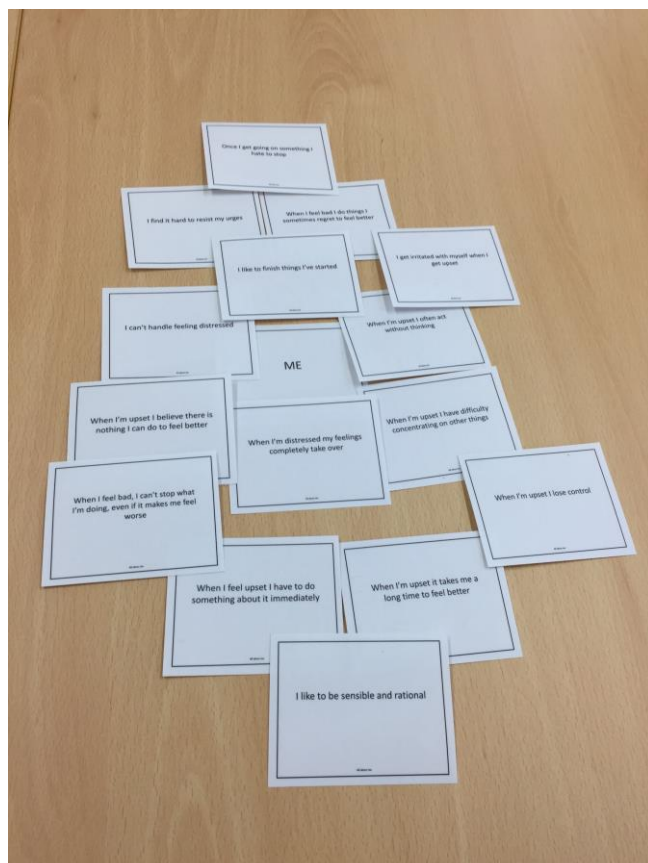
Table 8.4. My Experience item selection

Card-sort task	Source	Item	Frequency
My Experience	CaTS - thoughts	I could not think of anything else to do	11
	CaTS - thoughts	I felt anxious and worried	11
	CaTS - thoughts	I couldn't solve a problem I faced	10
	additional thought	I was feeling bad - and just did it in response	10
	CaTS - thoughts	No one listened to me or took me seriously	10
	CaTS - feelings	I felt sad	10
	additional feelings	I felt wound up	10
	additional feelings	I felt annoyed	10
	CaTS - feelings	I felt worthless	10
	CaTS - feelings	I hated myself	10
	CaTS - feelings	I felt hopeless	10
	based on CaTS events	Issues at school/college/work	10
	CaTS - feelings	I felt numb	9
	based on CaTS events	I had issues with family	9
	CaTS - thoughts	I struggled to make decisions	8
	CaTS - thoughts	I didn't plan it	8
	CaTS - thoughts	I thought about something bad that had happened	8
	based on CaTS events	Issues with boyfriend/girlfriend	8
	additional thought	I just did it - without really thinking about what might happen afterwards	7
	CaTS - feelings	I felt angry	7
	CaTS - feelings	I felt rejected	7
	CaTS - feelings	I felt like a burden	7
	Expectations	I thought I'd feel better	7
	CaTS - outcome	After... I felt worse	7
	additional thought	I didn't think about what I was doing - I just did it	6
	CaTS - feelings	I felt ignored	6
	CaTS - feelings	I did not know how I was feeling	6
	CaTS - feelings	I felt ashamed	6
	based on CaTS events	Something bad happened	6
	Expectations	I thought I'd feel calmer	6
	additional thought	I did it on automatic pilot	6
	CaTS - feelings	I wanted to die	5
	CaTS-thoughts	I couldn't trust anyone	5
	CaTS - behaviour	I had access to the means to hurt myself	5
	CaTS - outcome	After... I felt better	5
	additional outcome	After... I felt more in control	5
	Expectations	I thought I'd feel better, but not for long	4
	Expectations	I didn't expect to feel any different	4
	CaTS - outcome	After... I felt no different	4
	based on CaTS events	I had issues with friends	3
	Expectations	I thought I'd feel calmer, but not for long	3
	CaTS - outcome	After... It stopped me from killing myself	1
	Participant inclusion	It felt like a release	1

Table 8.5. Frequency of All About Me item selection

Card-sort task	Source	Item	Frequency
All About Me	UPPS-P (lack of) Perseverance	Once I get going on something I hate to stop	15
	Difficulties in Emotion Regulation Scale	I get irritated with myself when I get upset	15
	Difficulties in Emotion Regulation Scale	When I'm upset I lose control	15
	UPPS-P (lack of) Premeditation	I like to be sensible and rational	14
	Distress Tolerance Scale	I can't handle feeling distressed	14
	Difficulties in Emotion Regulation Scale	When I'm upset it takes me a long time to feel better	14
	UPPS-P (lack of) Perseverance	I like to finish things I've started	13
	UPPS-P - Negative Urgency	When I'm upset I often act without thinking	13
	Distress Tolerance Scale	When I'm distressed my feelings completely take over	13
	Difficulties in Emotion Regulation Scale	When I'm upset I have difficulty concentrating on other things	13
	UPPS-P Sensation Seeking	I enjoy taking risks	12
	UPPS-P Sensation Seeking	I like new and exciting experiences	12
	UPPS-P (lack of) Premeditation	I think carefully before I do anything	12
	UPPS-P - Negative Urgency	When I do bad I do things I sometimes regret to feel better	12
	UPPS-P - Negative Urgency	When I feel bad, I can't stop what I'm doing, even if it makes me feel worse	12
	Brief self-control scale	I find it hard to resist my urges	12
	Brief self-control scale	I am good at resisting temptation	12
	Brief self-control scale	I am very self-disciplined	12
	UPPS-P Positive Urgency	I tend to act without thinking when I'm <u>really excited</u>	11
	Distress Tolerance Scale	When I'm upset I <u>have to</u> do something about it immediately	10
	Difficulties in Emotion Regulation Scale	When I'm upset I believe there is nothing I can do to feel better	10
	Difficulties in Emotion Regulation Scale	I feel confused about how I feel	10
	Difficulties in Emotion Regulation Scale	I have difficulty making sense of my feelings	10
	UPPS-P Positive Urgency	I tend to lose control when I'm in a great mood	9
	Brief self-control scale	I get distracted easily	9

Photograph 1: All About Me and My Experience example card selections



Chapter 9: General Discussion

9.1 Overview

Are young people who self-harm impulsive? A central conclusion of this thesis is that rash response to heightened (predominantly anxious) arousal, enmeshed with poor cognitive management and difficulties with behavioural control create a common context for self-harm in youth. These tendencies are captured by unidimensional components of trait impulsivity, and in particular NUR. It is possible to conclude, therefore, that there is an impulsive trait basis to self-harm, at least in community samples of young people. Yet, the findings presented in this thesis reveal that how – and when – that trait basis to impulsive behaviour manifests within an act of self-harm, is not straightforward. This is unsurprising given the complexity of the behaviour. Studies presented in this thesis sought to explicate the nature of self-harm as an impulsive phenomenon by examining constituent features of the behaviour as framed in five broad research questions. This chapter begins therefore by summarising the main findings and key conclusions with reference to each question. Broader implications of the research, including clinical and research implications, and other important issues raised in this thesis are then explored. Finally, a discussion of the strengths and limitations of the work as a whole, and future directions is provided.

9.2 Findings in relation to key research questions

9.2.1 What is the concurrent association between impulsivity facets and self-harm outcomes in adolescents, accounting for the influence of other correlates?

Key findings: Study 1.1, a cross-sectional survey study with adolescents aged 13-15 years, revealed a differential pattern of association between facets of impulsivity and self-harm outcomes. Adolescents with a lifetime history of self-harm were characterised best by NUR. Increasing levels of NUR were also associated with a more serious self-harm profile (i.e. current > recent > past; and high frequency > mid frequency > low frequency). Similarly, Study 3.1, an online survey of adolescents aged 16-22 years found that lifetime self-harm was best characterised by NUR. In addition, this study found that the risk of more frequent self-harm was greater in those who were not only high in NUR, but also low in self-control – an interaction that

was identified and discussed as important by young people in the semi-structured interviews of Study 3.2. More frequent self-harm was also more likely in college-based adolescents who had high NUR, who also endorsed the expectation that self-harm would achieve affect-regulation (Study 3.1). Impulsivity related to deficits in conscientiousness was characteristic of more recent and frequent presentations of self-harm among young adolescents (Study 1.1) and present in interaction with depressive symptomatology in college-students in lifetime self-harm (Study 1.2). Frequent and current self-harm for younger adolescents was also characterised by individual differences in SS (1.1). However, this facet was not an important contributor to lifetime self-harm in college-based youth (3.1), although notably initial enjoyment of risk-taking was a response pattern commonly identified within the qualitative narratives of college students aged 16-22 years (Study 3.2).

Key conclusions: Nuanced examinations of self-harm outcomes, which look beyond a broad lifetime history of behaviour, are necessary to clarify the unique risk conferred by impulsivity-related traits. Emotion-based dispositions to rash action in response to negative affect are strong correlates of different self-harm outcomes and thus confer a broad risk for self-harm, which applies across adolescence and across gender. Cognitive processes appear to underlie heightened risk profiles, and notably exacerbate the influence of NUR on self-harm. Examining the cognitive context within which emotion-based impulsivity exerts influence is thus a necessary research focus. Tackling adaptive responses to emotion in adolescence is an important overarching prevention and treatment target. The failure to adequately reflect before acting may be a particularly important marker of higher risk in established behaviour and should be a focus for treatment and preventative interventions (see section 9.4).

9.2.2 What is the prospective/longitudinal relationship between dimensions of impulsivity and self-harm?

Study 1.2 found that first-time self-harm for among younger adolescents over the study period was related to SS in univariable analysis, but no other facet of impulsivity. Repeat self-harm over the study period was associated with emotion-based impulsivity, but only LPM differentiated those who repeated their self-harm over the study period and those whose behaviours abated

during this time. Impulsivity traits were not elevated in those who reported having thought about self-harm and who subsequently reported a self-harm act, compared to those who did not act on their thoughts over the study period. In qualitative examination (Study 3.2) young people identified as being dispositionally inclined to respond rashly to negative affect. They described heightened emotional state in interaction with cognitive dysfunction as creating a risk-context, which precipitated the short-term pathway to self-harm, yet also suggested that emotion-divorced action on impulse was consistently proximal to a subsequent act of self-harm.

Key conclusions: Impulsive pathways linked to emotion and to deficits in premeditation are associated with repeated self-harm, but cognitive deficits underpin the short-term maintenance of self-harm and should be a prime treatment focus for repeat presentations in young adolescents who are currently engaging in self-harm. First time self-harm in younger adolescents relates to an impulsive drive for new experience and perhaps a high tolerance of risk, but this influence does not predict on-going self-harmful behaviour. Given this, work on risk re-evaluation could be an important global prevention target in early stages of adolescence.

9.2.3 Do facets of impulsivity distinguish between thoughts of self-harm and acts of self-harm?

Study 1.1 revealed that those who had acted on self-harm were distinguished from those who had only thought about self-harm by higher levels of PUR, NUR and LPM. Only NUR retained an independent association over and above the other impulsivity facets. No prospective association was found in Study 1.2 between any SUPPS-P facet and change in status from thoughts only of self-harm to acts of self-harm.

Key conclusions: Emotion-based impulsivity and in particular NUR is implicated in the transition from thinking about self-harm to acting on self-harm thoughts. This finding supports the hypothesised role of impulsivity as a volitional moderator within the Integrated Motivational Volitional Model of self-harm (O'Connor, 2011; O'Connor & Kirtley, 2018). However, more work is needed to clarify if impulsivity traits have predictive utility within an ideation-to-enaction framework. A small sample size may have masked prospective relationships in Study 1.2.

9.2.4 How is the impulsive context of self-harm understood and explained by young people in general and in relation to a specific incidence of behaviour?

In study 3.2, college students with a history of self-harm described a heightened emotional-cognitive context, which often precipitated an impulsive behavioural response. This often manifested in unplanned, rash self-harm in reaction to distress, often resulting in explosive anger. Affect-regulation was a consistent motivating factor, but was not always achieved. For some, the impulsive urge to self-harm could be controlled and delayed. In some cases self-harm had become a habitual, quick response. Overall, participants described a tension between impulse and control, the equilibrium of which was dynamic and appeared to change as a function of age and maturity. This was reflected in accounts of self-harm and also other maladaptive acts suggesting a common developmental trajectory in the influence of impulsivity across risky and potentially harmful acts.

Key conclusions: Improved understanding of the progression of impulsive acts can be gained via qualitative examination. Young people identified with conceptions of impulsivity as clarified by the SUPPS-P traits and readily articulated impulsive processes within a broader psychological context (which included anger, anxiety, low self-control, distorted cognitions) in their individual pathways to self-harm (or other potentially harmful behaviour). As such, support is provided within narrative accounts for the cognitive-emotional context of self-harm described in Study 3.1. These findings are in line with theoretical path models of impulsivity which combine emotional, cognitive, motivational, and behavioural domains in predicting psychopathology (Hasking et al., 2017; Johnson, Tharp, Peckham, Carver, & Haase, 2017).

9.2.5 Can we be sure that involving community-based young people in self-harm research is ethically sound? How have young people felt about taking part in this research?

Study 2 was a multi-method longitudinal study using additional material from the self-report surveys completed in Study 1.1 and 1.2, analysed quantitatively and qualitatively. Findings indicated that most young people were happy to take part in research surveys about self-harm and cited important benefits. Although, for most participants, mood was not adversely impacted

by participation, this was more likely to be the case for girls and for those with heightened vulnerability (self-harm history). However, finding survey participation upsetting was not necessarily equated with finding the process unrewarding.

Key conclusions: A multi-method approach to examining the impact of self-harm research in schools in which objective and subjective accounts are considered can support an evidence-based examination of the ethical suitability of self-harm studies with young age groups. Evidence suggests participation can offer many benefits to young respondents, including those at heightened vulnerability. Methods of impact assessment can easily be introduced within research designs to examine the impact on all participants, including those at heightened vulnerability.

9.3 Overall implications of the research

9.3.1 Understanding of trait impulsivity (SUPPS-P) in relation to self-harm

Work to structurally separate the traits associated with impulsivity (Whiteside & Lynam, 2001; Cyders & Smith, 2008) is enabling research to consider how individual differences in these traits dispose individuals to rash acts and thus increase the likelihood of engagement in problematic behaviours, such as self-harm. The present thesis has demonstrated that the five traits delineated by the SUPPS-P Impulsivity Scale correlate with self-harm in young people, and furthermore, differentially relate to distinct self-harm outcomes (Study 1.1 and 3.1). In addition, separate traits demonstrate predictive utility in prospective models (Study 1.2) and are endorsed as valid and meaningful conceptual descriptors in the narratives of young people (Study 3.2). As such, the work supports the growing evidence base (reviewed in Chapter 1), which indicates that distinct impulsivity dispositions play a unique role in conferring risk for a range of problem behaviours. The present work extends this evidence base to a self-harm context in four key ways:

First, the work establishes that SUPPS-P facets differentiate risk for self-harm outcomes in early adolescence (13-15 years) and offers the first examination of the five impulsivity dimensions in a community-based sample of this age. It builds on earlier work, which has examined the UPPS (but not the trait of PUR) and NSSI in a broad school sample aged 14-20 years which found an

association between NUR and PUR and lifetime self-harm, and LPM and severe self-harm (Claes et al., 2013). In so doing, it adds to the broader developmental literature, which has established that UPPS-P traits are distinguishable in maladaptive behaviours of children, as well as older adolescents and young adults (Smith et al., 2007; Zolowski et al., 2010).

Second, the work establishes the consistent relevance of trait NUR in lifetime self-harm across early and mid-to-late adolescent groups, suggesting that this trait demonstrates broad stability in its predictive effect on self-harm across a wide developmental stage. As such, these empirical findings support the overall conclusions of systematically reviewed evidence across adolescent (see Chapter 3) and adult community and clinical samples (Lockwood et al., 2017; Hamza et al., 2015). Importantly, in terms of a mid-to-late adolescent sample (Study 2.1), the relevance of NUR has been established here in a representative sample of this age group. That is to say, it includes youth across diverse educational pathways and is not solely a homogenous group of high academic achievers as could be the case in a University-based sample. The work was thus able to demonstrate that educational attainment did not influence the relevance of NUR in lifetime self-harm.

Third, the work establishes the predictive utility of SUPPS-P facets as prospective predictors of self-harm onset and maintenance in young adolescents. This focus is important given a dearth of prospective examinations of the relationship between self-harm and impulsivity in general (Hamza et al., 2015; Lockwood et al., 2017). The present work did not support the findings of Riley et al., (2016) that NUR predicts self-harm onset in youth (we found that SS did), or that LPS predicts the maintenance of behaviour (we found that LPM did). Nonetheless, both studies underscore the discriminative predictive utility of SUPPS-P facets. As discussed in Chapter 7, the distinctions between our findings and those of Riley and colleagues may reflect developmental differences in the sampling frames of each study. The early adolescent sample of Study 1.2 represents a more theoretically and empirically sound examination of first-time behaviour than the female-only undergraduate sample of Riley and colleagues, given that self-harm onset and peak is more likely to occur at this early developmental stage (Nock, 2010). Previously, findings

from the field of suicidology have shown that cross-sectional correlates of behaviour do not necessarily retain predictive utility within prospective designs (Glenn & Nock, 2014). The present work meets the research call for greater examination of constructs beyond associative designs, and clarifies that trait impulsivity is a robust correlate and prospective risk factor.

Fourth, the work contributes to current theoretical discussions about impulsivity and its role within maladaptive behaviour in general, and specifically within the progression of self-harm. Primarily, the evidence provides clear support for the Theory of Urgency (Cyders & Smith, 2008). This claim is supported by evidence of unique associations between urgency facets and a number of self-harm outcomes (lifetime history, recency, frequency, thoughts, the transition to enactment, repetition over time). As discussed in Chapter 2, Urgency Theory predicts that urgency traits will have a unique and clinically important relationship with risk-taking behaviour and suggests that rash action, spurred by strong emotions, provides immediate relief from distress at the expense of long-term goals. There are strong conceptual parallels between Urgency Theory and the affect-regulation models of self-harm/NSSI, which similarly draw on negative reinforcement processes. As such, the present findings provide consistent support for key models referenced in Chapter 2 (Experiential Avoidance Model; Chapman et al 2006; Emotional Cascade Theory; Selby et al 2006). Urgency Theory suggests that rash action in response to strong arousal may be functionally underpinned by brain systems that are biased towards emotion-based stimuli but may lack affective connections to the consequences of actions and long-term implications (Cyders & Smith, 2008). Links between adolescence and Urgency Theory are plausible, given that (i) adolescence is a period normatively associated with the tendency to experience intense and changeable emotions that are often tied to rash acts, and (ii) the maturational trajectory of emotion and cognition processes in adolescence facilitates affect-driven behaviour (Steinberg, 2004). Interestingly, the information provided by young people within qualitative accounts of self-harm (Study 3.2) highlighted that different emotional contexts (e.g. relating to anger, anxiety or depressive symptomatology) acted in a transactional relationship with impulsive responses.

Notably, comparison between the school and college-based samples revealed an age-related distinction in anxiety and depressive symptomatology, with the former described as a stronger influence on behaviour for younger adolescents, and the latter identified as more important by older adolescents. Evidence with clinical and community samples has pointed to a developmental trajectory in which anxiety symptomatology has early onset and then levels off in early adolescence; while mood disorders show a linear increase from mid-to-late adolescence, particularly for girls (McLaughlin & King, 2015; Merikangas, He, Burstein, Swanson, Avenevoli, Cui et al., 2010; Twenge & Nolen-Hoeksema, 2002; Van Oort, Greaves-Lord, Verhulst, Ormel, & Huizink, 2009). Consistent with the present findings, O'Connor and colleagues (2009) showed that anxiety, but not depressive symptoms, was an important predictor of self-harm in community-based youth aged 15-16 years. Stanford and colleagues used psychological profiling to explore complexity in self-harm risk factors in a longitudinal community sample of adolescents aged around 14 years. They compared first-time self-harm rates over a six-month period across six groups with different psychological profiles. The highest rate of new self-harm was found in one group characterised by high anxiety and poor use of coping strategies. The findings in this thesis add to these previous results in suggesting that it is essential to differentially examine the interactions between anxiety and depressive symptomatology and impulsivity at distinct developmental stages in order to better predict risk of rash reactivity in response to emotion (Stanford, Jones, & Hudson, 2017).

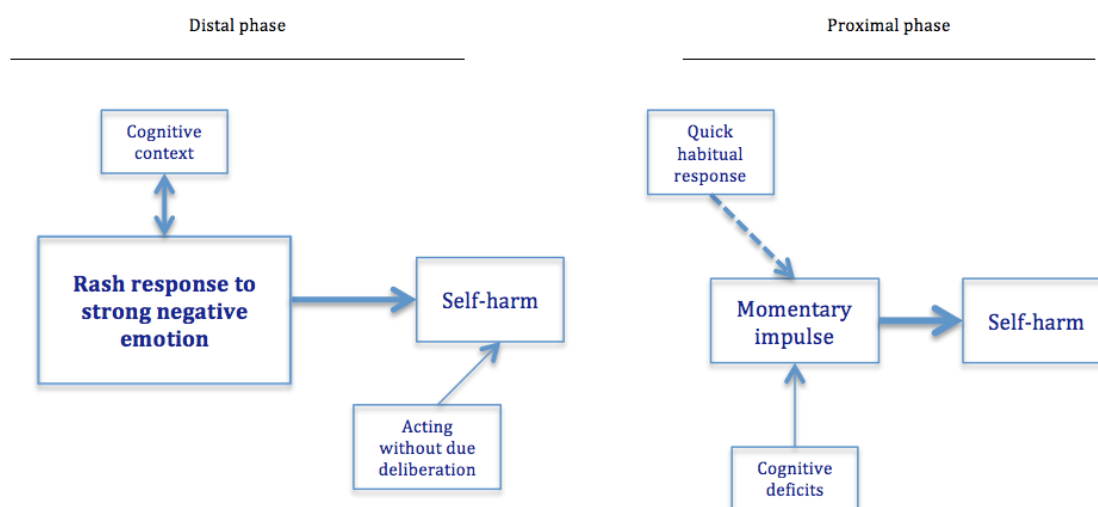
Overall, findings from this thesis align closely to a transactional theoretical model of self-harm as proposed by the CEM-NSSI (Hasking et al., 2017) which allows for a dynamic interaction between impulsivity (as a dispositional diathesis characterised by NUR) and broader cognitive processes and cognitions which moderate its expression. However, within qualitative discussions in Study 3.2, facilitated by the card sorting tasks, a number of young people suggested that while they identified as being likely to respond rashly to strong emotions, they conceptualised their behaviour in the immediate moments before self-harm as action on impulse, divorced of emotion and thinking, a conception closer to the idea of behavioural inhibition. Evidence from the original CaTS task (Townsend et al., 2016) upon which the present card sort task was based,

similarly identified an impulsivity-related item as the most proximal risk factor for self-harm in an adolescent sample. Therefore, on the basis of present findings, an optimal modelling of impulsivity within self-harm incorporates not only a transaction between an emotion-driven impulsive disposition in dynamic interaction with broader cognitive processes and cognitions (as a distal influence), but also includes an impulsive (emotion-free) behavioural inhibition as an immediate (proximal) precursor to behaviour. Integrative risk-models of impulsivity which account for dual state and trait pathways of influence for impulsivity in explaining maladaptive behaviours such as binge eating (Pearson et al., 2015) may offer a future avenue of clarifying the connection between these processes. The first pathway relates to momentary impulse, loss of control and a drive to act in pursuit of reward (e.g. food consumption – but, arguably, self-harm as a method of affect-regulation). The second pathway reflects trait-based factors, which suggest that stable deficits (such as NUR) provide a dispositional context for behaviour. Extending such models to self-harm research may be a logical next step. Figure 9.1 tentatively models relationships between impulsivity and self-harm on the basis of key findings in the thesis.

Consistent findings from the time-to-engage measures examined in Study 1.1 and Study 3.1 suggested that, across adolescent groups, about half of young people surveyed described engaging in an act of self-harm within 10 minutes of the first urge. In study 3.2, young people elucidated that behaviour emerged out of nowhere and as such the opportunities for intervention were slender “Once you get to urge you are too late”. This account resonates with theorists who suggest that distal, indirect models of the influence of impulsivity on suicidal behaviour offer greater opportunities for support than proximal models (Anestis et al., 2014) as their window of opportunity for intervention is broader. Others have stressed (e.g. Liu et al., 2017), that proximal markers of risk offer more clinically meaningful targets by providing temporal clarity – i.e. not just who is at risk but when they are at risk. Given that evidence reviewed systematically in Chapter 3 revealed little relationship between state-based behavioural markers of impulsivity and self-harm in young people, future work using novel and varied techniques such as Ecological Momentary Assessment approaches could help to further unpick the role of impulsivity in the proximal moments before self-harm. Importantly, the

present findings offer strong support for the role of urgency in the ideation-to-enaction framework as described by the Integrated Volitional-Motivational model of self-harm (O'Connor, 2011). Further clarification of how increased dispositional impulsivity exerts influence at a volitional moderator level is a future research priority. This is particularly necessary, given null prospective findings in Study 1.2.

Figure 9.1. Graphic depiction of a proposed distal and proximal role for impulsivity in adolescent self-harm according to key findings in the thesis



Notes: In the distal phase, impulsivity (conceptualised as a trait based predisposition towards rash action in response to heightened negative emotion) provides a background context for self-harm. Impulsivity acts as a diathesis, but exerts influence in transaction with a broader cognitive context of cognitive deficits (e.g. low self-control) and other cognitions (e.g. expectancy). The trait based tendency towards rash action without due consideration is an additional factor which may have greater relevance in maintained behaviour. In the proximal phase, momentary impulse drives an immediate behavioural response to self-harm. Impulsivity is conceived as spur of the moment behavioural inhibition, may be divorced of emotion, and may relate to habitual response patterns.

9.4 Clinical and treatment implications

At a fundamental level, the research presented in this thesis suggests that more precise operationalisation of impulsivity traits in which the differential relationship with specific self-harm outcomes are examined, can provide clinically-relevant information to better identify and support adolescents at risk of self-harm. Specifically, findings suggest that helping young people to better manage emotional response without immediate engagement in behaviour is likely to offer benefit at a broad community level, and in particular for those having self-harm thoughts.

Approaches such as Dialectical Behaviour Therapy (DBT; Linehan; 1993) and the shorter modified version for adolescents (DBT-A; Miller et al., 2007) have empirical support for those presenting with behaviour. More general work focusing on adjusting emotional responses, building effective interpersonal skills to communicate feelings, or evaluating behavioural choices may also be effective (Zapolski, Settles, Cyders, & Smith, 2010). First-time self-harm was associated with SS in the present thesis, and this facet of impulsivity also appears important in frequent behaviour in younger adolescents. Theorists have suggested that SS may be driven in part by an affect-heuristic (Romer & Hennessey, 2004) in which quick decisions are made on the basis of emotion. The present evidence suggests that discussion of alternative ways to pursue novelty and stimulation would be most usefully targeted at young adolescents. A focus on tackling cognitive deficits and cognitions may benefit those with established self-harm and specifically helping young people to anticipate the consequences of actions is likely to be beneficial. Evidence from qualitative narratives in Study 3.1 suggested that a revaluation of long-term benefits and short-term risks was achieved with maturity and experience. Importantly, this signals that impulsivity traits appear to represent modifiable targets for intervention.

9.5 Methodological issues

9.5.1 Challenges of recruitment

Study 3.1 presented a number of procedural challenges, which impacted on recruitment and are worthy of comment. A significant issue was that many College students were geographically spread across several sites or based within work placement settings for vocational courses. Agreed ethics procedural arrangements necessitated the face-to-face delivery of safeguarding messages for the research, but it was not easy to coordinate appropriate classroom-based sessions for times when students would be on main campus. While tutors were very responsive to conducting the research, additional timetable pressures squeezed their already limited face-to-face time with their students. From a very large sampling frame (approximately 8,700) this resulted in a final sample of just 374, which may have resulted in Study 3.1 being underpowered. Analysis of rates of attrition suggested that less academic students were more likely to fail to complete the follow-up survey in comparison to students with higher academic records. This may

relate to the fact that the former group had additional off-campus commitments as part of non-academic pathways; it certainly underlines the methodological complications inherent in accessing this population for longitudinal research. While the college-based studies were originally designed to replicate both the cross-sectional and longitudinal components of the school-based studies, the non-anticipated obstacle of a permanent college closure during the time of the survey undoubtedly impacted severely on the delivery of the follow-up survey. Low participation numbers (n=45) ultimately resulted in the cessation of the follow-up stage of this study. Attempts were made in study 3.1 to recreate the classroom-focused delivery, which had worked so well in the school-based studies, (albeit in a lab-based room with online access to the survey). However, this was simply not workable given the difficulties highlighted above. It raises the ethical spectre however, that the strong sample size and low attrition of the school-based students who completed their surveys with paper and pen under exam-like conditions, may have capitalised on a familiar and traditional method of data collection in school-based research (Gallacher & Gallagher, 2008) and fed into an unequal power dynamic (see Reflexivity Statement Chapter 6, Section 6.3.4)

9.6 Wider issues raised by the research – beyond research outcomes

9.6.1 Prevalence of self-harm

The prevalence of lifetime self-harm in the present data was in the range of 23-27% in young people aged 13-15 years, rising to 35% in those aged 16-22 years. The findings are higher than the 13-15% prevalence rate consistently reported in some community-based studies with youth aged 14-17 years (e.g. Hawton et al., 2002; O'Connor et al., 2009; De Leo & Heller, 2004; Portzky et al., 2008; Stallard et al., 2012). Yet, comparable and even higher rates have been reported elsewhere. For example, Baetens (2011) reported prevalence of 27% in students aged 14-19 years in Belgium; Cerutti and colleagues reported rates of 41.9% in Italian high school students (Cerutti, Manca, Presaghi, & Gratz, 2011); Garisch et al., (2015) found a prevalence rate of 48.7% in predominantly 16-year-old high school students in New Zealand; while Lundh and colleagues (2007) reported a lifetime prevalence of 65.9% among 15-year-old Swedish adolescents. As such, there appears to be wide variability in findings. Indeed, findings from older adolescent and young

adult samples (within mainly University based populations) have also varied widely e.g. around 20% (Whitlock et al., 2006) up to 38% (Gratz et al., 2002) and up to 46.5% in past year indications (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007). It is difficult to establish if variation in these accounts relates to cross-cultural differences in self-harm, or reflects an artefact of assessment tools and study designs (Nock, 2010). Nonetheless, the present findings sit within the range indicated by previous work. Moreover, the present data reflect current findings that point to high and increasing levels of self-harm in young adolescent populations (Geulayov et al., 2017).

Of note, while the prevalence of reported self-harm (yes/no) was high in the present samples the data indicated that a large proportion of participants endorsed a low frequency of behaviour. Over half of respondents in the SHIP-SHAPE school data - 58% at baseline (study 1.1) and 63% at follow-up (study 1.2) - indicated that they had self-harmed on 1-2 occasions, with less than 10% endorsing the highest frequency of self-harm (>10 incidences). Notably, this pattern was not reflected in the college-based sample in which roughly a third of participants endorsed 1-2 incidences (35%) and 23% endorsed the highest frequency (>10 incidences). These findings are in line with previous data, which have shown a high proportion of young adolescents (aged 13-15 years) endorsing low frequency (1-2 incidences) of self-harm (Bjarehed et al., 2012). The present findings may lend support to the distinction offered by Klonsky & Olino (2008) that low-frequency behaviour is qualitatively distinct from higher frequency behaviour within younger samples, such that early adolescents who have self-harmed on only one or two occasions may arguably be considered to be experimenting with self-harm. The length of time since first endorsement of self-harm was not captured in these studies so it is not possible to rule out that the lower endorsement of self-harm is a function of less years since onset. Nonetheless there appears to be a distinction between the school and college data which supports the notion of early experimentation.

9.7 Limitations

The limitations of each study have been examined within each chapter hence only a few key issues are discussed here. Firstly and most notably, the research relied heavily on self-report

measures to examine impulsivity. As discussed in Chapter 1 a benefit of self-report surveys is that they can enable a comprehensive modelling of the impulsivity construct. Nonetheless, the accuracy of data resulting from such tools can be questioned given associated response biases or the risk of mood-congruent reporting (Demetriou et al., 2015). Young respondents may lack insight into their own emotional states and patterns of thinking and behaving (Braet et al., 2014). Moreover, impulsive youth who act on the spur of the moment and without deliberation may do so without full consciousness of the processes underlying such acts (Jacobson & Gould, 2007). Importantly, findings from Study 3.2 indicated that adolescents from 16 years of age upwards were able to understand and fully articulate psychological awareness. In this study, however, participants were facilitated by the use of the card-sort tasks. Given the proximal relevance of impulsivity in pathways to self-harm identified in Study 3.2 and discussed in the context of the ideation-to-enaction framework, it would be useful for future research to also consider how emotion-based dispositions to rash action relate to in-vivo lab-based assessment. Little support for the association between performance-based impulsivity and self-harm was found within the Systematic Review (Chapter 3). Nonetheless, behavioural impulsivity is most likely to be associated with self-harm under conditions of negative affect (as found by Allen & Hooley, 2014). Notably, a common shortfall of lab-tasks which have examined dimensions of impulsivity under conditions of induced emotion is a failure of the induction task to actually result in a change of mood (Gunn & Finn, 2015; Johnson, Tharp, Peckham, Sanchez, & Carver, 2016). Some authors have suggested that manipulating affect may not be the key to demonstrating an association between behavioural measures of impulsivity and self-harm, but an affect regulation analogue is required which manipulates the “reward” of mood regulation which may follow self-harm. A relatively new task, the three-task procedure (TTP; Cyders, Coskunpinar, & Lehman, 2012) which combines a cognitive task, a reward task and positive/negative mood induction, has received early support in an undergraduate sample and may offer promise for future research.

Dialogue with participants in study 3.2 identified individual discrepancies in the reporting of self-harm behaviour between the anonymous self-report survey and the face-to-face interview with a researcher. Notably, Bjarehed and colleagues (2012) conducted a combined survey and interview

study with young participants and found that almost half who disclosed self-harm in the survey did not acknowledge the behaviour subsequently at interview. In Study 3.2 the opposite pattern of response was found. When probed, young people suggested that they felt less comfortable disclosing to an anonymous survey because they would not know who was interpreting their response. This has important research implications for study designs. Notably, inconsistencies in response were also found between baseline data and follow-up data in the school-based studies, again with a large number of participants disclosing a past history of self-harm (i.e. which occurred before the study period) at the second assessment. It is possible that young people felt more comfortable at the second assessment and more able to disclose. In support, increased positive endorsement of participation in the survey in Study 2 was indicated by those with self-harm at follow-up. Nonetheless, these findings suggest that the reliability of these data should be approached with a measure of caution.

9.8 Key strengths

Strengths of the studies include a large sample for the school-based survey study (n=594) and an even distribution of boys and girls (50% male and 47% female in the school sample, and 40% male and 60% female in the college sample) which is rarely achieved in the field of self-harm and provided a comprehensive picture of self-harm in community-based youth. An additional strength is that potentially confounding factors such as age, gender, anxiety and depressive symptomatology, and affect were included within multivariable regression analyses so that the independent influence of impulsivity dimensions could be distinguished. The inclusion of measures of affect is particularly important in establishing the influence of urgency traits, i.e. establishing that it is the tendency to act rashly when emotional, rather than the tendency to experience heightened emotion per se which is problematic (Cyders & Coskunpinar, 2010).

The integration of multiple and converging methods of enquiry is an additional strength.

Qualitative data are ideally suited to understanding the meanings, context and consequences of behaviour and there has been limited specific exploration of impulsivity within qualitative research to date. The thesis demonstrates the advantages of a multi-method approach

employing both quantitative and qualitative approaches to augment understanding. For example, the two approaches presented a clearer picture of the nuances of research participation within Study 2. The integrative approach revealed that while individuals with self-harm reported a lowering of mood, they also revealed that feelings of distress were not necessarily cognitively appraised in negative terms. The qualitative work in Study 3.2 clarified the complex emotional, cognitive and behavioural overlaps that increase risk for self-harm at an individual level. This corroborates the interaction between NUR and low self-control revealed quantitatively in Study 3.1. Such triangulation provides a richer understanding than each method offers in isolation.

A further strength of the work in this thesis was the involvement from the outset of a young advisory panel who were instrumental in guiding the delivery and design of the school and college-based surveys. Involving the perspectives of those whose personal experience is central to the research focus is an important component of the research and also manifests in the qualitative components of Study 2 and Study 3.2. There is a danger that misplaced protectionism can limit research opportunities for vulnerable groups and that notions of risk (embedded in risk-averse consent processes) can close down the opportunities and benefits that research participation can offer. A final strength of the present thesis was an active engagement with ethical debates parallel to the delivery of the broader body of work. The thesis sought not only to directly gauge the impact of the present research process on participants (Study 2), but to routinely include simple mood mitigation tools, online or in paper format, within each study. These images, doodles pages etc. sought to recalibrate any induced negative mood as a result of study participation. Mood recalibration techniques have been recommended for mental health research (Lloyd-Richardson et al., 2015). The present research suggests these simple techniques are popular, innocuous and easily embedded within research approaches.

9.9 Key next steps in research

Further delineation of the role of emotion-based impulsivity in self-harm is now needed. This thesis has begun to explore the context within which NUR may increase risk (e.g. via expectation / self-control). Evidence has been found of a role for PUR – but more work is needed to better

clarify the action of mechanism for this. More work is needed to explicate the context within which Urgency exerts its influence across internalising and externalising behaviours. Importantly, such work may help to clarify the link found in the present data (Chapter 4, 7, 8) that anger is a consistent factor associated with self-harm and impulsivity.

An important future research area should now explore why it is that impulsive mechanisms may be linked to self-harm, as opposed to another maladaptive behaviour, or indeed to examine how the selection of outcome behaviour may change as a function of developmental stage and experience. Acquired Preparedness models (Smith & Anderson, 2001), as discussed in more detail in Chapter 8), have suggested that individuals are differentially prepared to acquire expectancies as a function of their personality traits. Thus, traits such as NUR exert an influence on the formation of outcome expectancies associated with a particular behaviour. Research has yet to fully examine such models in relation to self-harm, although early findings presented in this thesis suggest that expectancies (here about affect-regulation) do reveal an interactive association with NUR. This is an emerging and important area of research of relevance across psychopathological behaviours and should now form the focus of further examination.

Evidence from Chapter 8, consistent with cognitive models proposed by Wenzel and Beck (2008) and Baumeister (1990, 2007), suggests there may be a period of heightened risk immediately preceding a self-harm episode associated with emotion-based impulsivity, deficits in control and narrowed attentional processing. This risk-period represents an important intervention opportunity. Given that identifying who is likely to self-harm on the basis of their intention to act may be problematic – and young people in Study 3.2 were not necessarily aware of their intentions, work to identify cognitive warning signs for behaviour may be a valuable aid in identifying and treating those at risk of self-harm (Adler, Bush, Barg, Weissinger, Beck, & Brown, 2016). Assessment work within experimental performance-based studies e.g. using attentional fixation tasks and control tasks, or neurophysiological designs using fMRI, may support the identification of specific cognitive markers, to better inform treatment strategies for those with distinct dimensions of trait impulsivity. Given that cognitive-impulsivity was implicated in

heightened risk profiles (more frequent, more recent self-harm) in Study 1.1, it may also be useful to contrast the current findings (both quantitative and qualitative) with evidence gained from clinically referred samples who may present with a more severe self-harm risk profile.

Findings in Chapter 8 that attentional difficulties (e.g. heightened distractibility) may be protective, chimed with the evidence in Study 1.1 that increased LPS lowered risk of more frequent self-harm. Notably, attention and impulsivity are core features of ADHD and evidence has shown that adolescents with a sub-type of ADHD (combining hyperactivity, inattention and impulsivity symptoms) were more likely to engage in self-harm than those with an inattentive-only subtype (Hinshaw, Owens, Zalecki, Huggins, Montenegro-Nevado, Schrodek et al., 2012). Such findings suggest that attentional mechanisms underlying self-harm may be implicated across diverse populations, but more work is needed to clarify this relationship. The qualitative approach of Study 3.2 which examined the temporal progression of self-harm over the short-term could be usefully extended to clinically referred samples for self-harm and other psychopathologies, including those with ADHD. Such qualitative examinations are rare in the literature and would constitute an important addition to understanding of how impulsivity, cognition and emotion interact in young people to confer proximal risk of behaviour.

9.10 Final conclusion

A better understanding of how dimensions of impulsivity are uniquely linked to self-harm outcomes (e.g. ideation versus acts, frequency and recency of behaviour) and how specific traits interact with other factors (low control, expectation) to exacerbate risk, may ultimately guide researchers and clinicians to provide better targeted support for young people. This thesis has provided empirical support of the unique associations between emotion-related impulsivity, and traits related to poor deliberation, low persistence and sensation-seeking in adolescent self-harm. It has also presented an idiographic contextualised understanding of self-harm as an impulsive act for young people. The work furthers theoretical understanding and contributes to important methodological and ethical discussions in the field. Findings underscore the consistent relevance of emotion-driven impulsivity across adolescence, but suggest that the impulsive and

emotional context of self-harm varies in accordance with developmental stage. The work confirms that understanding unidimensional elements of impulsivity (within a developmental context) should form an essential component of future theoretical, practical and clinical endeavour in the field of adolescent self-harm.

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Appendices

Appendix A-1: Search Strategies

A. CINAHL

S3 S1 AND S2

S2 ((MH "Injuries, Self-Inflicted") OR (MH "Self-Injurious Behavior") OR (MH "Suicidal Ideation") OR (MH "Suicide, Attempted") OR (MH "Suicide") OR (MH "Overdose")) OR TI (Self Harm* OR Self-Harm* OR Self Injur* OR Self-Injur* OR Self Inflicted Injur* OR Self-Inflicted Injur* OR Self-Destruct* OR Self Destruct* OR Parasuicid* OR Suicid* OR Self Mutilat* OR Self-Mutilat* OR Automutilat* OR Auto Mutilat* OR Auto-Mutilat* OR Artificial Skin Lesion* OR Self Wound* OR Self-Wound* OR Self Inflicted Wound* OR Self-Inflicted Wound* OR Self-Poison* OR Self Poison* OR Self Kill* OR Self-Kill* OR Autotom* OR Overdose*) OR AB (Self Harm* OR Self-Harm* OR Self Injur* OR Self-Injur* OR Self Inflicted Injur* OR Self-Inflicted Injur* OR Self-Destruct* OR Self Destruct* OR Parasuicid* OR Suicid* OR Self Mutilat* OR Self-Mutilat* OR Automutilat* OR Auto Mutilat* OR Auto-Mutilat* OR Artificial Skin Lesion* OR Self Wound* OR Self-Wound* OR Self Inflicted Wound* OR Self-Inflicted Wound* OR Self-Poison* OR Self Poison* OR Self Kill* OR Self-Kill* OR Autotom* OR Overdos*) S1 TI (Impulsi*) OR AB (Impulsi*)

B. EMBASE

1. Impulsiveness/ or (Impulsi\$).ti,ab.
2. exp Suicidal Behavior/ or Automutilation/ or Drug Overdose/ or (Self Harm\$ or Self?Harm\$ or Self Injur\$ or Self?Injur\$ or Self Inflicted Injur\$ or Self?Inflicted Injur\$ or Self?Destruct\$ or Self Destruct\$ or Parasuicid\$ or Suicid\$ or Self Mutilat\$ or Self?Mutilat\$ or Auto Mutilat\$ or Auto?Mutilat\$ or Artificial Skin Lesion\$ or Self Wound\$ or Self?Wound\$ or Self Inflicted Wound\$ or Self?Inflicted Wound\$ or Self?Poison\$ or Self Poison\$ or Self Kill\$ or Self?Kill\$ or Autotom\$ or Overdos\$).ti,ab.
3. 1 and 2
4. limit 3 to exclude medline journals

C. MEDLINE

1. exp Impulsive Behavior/ or (Impulsi\$).ti,ab.
2. exp Self-Injurious Behavior/ or Drug Overdose/ or (Self Harm\$ or Self?Harm\$ or Self Injur\$ or Self?Injur\$ or Self Inflicted Injur\$ or Self?Inflicted Injur\$ or Self?Destruct\$ or Self Destruct\$ or Parasuicid\$ or Suicid\$ or Self Mutilat\$ or Self?Mutilat\$ or Auto Mutilat\$ or Auto?Mutilat\$ or Artificial Skin Lesion\$ or Self Wound\$ or Self?Wound\$ or Self Inflicted Wound\$ or Self?Inflicted Wound\$ or Self?Poison\$ or Self Poison\$ or Self Kill\$ or Self?Kill\$ or Autotom\$ or Overdos\$).ti,ab.
3. 1 and 2
4. limit 3 to humans

D. PsycINFO

1. Impulsiveness/ or (Impulsi\$).ti,ab.
2. exp Self Destructive Behavior/ or Suicidal Ideation/ or Drug Overdoses/ or (Self Harm\$ or Self?Harm\$ or Self Injur\$ or Self?Injur\$ or Self Inflicted Injur\$ or Self?Inflicted Injur\$ or Self?Destruct\$ or Self Destruct\$ or Parasuicid\$ or Suicid\$ or Self Mutilat\$ or Self?Mutilat\$ or Auto Mutilat\$ or Auto?Mutilat\$ or Artificial Skin Lesion\$ or Self Wound\$ or Self?Wound\$ or Self Inflicted Wound\$ or Self?Inflicted Wound\$ or Self?Poison\$ or Self Poison\$ or Self Kill\$ or Self?Kill\$ or Autotom\$ or Overdos\$).ti,ab.
3. 1 and 2
4. limit 3 to human

E. PubMed

(("Impulsive Behavior"[MeSH] OR Impulsi*) AND ("Self-Injurious Behavior"[MeSH] OR "Drug Overdose"[MeSH] OR Self Harm* OR Self-Harm* OR Self Injur* OR Self-Injur* OR Self Inflicted Injur* OR Self-Inflicted Injur* OR Self-Destruct* OR Self Destruct* OR Parasuicid* OR Suicid* OR Self Mutilat* OR Self-Mutilat* OR Automutilat* OR Auto Mutilat* OR Auto-Mutilat*

OR Artificial Skin Lesion* OR Self Wound* OR Self-Wound* OR Self Inflicted Wound* OR Self-Inflicted Wound* OR Self-Poison* OR Self Poison* OR Self Kill* OR Self-Kill* OR Autotom* OR Overdos*)) NOT MEDLINE[sb]

F. The Cochrane Library

#1 MeSH descriptor: [Impulsive Behavior] explode all trees

#2 (Impulsi*):ti,ab

#3 #1 or #2

#4 MeSH descriptor: [Self-Injurious Behavior] explode all trees

#5 MeSH descriptor: [Drug Overdose] explode all trees

#6 (Self Harm* or Self-Harm* or Self Injur* or Self-Injur* or Self Inflicted Injur* or Self-Inflicted Injur* or Self-Destruct* or Self Destruct* or Parasuicid* or Suicid* or Self Mutilat* or Self-Mutilat* or Automutilat* or Auto Mutilat* or Auto-Mutilat* or Artificial Skin Lesion* or Self Wound* or Self-Wound* or Self Inflicted Wound* or Self-Inflicted Wound* or Self-Poison* or Self Poison* or Self Kill* or Self-Kill* or Autotom* or Overdos*):ti,ab

#7 #4 or #5 or #6

#8 #3 and #7

Appendix B-1: Student Information Sheet Study 1.1



STUDENT INFORMATION SHEET

The SHIP-SHAPE study
Self-Harm in school-aged young people

Hello. We are researchers at the University of Nottingham. We are asking all students in Years 9 and 10 at your school to fill in two short surveys as part of the SHIP-SHAPE research study.

What will you ask me about?

We will ask you about how you think and usually behave as well your experiences (*if any*) of self-harm. Self-harm is hurting yourself (such as cutting or hitting) or self-poisoning, on purpose, no matter what the reason. We are hoping to understand more about how some of the ways we act (such as acting without thinking) could be linked to self-harm for some young people. All questions are optional, which means you don't have to answer them if you don't want to. The survey will last around 30 minutes.

Do I have to take part?

No. It is up to you if you would like to take part and you can change your mind at any time without having to give us a reason.

Who will know I have taken part?

The survey is anonymous which means we do not want you to put your name on it and there will be nothing that will identify you as having taken part. Once you have finished the survey and the researcher has collected it from your desk, it will not be possible to remove your answers, but again, you can't be identified. What you tell us will also be confidential which means it will stay between you and us (the research team), unless we have serious concerns about your safety, in which case we will talk to your school to check you are ok.

Why are we asking you about this?

Most young people do not self-harm, but in a typical school class around 3-5 young people may self-harm, or be thinking about it. In many cases young people choose to keep this a secret for lots of different reasons. By filling out this survey you will have the chance to tell us, anonymously, about your experiences, whether or not you have self-harmed. This knowledge may help us to support other young people, so your involvement in this research is really helpful and valued.

Will I find this helpful?

Although this research will help us understand how to support young people who self-harm in general, those who take part in surveys like this have said they personally value having the chance to talk about self-harm, and like taking part in scientific research to help others.

We hope you'll want to take part in this research study. If you have any questions or are worried about this research, please get in touch.

Thank you!

Our contact details:

Jo Lockwood, llxjll@nottingham.ac.uk; Prof Kapil Sayal, Kapil.sayal@nottingham.ac.uk
Division of Psychiatry and Applied Psychology, University of Nottingham

Appendix B-2: Example Resource Sheet

Resource sheet

Who can I talk to at my school?

You can talk to the Pastoral Assistant for your Year group about any concerns you have about self-harm or other issues for yourself or for a friend.

If you prefer, you can talk to another member of staff you feel happy to talk to.

Harmless
user led organisation – information and support for people who self-harm
www.harmless.org.uk
info@harmless.org.uk

NHS Direct 111
www.nhs.uk/111

CAMHS
Child and Adolescent Mental Health Services
0115 876 4000

Childline
24 hour helpline and website for young people
0800 1111
www.childline.org.uk

NGY my place (Base 51)
counselling and youth services
0115 704 3114
www.ngymyplace.co.uk

Samaritans
24 hour helpline
08457 909090

Youngminds
www.youngminds.org.uk

Kooth
counselling for young people
www.kooth.com

The Mix
support for under 25s including guides and videos
www.themix.org.uk

selfharm.co.uk

Your GP
You can talk to your doctor about your feelings and about self-harm
Ring your local GP surgery for an appointment - you don't have to say what it is for
You can ask for a male or female GP
Your conversation with the GP is confidential - but if they are worried about your safety they may want to talk to your parents or others who care for you

The SHIP-SHAPE team
Joanna Lockwood llxjll@nottingham.ac.uk
Division of Psychiatry and Applied Psychology
School of Medicine, The University of Nottingham

The University of Nottingham
UNITED KINGDOM • CHINA • MALAYSIA

Appendix B-3: SHIP SHAPE school survey



The SHIP SHAPE study **Self-Harm in school-aged young people**

Student Survey

Researcher: Joanna Lockwood
University of Nottingham
llxjll@nottingham.ac.uk



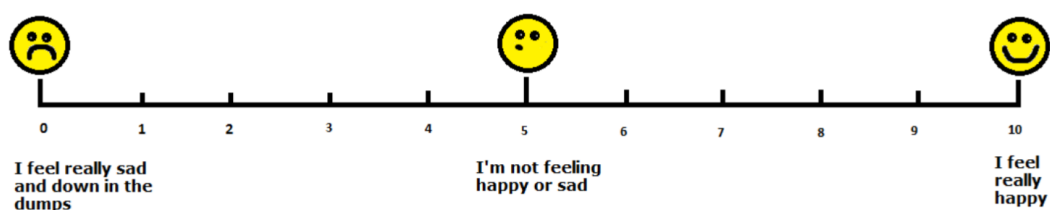
Thank you for agreeing to take part in this study. Your participation is really appreciated!

Your unique code

PLEASE insert your 8 digit unique code below. (Remember this is your first and last initial followed by your date of birth.)

How do you feel at the moment?

Before we begin we'd like you to tell us how happy or sad you are feeling at this moment by marking how you currently feel on the following scale.



This study has 3 sections. Please try to answer each section as honestly as possible.

Section 1: About me

First, we'd like to ask you a few questions about your age, gender and ethnicity.

1. a How old are you? _____

1.b What is your gender (please tick)

Boy ☐ Girl ☐ Prefer not to say ☐

1.c What is your ethnicity? _____

Section 2: Is this like me?

Now we'd like to ask you to read some statements that describe ways in which people act and think. Please read each statement carefully and think about whether it is like you. For each statement, circle the number that represents how the statement describes you.

	Strongly agree	Agree some	Disagree some	Strongly disagree
1. I generally like to see things through to the end.	1	2	3	4
2. My thinking is usually careful and purposeful.	1	2	3	4
3. When I am in a great mood, I tend to get into situations that could cause me problems.	1	2	3	4
4. Unfinished tasks really bother me.	1	2	3	4
5. I like to stop and think things over before I do them.	1	2	3	4
6. When I feel bad, I will often do things I later regret in order to make myself feel better now.	1	2	3	4
7. Once I get going on something I hate to stop.	1	2	3	4
8. Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.	1	2	3	4
9. I quite enjoy taking risks.	1	2	3	4
10. I tend to lose control when I am in a great mood.	1	2	3	4
11. I finish what I start	1	2	3	4
12. I tend to value and follow a rational, "sensible" approach to things.	1	2	3	4
13. When I am upset I often act without thinking.	1	2	3	4
14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional	1	2	3	4
15. When I feel rejected, I will often say things that I later regret	1	2	3	4

16. I would like to learn to fly an airplane.	1	2	3	4
17. Others are shocked or worried about the things I do when I am feeling very excited.	1	2	3	4
18. I would enjoy the sensation of skiing very fast down a high mountain slope.	1	2	3	4
19. I usually think carefully before doing anything	1	2	3	4
20. I tend to act without thinking when I am really excited.	1	2	3	4



Now we'd like to ask you to read some statements that describe ways in which people respond to emotions. Again, read each statement and think about whether it is like you. For each statement, circle the number that best describes you.

	Almost never	Sometimes	About half the time	Most of the time	Almost always
1. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
2. When I'm upset, I believe there is nothing I can do to make myself feel better.	1	2	3	4	5
3. When I'm upset, I believe that I will end up feeling very depressed.	1	2	3	4	5
4. When I'm upset, I become embarrassed for feeling that way.	1	2	3	4	5
5. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
6. When I'm upset, I become irritated at myself for feeling that way.	1	2	3	4	5
7. When I'm upset, I become out of control.	1	2	3	4	5
8. When I'm upset, I lose control over my behaviour.	1	2	3	4	5
9. When I'm upset, I have difficulty controlling my behaviour.	1	2	3	4	5
10. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
11. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
12. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
13. I care about what I am feeling.	1	2	3	4	5
14. When I'm upset, I acknowledge my emotions.	1	2	3	4	5
15. I pay attention to how I feel.	1	2	3	4	5
16. I am confused about how I feel.	1	2	3	4	5
17. I have difficulty making sense out of my feelings.	1	2	3	4	5
18. I have no idea how I am feeling.	1	2	3	4	5

Thinking about yourself and how you normally feel, circle the extent to which you generally feel...

	Never	Not very often	Sometimes	Often	Always
1. Upset	1	2	3	4	5
2. Hostile	1	2	3	4	5
3. Alert	1	2	3	4	5
4. Ashamed	1	2	3	4	5
5. Inspired	1	2	3	4	5
6. Nervous	1	2	3	4	5
7. Determined	1	2	3	4	5
8. Attentive	1	2	3	4	5
9. Afraid	1	2	3	4	5
10. Active	1	2	3	4	5



The following statements describe how you have been feeling during the PAST WEEK. Read each item and then place an "X" next to the answer that best describes you. Don't think too much about your answer. Mark only one answer for each question.

1 I feel tense or wound up:

- ☐ Most of the time
- ☐ A lot of times
- ☐ From time to time
- ☐ Not at all

2 I still enjoy the things I used to:

- ☐ Definitely as much
- ☐ Not quite so much
- ☐ Only a little
- ☐ Hardly at all

3 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

4 I can laugh and see the funny side of things:

- ☐ As much as I always could
- ☐ Not quite as much now
- ☐ Definitely not so much now
- ☐ Not at all

5 Worrying thoughts go through my mind:

- ☐ Most of the time
- ☐ A lot of times
- ☐ From time to time
- ☐ Not at all

6 I feel cheerful:

- ☐ Most of the time
- ☐ Usually
- ☐ Not often
- ☐ Not at all

7 I can sit at ease and feel relaxed

- ☐ Definitely
- ☐ Usually
- ☐ Not often
- ☐ Not at all

- 8 I feel as if I am slowed down:**
☐ Nearly all the time
☐ Very often
☐ From time to time
☐ Not at all
- 9 I get a sort of frightened feeling like butterflies in the stomach:**
☐ Not at all
☐ From time to time
☐ Quite often
☐ Very often
- 10 I have lost interest in my appearance:**
☐ Definitely
☐ I don't take so much care as I should
☐ I may not take quite as much care
☐ I take just as much care as ever
- 11 I feel restless, as if I have to be on the move:**
☐ Very much indeed
☐ Quite a lot
☐ Not very much
☐ Not at all
- 12 I look forward with enjoyment to things:**
☐ As much as I ever did
☐ A little less than I used to
☐ Definitely less than I used to
☐ Hardly at all
- 13 I get a sudden feeling of panic:**
☐ Very often indeed
☐ Quite often
☐ From time to time
☐ Not at all
- 14 I can enjoy a good TV programme or book**
☐ Often
☐ Sometimes
☐ Not often
☐ Hardly at all

Thanks for answering all those questions.
Just one section left now...

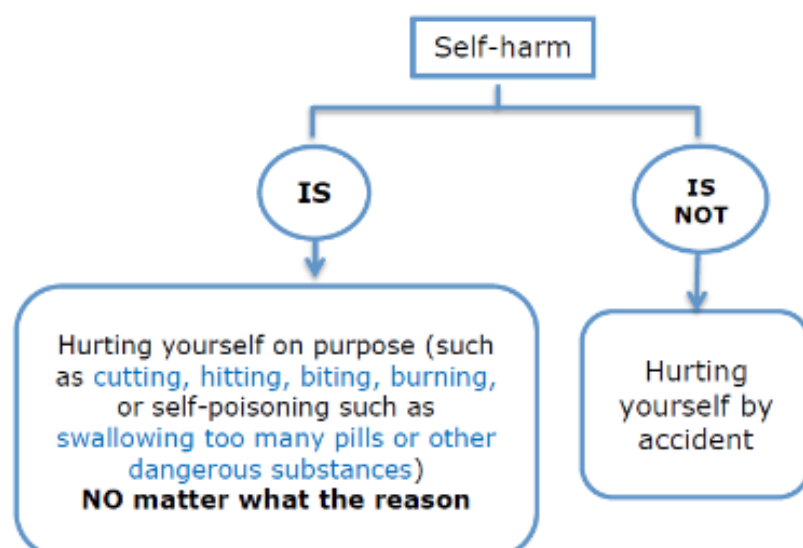


Section 3 Self-harm behaviour

In this section we will ask you some questions about self-harm.

All of the questions are optional so you don't have to answer any you don't want to, and you can stop the survey at any time.

Please remember everything you tell us is anonymous, and try to be as honest as you can.



1. Have you ever seriously *thought* about trying to harm yourself on purpose in some way (such as cutting yourself) but *not* actually done so?

Please circle: Yes No

2. Have you ever on purpose harmed yourself in some way (such as cutting, hitting, biting or swallowing things)?

Please circle: Yes No

3. How often have you on purpose harmed yourself?

Please tick:

Never	()
Rarely (1-2 times)	()
Sometimes (3-5 times)	()
Often (5-10 times)	()
Very often (more than 10 times)	()

4. When was the last time you deliberately harmed yourself? Please tick:

- Over a year ago ()
In the last 6 months ()
In the last 2 months ()
In the last 4 weeks ()
I never have ()

5. Please describe what you did to harm yourself the last time? (If you have never self-harmed please write "not relevant".)

6. Typically, how quickly do you act upon your urge to self-harm?

- | | | | | | |
|-------------------|-----|---------------|-----|---------------|-----|
| Less than 10 mins | () | 10-30 minutes | () | 30-60 minutes | () |
| 1-3 hours | () | 3-6 hours | () | 6-12 hours | () |
| More than 1 day | () | Not relevant | () | | |

7. The last time you harmed yourself, what was the reason? (If you have never self-harmed please write "not relevant".)

8. Would you feel able to talk to someone in school about difficulties you were having with self-harm?

Please circle: Yes No

9. If yes, who would you be most likely to talk to in school? Please explain.

If no, please explain why you wouldn't feel able to talk to someone.

10. Please tell us anything more about your experience of self-harm or any thoughts about self-harm in general.



The survey is almost complete. Before you finish we'd like to ask how you found taking part in the survey?

	Please tick
Interesting	<input type="checkbox"/>
Enjoyable	<input type="checkbox"/>
Fine	<input type="checkbox"/>
Upsetting	<input type="checkbox"/>
Annoying	<input type="checkbox"/>
Other (?) _____	<input type="checkbox"/>

Please share any other thoughts you have about taking part in this survey, or feelings the content may have raised (optional)

The survey has now finished. Thanks for taking part! Your time and help will really make a difference.

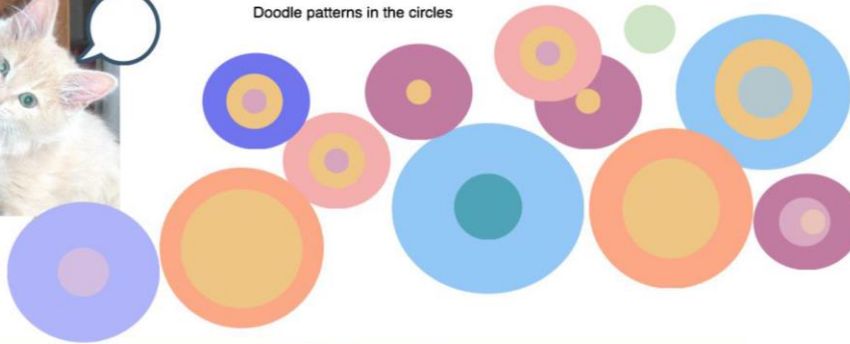
If you would like to talk through any feelings you may have, or if you feel upset in any way, please tell us. Your Information sheet and Resource sheet are to keep. On them you'll find our details and those of other organisations you can contact at any time.

Time to chill... check out the following page. Don't forget to tell us how you are feeling now on the smiley face chart... Is this different from how you felt earlier?





Doodle patterns in the circles



Exam howlers!

Q. When might you use inverted commas?

A. "When you're upside down..."

Q. Calculate the mean of this group of numbers: 2, 12, 5, 8, 4, 19, 8

A. Eight looks quite mean

Q. What is the Italian term for a change of speed in music?

A. Fast-a. Fast-a

Q. Define capital punishment.

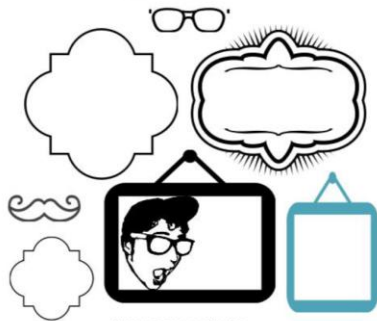
A. When you get in trouble for not putting a capital letter at the start of a sentence.

Q. When Queen Elizabeth I came to the throne what is the first thing she did?

A. Sat down

Q. In school I think I could do better at...

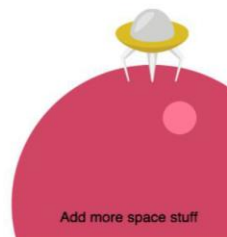
A. Spilling



Draw some portraits



Grow some flowers



Add more space stuff

How do you feel at the moment?



0

1

2

3

4

5

6

7

8

9

10

I feel really sad and down in the dumps

I'm not feeling happy or sad

I feel really happy

Appendix C-1: Student Information Sheet study 3.1



STUDENT INFORMATION Sheet

The SHIP-SHAPE study
Self-Harm in young people at college

Hello. We are researchers at the University of Nottingham. We are asking all students aged 16-25 at your college to fill in two short surveys, one now and another in three months time, as part of the SHIP-SHAPE research study.

What will you ask me about?

We will ask you about how you think and usually behave as well your experiences (*if any*) of self-harm. Self-harm is hurting yourself (such as cutting, hitting or punching) or self-poisoning, on purpose, no matter what the reason. We are hoping to understand more about how some of the ways we act (such as acting without thinking) could be linked to self-harm for some young people. All questions are optional, which means you don't have to answer them if you don't want to. The survey will last around 30 minutes.

Do I have to take part?

No. It is up to you if you would like to take part and you can change your mind at any time without having to give us a reason.

Who will know I have taken part?

The survey is anonymous which means we do not want you to put your name on it and there will be nothing that will identify you as having taken part. Once you have submitted the survey, it will not be possible to remove your answers, but again, you can't be identified. What you tell us will also be confidential which means it will stay between you and us (the research team), unless we have serious concerns about your safety, in which case we will talk to your college to check you are ok.

Why are we asking you about this?

Most young people do not self-harm, but around 15% of young people may have experience with self-harm, or have thought about it. In many cases young people choose to keep this a secret for lots of different reasons. By filling out this survey you will have the chance to tell us, anonymously, about your experiences, whether or not you have self-harmed. This knowledge may help us to support other young people, so your involvement in this research is really helpful and valued.

Will I find this helpful?

Although this research will help us understand how to support young people who self-harm in general, those who take part in surveys like this have said they personally value having the chance to talk about self-harm, and like taking part in research to help others.

What will you do with the data?

All data will be kept securely for 7 years and then disposed of securely. During this time only members of the research team will have access to the data. Study findings will be used in a PhD thesis and may be published in academic journals, or discussed in research settings. A summary of whole study findings can be provided.

We hope you'll want to take part in this research study. If you have any questions or are worried about this research, please get in touch.

Thank you!

Queries or complaints

Please contact Professor Kapil Sayal kapil.sayal@nottingham.ac.uk in the first instance. If this does not resolve matters to your satisfaction, please write to the Administrator of the Division of Psychiatry & Applied Psychology's Research Ethics Committee (Adrian.Pantry@nottingham.ac.uk 0115 82 31459) who will pass your query to the Chair of the Committee.

Data online

This survey will be conducted using online software. We believe there are no known risks associated with this. However, as with any online related activity there is always the possibility of a security breach. We will do everything possible to ensure your answers in this study will remain anonymous. To minimize risks we will use an online survey host recommended by the University of Nottingham which includes additional encryption and account security features.

The SHIP-SHAPE Team

Joanna Lockwood, llxjll@nottingham.ac.uk Division of Psychiatry & Applied Psychology, School of Medicine, University of Nottingham;
Kapil Sayal, Professor of Child and Adolescent Psychiatry kapil.sayal@nottingham.ac.uk;
Ellen Townsend, Professor of Psychology and Director of the Self-Harm Research Group;
David Daley, Professor of Psychological Intervention

Appendix C-2: College Online Survey

Is this like me? Self control (page 12/20)

The following questions ask about the control you have over your behaviour. Read the following statements and select the number that is most like you.

Please don't select more than 1 answer(s) per row.

Please select at least 13 answer(s).

	1 - Not at all like me	2 - A little like me	3 - Somewhat like me	4 - Mostly like me	5 - Very much like me
1. I am good at resisting temptation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I have a hard time breaking bad habits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I am lazy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I say inappropriate things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I do certain things that are bad for me, even if they are fun.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I refuse things that are bad for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I wish I had more self-discipline.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. People would say that I have very strong self-discipline.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Pleasure and fun sometimes keep me from getting work done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I have trouble concentrating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I am able to work effectively toward long-term goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I often act without thinking through all the alternatives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Is this like me? When I'm feeling upset... (page 13/20)

Finally in this section, we'd like you to think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

Please don't select more than 1 answer(s) per row.

Please select at least 15 answer(s).

	1 - Strongly agree	2 - Mildly agree	3 - Agree and disagree the same	4 - Mildly disagree	5 - Strongly disagree
1. Feeling distressed or upset is unbearable to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. When I feel distressed or upset, all I can think about is how bad I feel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I can't handle feeling distressed or upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. My feelings of distress are so intense that they completely take over.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. There's nothing worse than feeling distressed or upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I can tolerate (put up with) being distressed or upset as well as most people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. My feelings of distress or being upset are not acceptable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I'll do anything to avoid feeling distressed or upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Other people seem to be able to put up with feeling distressed or upset better than I can.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Being distressed or upset is always a major ordeal for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I am ashamed of myself when I feel distressed or upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. My feelings of distress or being upset scare me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I'll do anything to stop feeling distressed or upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. When I feel distressed or upset, I must do something about it immediately.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thanks for answering all those questions. That's the end of Section Two. You are more than half way through the survey now.

Self-harm (3) (page 16/20)

The following questions will help us to understand your experience of self-harm.

7. The last time you self-harmed, what the reason? Tick all that apply

- ☐ 1. Feeling angry or annoyed
- ☐ 2. Feeling sad or depressed
- ☐ 3. Feeling upset or bad about something.
- ☐ 4. Arguments / issues with friends
- ☐ 5. Arguments / issues with family
- ☐ 6. Feeling anxious or worried about something
- ☐ 7. Can't remember
- ☐ Other

If you selected Other, please specify:

8. The following question will help us to understand a little more about how you feel when you self-harm. Young people tell us they self-harm for lots of different reasons. But to what extent do you agree with the following statements?

Please don't select more than 1 answer(s) per row.

	0 - Yes	1- Yes, for a while	2 - Yes, but it doesn't last long	3 - No
When I self-harm I expect to... feel calmer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I self-harm I expect to... feel a release of emotional pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I self-harm I expect to... feel less anxious, frustrated, angry, or other emotions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I self-harm I expect to... feel better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Quick exit](#)

☐ I no longer want to take part

Appendix D-1: Student Information sheet Study 3.2



PARTICIPANT INFORMATION

Division of Psychiatry & Applied Psychology
School of Medicine, Faculty of Medicine & Health Sciences

Project Title: The role of impulsivity, emotion and self-control in adolescent self-harm: What do young people say?

Researcher: Joanna Lockwood, llxjll@nottingham.ac.uk

Supervisor: Kapil Sayal, Kapil.sayal@nottingham.ac.uk

Ethics Reference Number: 243

You are invited to take part in a research project in which we are asking young people to talk to us about how they think, feel and behave. This Participant Sheet will tell you more what taking part in this project would involve.

What is the project about?

We are exploring young people's experience of impulsive behaviour. This might be, for example, when we act quickly without thinking through the consequences of our actions, or act quickly when we feel strong emotions. We would like to understand how impulsive behaviour like this might be linked to self-harm. (Self-harm is any act of self-injury or self-poisoning no matter what the reason.) We would like to talk to young people and ask them how they think and feel about these issues. We would like to talk to you whether or not you have personal experience of self-harm.

Do I have to take part?

It is up to you if you would like to take part, and you may change your mind at any time before or during the study without having to give us a reason. Once you have taken part in the research it may not be possible to withdraw your information.

Who is being asked to take part, and why?

All students aged 16-24 who took part in the Ship-Shape College survey, and who said they would be interested in participating in future research, are being invited to take part. We hope to learn more about impulsive behaviour and self-harm in young people so that we can help to support others in the future. Your involvement will be really helpful and valued.

What will I be asked to do?

The study involves a face-to-face interview with a researcher on college campus or at The University of Nottingham. The interview will last up to an hour, but you can choose to stop the discussion sooner if you prefer. We will ask you questions about the ways in which you tend to think, feel and act, and specifically about impulsive behaviour. During the interview we will ask you about self-harm thoughts and feelings. You may have personal experiences that you feel comfortable talking about, or instead prefer to talk

Participant Information Sheet v2

more generally about your understanding of self-harm. You may also tell us about other behaviour you feel comfortable talking about. We will not ask you to discuss the answers you provided in the Ship Shape survey.

As part of the interview you will also be given a short activity to complete. You'll be given cards with statements on which describe ways of thinking, feeling and acting. We'll ask you to pick cards which you feel best describe you and your experiences and to talk to us about your choices. We will record the interview on a digital recorder and take a photograph of your final card selection. This is so that we can listen to what you say, and remember your choices later.

Will the research be of any personal benefit to me?

This research will help us better understand factors that can lead to self-harm in young people in general, but those who have taken part in research like this have said they personally value having the chance to talk to someone about mental health issues or self-harm, and like taking part in scientific research to help others. The researcher is trained to listen and to be non-judgmental.

What will happen to the information I provide?

All information collected during the interview will be confidential i.e. will stay between you and the research team, and will be stored on a password-protected database. However, if you tell us something that means we have serious concerns about your safety we may need to inform your college. At the end of the interview the recorded information will be written up (transcribed) by the researcher ready for analysis. Your information will be made anonymous (i.e. your name and anything that can identify you will be removed). We would like to be able to quote what you say in our research reports, and you will not be identifiable. If you do not wish us to do this, please tell us.

What will you do with the data?

Study findings will be used in a PhD thesis and may also be published in academic journals or discussed in research settings. A summary of study findings can be provided.

At the end of the project, all raw data will be kept securely by the University under the terms of the Data Protection Act. The data will not be kept elsewhere.

If you have any questions or concerns, please don't hesitate to ask. We can be contacted before and after your participation at the above address.

THANK YOU FOR YOUR PARTICIPATION

If you have any queries or complaints about this study, please contact the student's supervisor in the first instance. If this does not resolve the query to your satisfaction, please write to the Administrator to the Division of Psychiatry & Applied Psychology's Research Ethics Sub-Committee (MS-DPAPEthics@nottingham.ac.uk, +44 (0)115 8232214) who will pass your query to the Chair of the Committee.

Appendix D-2: Study 3.2 Interview schedule – no self-harm

AIM: to interview young people about being impulsive and about their behaviour and their thoughts about self-harm (or another behaviour) using open-ended questions, follow up questions and prompts. Questions can be drawn on during the tasks as appropriate.

Q1. Looking at the selections you've made for the card-activity both in terms of the cards about you, and the ones about your recent experience could we talk about some of your choices. How did you find that experience / did you identify items that you'd not really thought about before, or were surprising?

Q2. We've talked a bit in the survey and in the card activity about impulsivity and there are different ways we can understand impulsivity. One way is that we might act a bit rashly when we are feeling strong emotions. Does this way of responding to emotion seem relevant in your experience, or have you any other thoughts about this and how it might relate to you and the way you behave in other instances?

Q3. Another way of thinking about impulsiveness is as a way of responding which means we tend to make quick decisions without thinking through the consequences, or worrying about what those consequences might be? So this is not so much about reacting to emotions, it's more about how we think and process things. Does this way of thinking seem relevant in your experience?

Q4. Thinking about all these things we've been talking about, I'd like to ask you a little about the first time you [behaviour selected]. Can you recall that experience? I'd like to understand how you might have been thinking and feeling at that time? Thinking about the cards you selected for your recent experience of xxx, do you think you'd have picked different cards or removed cards for that first experience? Do you think impulsivity (emotion / cognitive) was relevant that first time?

Q5. Are there times in which you've thought about acting impulsively, but not gone on to do so? Can you think of reasons why this might be?

Q6. This research is interested in self-harm and I'm wondering if you have any thoughts about the things we've spoken about (so how we respond to emotion, or thinking about consequences, or being able to resist our urges) that might make a difference to young people in starting to self-harm or stopping self-harm?

Q9. I've asked you lots of questions. I wondered if there was anything you'd like to ask me about what we've been talking about.

How have you found taking part?

[verbal Debrief. Signpost.]

Appendix D-3: Study 3.2 Interview schedule – self-harm

AIM: to interview young people about being impulsive and about self-harm using open-ended questions, follow up questions and prompts. Questions can be drawn on during the tasks as appropriate.

"You've talked to me a little about how you see yourself, and your experience of self-harm in the card task. Now I'd like to explore some of the things you've identified in a little more detail and to talk to you about some of the other times you might have self-harmed (or thought about it) and how you might have been thinking and feeling then. Is this ok?"

Q1. To begin, it would be really helpful if you could tell me a little more about your history with self-harm. (Prompts: How old were you when you first thought about self-harm and first self-harmed? When was the last time you self-harmed? How frequently might you self-harm? Can you tell me a little about the methods that you might use to self-harm?)

Q2. Are you currently receiving any mental health support / have you talked to anyone about your self-harm before? Is this something you think you could do?

Q3. Looking at the selections you've made for the card-activity both in terms of the cards about you, and the ones about your recent experience of self-harm...could we talk about some of your choices. How did you find that experience / did you identify items that you'd not really thought about before, or were surprising?

Q4. We've talked a bit in the survey and in the card activity about impulsivity and there are different ways we can understand impulsivity. One way is that we might act a bit rashly when we are feeling strong emotions. Does this way of responding to emotion seem relevant in your experience, or have you any other thoughts about this and how it might relate to you and the way you behave in other instances?

Q5. Another way of thinking about impulsiveness is as a way of responding which means we tend to make quick decisions without thinking through the consequences, or worrying about what those consequences might be? So this is not so much about reacting to emotions, it's more about how we think and process things. Does this way of thinking seem relevant in your experience?

Q6. Thinking about all these things we've been talking about, I'd like to ask you a little about the first time you self-harmed. Can you recall that experience? I'd like to understand how you might have been thinking and feeling at that time?

Q7. Thinking about the cards you selected for your recent experience of self-harm, do you think you'd have picked different cards or removed cards for that first experience? Do you think impulsivity (emotion / cognitive) was relevant that first time? Do you have different expectations of self-harm now than you did then? Have your motivations changed?

Q8. Are there times in which you've thought about self-harm, but not gone on to self-harm? Can you think of reasons why this might be? [Explore self-control, emotional awareness, resisting urges].

Q9. Do you think some of the things we've spoken about how we respond to emotion, or thinking about consequences, or being able to resist our urges might make a difference to you, or to others in stopping them from self-harming?

Q10. I've asked you lots of questions. I wondered if there was anything you'd like to ask me about what we've been talking about.

How have you found taking part?

[Verbal Debrief. Signpost.]

Appendix D-4: Example transcript study 3.2

progression
pattern = annoyance → numbness → sadness

355 JL It didn't. And then as we get a bit nearer, and I know it's hard to separate all
356 these out, but the things have gone now from feeling annoyed to more
357 numb(?)

Processing
Combination
of different
emotions

358 P It just felt like what, like, there's nothing I can do, this is just how I'm gonna
359 feel, like, I'm gonna hate on myself, but at the same time I'm gonna feel like *upset*
360 really upset and sad because there's no one there for me, I'm by myself, they'll *sad*
361 never understand what I'm going through. *alone, isolated*

362 JL Okay. And does the annoyance, do you think that goes away?
363 P It's kind of in the back of your mind, but it's more like, there's no one here
364 for me and it's like you just feel like you're just a bit worthless. You don't feel
365 like you're, I don't know. It basically feels like you're just nobody at the *worthless*
366 moment.

[10 mins]

367 JL Okay. And, you know, you're feeling sad and you're feeling ignored and
368 you've picked feeling anxious and worried in the 10 minutes before.

Processing
Mix of emotions
anxiety surrounding
what she will
do with the
emotions.

369 P Oh, that's only because I was like, what's the next step, what am I going to *confusion*
370 do with all these feelings. I am going to let it go, keep it in myself, am I actually *uncertainty*
371 going to do something that I will, not regret, but what I will, like, what I would
372 do to myself, I don't want to do anything, but at the same time though, that *see 11.55-56*
373 went in to the back of my mind and I was like, I actually can do something *crave active response*

374 about it. But at time I wasn't sure what I was gonna do. *self-harm isn't inevitable*
375 JL Okay, so this is an interesting card in that *you are* ~~you~~ feeling worried because
376 you've got all of this and you know that you need to do something with it.

377 P Yeah, because I don't want to just keep it in, it might as well just either talk
378 to someone, but there's no one to talk to, so I was like, what am I going to do
379 at this point? And that's probably what, the more time I thought about it, the
380 more I was thinking about actually self-harming. *emotions need to come out.*

anxiety is about
the response - not
the trigger.
What makes
it SH that
she chooses?

emotional-
cognitive
spiral

[10 mins prior]

talking self.
into a behavior

deserved

urge =
more proximal

less than
[10 min]

Progression
pattern =

injustice → deserving → needing

381 JL Okay. So here we are 10 minutes before and at this point, are you thinking
382 about self-harm?

383 P It's going through my mind, but at the same time I don't know if it's the
384 appropriate choice, because why would I do something like this to myself? It's

385 not nice, I didn't do anything wrong, but the more I think about it, the more I
386 think it is actually true, no one will like, like me, no one wants to be friends

387 with me, this is all my fault, so I might as well just do it, because that's like a
388 punishment basically.

389 JL Okay. Is that how you would, in this instance, it's a punishment?

390 P Yeah, because it's like, it's, you've done something wrong and you should

391 know how it feels again, even though, I know it sounds a bit weird but, you

392 didn't know that you did something wrong in the past and you didn't feel like,

393 'oh yeah, I've got an iss- they've got an issue' but at the moment you're there,

394 the self-harming stage, you know that you did something wrong, so yes you've

395 had that feeling again, so basically, I don't know how to explain it, it's more

396 like, you want to show, you want to see how they felt, but they felt nothing

397 like you felt. Like you feeling like the worst at that point.

398 JL Okay. And here we are, doing it on automatic pilot, less than 10 minutes

399 before.

400 P That's when it probably would be, when I was thinking about it, I'd just go do

401 it because it just feels like an urge now, it's more like I need to do it, because if

402 I don't do it I will do something even worse, that's something that's the first

403 stage, which was probably, I was never thinking about doing anything further

404 than that. But that was like, if I don't do this I would have thought(?) of

405 something more serious and no one's going to be there for me so.

406 JL And when you say more serious, what do you mean?

SH is
justified

catastrophizing
over-thinking

competitive?

urge now

rational
urge.
|
sensible
option

protective
stops her
going
further

choice of
method comes
associations
a different
method
would need
different
associations -
more effort in
working out?

407 P It's nothing major, like, I'm not gonna kill myself, but it would probably be
408 something like, I will hit myself, I will just abuse myself physically.
409 JL Okay. And the cutting yourself, which is this what that instance was?
410 P Yeah.

411 JL Is that, do you not consider that worse because that's, you've done that
412 before you're used

413 P Yeah, but at the same time, it's more like, I know what I'm gonna, I know the

easy, heuristic ingrained because known

414 feeling, it's gonna feel like a, even though it's a punishment it's like a relief

415 because I've done it to myself and I know that that's the punishment I had and

416 then that's it for now and if it comes again I will know that I have to do it

417 again.

if...then → matter of fact black and white

418 JL Okay. Whereas if you didn't act on this urge and you said you might do

419 something worse

420 P Yeah

421 JL That's because it's unknown?

422 P Yeah, because probably I just want to see if that would make me feel better

423 after, but if that's gonna be worse in case that it's gonna hurt more.

424 JL Okay.

425 P Yeah. It's more about the pain now than anything. Yeah.

426 JL And is pain, you know that it's gonna hurt

427 P But it's like a release.

428 JL But it's a relief?

pain is an accomplishment

429 P It feels, the pain after, it feels like you've accomplished something, even

430 though it's nothing to accomplish, it's not an achievement, it's something you

431 shouldn't do, but it's, you feel better, you feel like just got it all, it's like all the

432 emotions but through physical pain basically.

physical expression of emotional pain

[at the moment of SH]

no planning
just response
automatic

consequences
are not
problematic
/
not negative

[Afterwards]

SH = stress
relief
resolving
the tension

433 JL Okay. Umm, and I suppose this, so here we are actually when you're doing
434 it, you've not planned it

435 P Even though it was like an automatic urge, it was like, I didn't, this, all this
436 wasn't leading in to anything, it was just emotion and it just happened.

437 JL So all of this, day before, hour before, thirty minutes, all these that you've
438 picked is building up in to this

439 P Up 'til it actually happened.

440 JL And then it's not that you thought, 'right, I'm doing going to', it's just the
441 emotions are now, finally, when we're at this minute before, there's no
442 planning, you just do that behaviour. And you didn't really think about what
443 might happen afterwards? Because?

444 P Because all like if it happened, I know ^{what's} it's going to happen after that, I can
445 just get on with what I was doing. Basically ignore everything that happened
446 and move on, even though there is a whole new thing in my head that's, that's
447 ^{going to} ~~not~~ to happen again, but I don't know when, that's the thing.

doesn't
think
about
next

448 JL Okay. And afterwards you've picked a few cards here, so you thought you'd
449 feel better, you thought you'd feel calmer, but is that, did you feel better? You
450 just thought you'd feel better.

qualified 'better'

451 P It was more like I felt better physically than emotionally. I felt like, 'oh my
452 god, this is' the feeling is amazing, because it's feel like I've done something
453 even though I shouldn't, but it's like, it's like taking a risk, it's something that I
454 would do to just relieve the stress rather than it making me feel better.

positive
outcome
is
linked
to the
lower
of the
situation
not
affect-
regulation

455 Because it makes you feel better more like 'oh yeah, I've done it,' than actually
456 'oh, I feel better, I'm gonna stop now', because it's not, it's like a constant, like
457 it comes back to you basically.

458 JL Okay. Afterwards you felt worse and no different as well?

Appendix E-1: Abstract from Reflective diary

Tuesday 15th November 2017

Reading through student responses from the school-study...

It would be inhuman not to be emotionally affected by the accounts of self-harm, and the other signs of distress or anxiety in so many of the surveys. I am not sure I had fully reflected before this process began (in the drive for a large data set) on how the very bulk of responses would make their impact. The fact that the survey is paper based is a significant component of this. This choice was important for a number of practical, methodological and ethical reasons, but I'd not particularly recognised that the physical process of opening each survey, turning to the page on self-harm and seeing a tick in a box left by a student only hours or days before, would have such an impact... This is difficult but so important I think. I imagine it is more affecting than receiving the automatically churned-out results of an online survey. I have to physically as well as emotionally deal with this, recording each incident in my spread sheet, which makes maintaining sight of the fact that each of these responses is a real child dealing with a real issue and choosing to share this with me, more salient. It makes me more aware of the privileged position I hold here... In a way, the tick box survey option to the question "Have you self-harmed, yes or no?" is harder to emotionally process than a more detailed open response. I can't hear the voice of the young person who has made this visceral mark in front of me. The only thing I have to go on is the strength and size and colour of the tick. It is hard to avoid assumptions about the mark making (Faint? Big, bold? What might this mean?). A maternalistic response? Certainly an over analysis...! I find lots more detail in the open responses and in the comments on the doodle page. More information is almost easier to deal with. Perhaps, having even more information in the face-to-face interviews planned in the next study will be easier still? Seems counterintuitive. Perhaps this is the counsellor in me? I can respond to a face-to-face encounter, deal with the emotion of an individual, signpost in person, feel more use. It is difficult to maintain a researcher focus. The distance between the child and me... distilled into that one small tick...

Appendix F-1: Ethics approval letter 202 (Study 1.1)



The University of
Nottingham

UNITED KINGDOM • CHINA • MALAYSIA

Faculty of Medicine & Health Sciences

School of Medicine

Division of Psychiatry and Applied Psychology

The University of Nottingham

YANG Fujia Building

Jubilee Campus

Nottingham

NG8 1BB

t: +44 (0)115 82 32214

www.nottingham.ac.uk/medicine

Investigators: Joanna Lockwood and Kapil Sayal

Title of study: Ship Shape study (Self harm and school aged young people)

Duration of study: Until September 2018

Ethics reference number: 202

Monday 4th July 2016

Dear Joanna,

A favourable opinion is given to the above named study on the understanding that the applicants conduct their research as described in the above numbered application, and adhere to all conditions under which the ethical approval has been granted and use only materials and documentation that have been approved. If any amendments to the study are required, an amendment should be submitted to the committee for approval.

David Daley (Professor)

Co-Chair of DPAP Ethics Subcommittee

Amanda Griffiths (Professor)

Co-Chair of DPAP Ethics Subcommittee

Appendix F-2: Ethics approval letter 202 (amendment)



UNITED KINGDOM • CHINA • MALAYSIA

Faculty of Medicine & Health Sciences

School of Medicine

Division of Psychiatry and Applied Psychology

The University of Nottingham

YANG Fujia Building

Jubilee Campus

Nottingham

NG8 1BB

t: +44 (0)115 82 32214

www.nottingham.ac.uk/medicine

Investigators: Joanna Lockwood and Kapil Sayal

Title of study: Ship Shape study (Self harm and school aged young people)

Duration of study: Until September 2018

Ethics reference number: 202

Tuesday 18th September 2018

Dear Joanna,

An amendment to this study was submitted to the committee for approval. The amendment was approved on Thursday 2nd February 2017.

David Daley (Professor)

Co-Chair of DPAP Ethics Subcommittee

Amanda Griffiths (Professor)

Co-Chair of DPAP Ethics Subcommittee

Appendix F-3: Ethics approval letter 243 (Study 3.2)



The University of
Nottingham

UNITED KINGDOM • CHINA • MALAYSIA

Investigators: Kapil Sayal and Joanna Lockwood

Title of study: The role of impulsivity, emotion and self-control in adolescent self-harm: What do young people say?

Duration of study: Until September 2019

Ethics reference number: 243

Faculty of Medicine & Health Sciences

School of Medicine

Division of Psychiatry and Applied Psychology

The University of Nottingham

YANG Fujia Building

Jubilee Campus

Nottingham

NG8 1BB

t: +44 (0)115 82 32214

www.nottingham.ac.uk/medicine

Thursday 17th August 2017

A favourable opinion is given to the above named study on the understanding that the applicants conduct their research as described in the above numbered application, and adhere to all conditions under which the ethical approval has been granted and use only materials and documentation that have been approved. If any amendments to the study are required, an amendment should be submitted to the committee for approval.

David Daley (Professor)

Co-Chair of DPAP Ethics Subcommittee

Amanda Griffiths (Professor)

Co-Chair of DPAP Ethics Subcommittee

Appendix G-1: Published research from this thesis

Eur Child Adolesc Psychiatry
DOI 10.1007/s00787-016-0915-5



REVIEW

Impulsivity and self-harm in adolescence: a systematic review

Joanna Lockwood^{1,2} · David Daley^{1,2} · Ellen Townsend³ · Kapil Sayal^{1,2}

Received: 25 April 2016 / Accepted: 27 October 2016
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Abstract Research supports an association between impulsivity and self-harm, yet inconsistencies in methodology across studies have complicated understanding of this relationship. This systematic review examines the association between impulsivity and self-harm in community-based adolescents aged 11–25 years and aims to integrate findings according to differing concepts and methods. Electronic searches of EMBASE, MEDLINE, PsychINFO, CINAHL, PubMed and The Cochrane Library, and manual searches of reference lists of relevant reviews identified 4496 articles published up to July 2015, of which 28 met inclusion criteria. Twenty-four of the studies reported an association between broadly specified impulsivity and self-harm. However, findings varied according to the conception and measurement of impulsivity and the precision with which self-harm behaviours were specified. Specifically, *lifetime* non-suicidal self-injury was most consistently associated with *mood-based* impulsivity-related traits. However, *cognitive* facets of impulsivity (relating to difficulties maintaining focus or acting without forethought) differentiated current self-harm from past self-harm. These facets also distinguished those with thoughts of self-harm (ideation) from those who acted on thoughts (enaction). The findings suggested that mood-based impulsivity is related to the

initiation of self-harm, while cognitive facets of impulsivity are associated with the maintenance of self-harm. In addition, behavioural impulsivity is most relevant to self-harm under conditions of negative affect. Collectively, the findings indicate that distinct impulsivity facets confer unique risks across the life-course of self-harm. From a clinical perspective, the review suggests that interventions focusing on reducing rash reactivity to emotions or improving self-regulation and decision making may offer most benefit in supporting those who self-harm.

Keywords Self-harm · Non-suicidal self-injury · Impulsivity · Adolescence · Urgency

Introduction

Self-harm and the extent of the problem in adolescence

Self-harm, defined here as intentional self-injury or self-poisoning irrespective of motivation or intent [1], is a significant problem affecting young people. Though estimates suggest around 25,000 adolescents present to hospital annually with self-harm in England and Wales [2], the often hidden and unreported nature of self-harm suggests that these are conservative estimates [3, 4]. Community-based studies in the UK reveal that around 13–15.5% of adolescents aged 13–18 years report a lifetime incidence of self-harm [5–8]—a high prevalence mirrored in findings from cross-national epidemiological surveys of youth [4, 9, 10]. While rates of self-harm show a consistent peak around 14–17 years [11] and the onset and cessation of self-harm typically occur around this age [4, 12], the behaviour is common across adolescence—here recognised as the broad developmental period spanning 11–25 years [10]. In fact,

✉ Joanna Lockwood
llxjll@nottingham.ac.uk

¹ Division of Psychiatry & Applied Psychology, Institute of Mental Health, University of Nottingham, Innovation Park, Triumph Road, Nottingham NG7 2TU, UK

² Centre for ADHD and Neurodevelopmental Disorders Across the Lifespan, (CANDAL) Institute of Mental Health, University of Nottingham, Nottingham, UK

³ School of Psychology, University of Nottingham, Nottingham, UK

Published online: 05 November 2016



Appendix G-2: Published research from this thesis

Lockwood et al.
Child Adolesc Psychiatry Ment Health (2018) 12:23
<https://doi.org/10.1186/s13034-018-0230-7>

Child and Adolescent Psychiatry
and Mental Health

RESEARCH ARTICLE

Open Access



What do young adolescents think about taking part in longitudinal self-harm research? Findings from a school-based study

Joanna Lockwood^{1,2*}, Ellen Townsend³, Leonie Royes³, David Daley^{1,2} and Kapil Sayal^{1,2}

Abstract

Background: Research about self-harm in adolescence is important given the high incidence in youth, and strong links to suicide and other poor outcomes. Clarifying the impact of involvement in school-based self-harm studies on young adolescents is an ethical priority given heightened risk at this developmental stage.

Methods: Here, 594 school-based students aged mainly 13–14 years completed a survey on self-harm at baseline and again 12-weeks later. Change in mood following completion of each survey, ratings and thoughts about participation, and responses to a mood-mitigation activity were analysed using a multi-method approach.

Results: Baseline participation had no overall impact on mood. However, boys and girls reacted differently to the survey depending on self-harm status. Having a history of self-harm had a negative impact on mood for girls, but a positive impact on mood for boys. In addition, participants rated the survey in mainly positive/neutral terms, and cited benefits including personal insight and altruism. At follow-up, there was a negative impact on mood following participation, but no significant effect of gender or self-harm status. Ratings at follow-up were mainly positive/neutral. Those who had self-harmed reported more positive and fewer negative ratings than at baseline: the opposite pattern of response was found for those who had not self-harmed. Mood-mitigation activities were endorsed.

Conclusions: Self-harm research with youth is feasible in school-settings. Most young people are happy to take part and cite important benefits. However, the impact of participation in research appears to vary according to gender, self-harm risk and method/time of assessment. The impact of repeated assessment requires clarification. Simple mood-elevation techniques may usefully help to mitigate distress.

Keywords: Self-harm, Adolescence, Ethics, Longitudinal, Multi-methods, Mood-mitigation

Background

Self-harm, here defined as any act of self-poisoning or self-injury irrespective of motivation or suicidal intent [1], is a common and significant health concern in adolescence. Average lifetime prevalence of self-harm in community-based samples of adolescents in Europe and Australia has been estimated at 17.8% [2], with rates comparable internationally [3]. While self-harm for many is about preserving rather than ending life [4] it is

nonetheless strongly linked to completed suicide, with 40–60% of those who die by suicide having a history of self-harm [5]. Youth who self-harm are also at increased risk of mental health difficulties and multiple life problems such as increased alcohol use and relationship difficulties [6, 7]. Adolescents who self-harm thus represent an extremely vulnerable group.

Adolescence—the developmental period spanning 12–25 years of age—is an important time to focus research on self-harm as these years are likely to include the onset (12–14 years), peak (15–24 years) and start of remittance of the behaviour [8–10]. Rates of self-harm behaviour are three times higher in adolescents than adult populations [11]. Much self-harm research to date

*Correspondence: lj1jll@nottingham.ac.uk

¹ Division of Psychiatry & Applied Psychology, Institute of Mental Health, University of Nottingham, University of Nottingham Innovation Park, Triumph Road, Nottingham NG7 2TU, UK
Full list of author information is available at the end of the article



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