Exposing Narrative Exposure Therapy. Investigating Autobiographical Memory Integration and the Process of Exposure and Habituation in Narrative Exposure Therapy.

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Portfolio Abstract

Introduction: Witnessing or being involved in traumas can lead to the development of post-traumatic stress disorder (PTSD). If people are subjected to multiple prolonged traumas this can lead to complex PTSD (CPTSD). Narrative Exposure Therapy (NET) is a treatment used for CPTSD; however, its autobiographical memory integration (ABMI) and exposure and habituation mechanisms of change are not well evidenced. The role of autobiographical memory (ABM) in therapeutic change needs to be explored. It is not appropriate to apply the existing measures of ABM to trauma narratives gained from therapy; therefore, the researcher developed the autobiographical memory integration coding tool (ABMICT). The NET protocol was adapted (termed NET+; Table 2) to allow its mechanisms of change to be examined.

Aims: The primary aim of the study was to investigate NET's posited ABMI and exposure and habituation mechanisms of change. Secondary aims included: a) investigating the effectiveness of NET+ for trauma symptoms and levels of psychological distress; and b) to explore participants' experiences and acceptability of NET+.

Methods: A single case design, mixed-method, naturalistic, sequential measurement, A-B, and follow up design was used. Change interviews were conducted after completing therapy. Participants were recruited from a secondary care mental health service within the UK. ABMI was measured by analysing therapy transcripts with the ABMICT. To assess exposure and habituation participants wore a chest strap collecting heart data and subjective units of distress were captured. Participants completed questionnaires to measure psychological distress, symptoms of trauma, and awareness of body experiences. Analyses included visually inspecting the outcome and process data, effect sizes, reliable (RC) and clinically significant change (CSC), and situational modelling analysis were also calculated. Content analysis was used to analyse the qualitative data.

Results: 3 female participants between the ages of 28-35 took part in the study. Two participants experienced symptom reduction in trauma with one experiencing a RC and another a CSC. Treatment effects were noticed in psychological distress for two participants, with small reductions in depression, anxiety, and stress across all participants, and a RC and CSC for one in anxiety. Two participants consistently experienced in session habituation. For all participants throughout therapy there were increases in vividness, sensory details, and decreases in disorganisation. Two participants had decreases in time and place details, emotional distancing, and narrative coherence more often than not. There were mixed results regarding fragmentation as one participant had a decrease across sessions, another an increase, and another had the same number of increases and decreases. For total word count two participants had the same number of increases and decreases, whereas only one experienced consistent decreases.

Conclusions: Claims of NET's effectiveness in treating trauma and general psychological distress cannot be made, due to the results not being demonstrated across three cases. However, NET did reduce levels of trauma, psychological distress, and anxiety for some participants. The study's findings do not support NET's claims of ABMI as a mechanism of change but do support the exposure and habitation element. NET seemed acceptable as the only adaption suggested was to include more sessions. Future research developing the coding tool is needed which would allow the role of ABM phenomenology in mental health conditions to be better understood.

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Statement of Contribution

- Project design: Jackson Lord, Prof Thomas Schröder, Dr Rachel Sabin-Farrell
- Application for ethical approval: Jackson Lord
- Recruiting participants: Jackson Lord, Dr Cathryn Young
- Data collection and delivery of intervention: Jackson Lord under the supervision of Prof Thomas Schröder
- Scoring measures: Jackson Lord
- Conducting change interviews: Nathan Kerr and Danila D'Errico
- Intervention quality checks: Prof Thomas Schröder
- Data entry: Jackson Lord
- Data analysis: Jackson Lord under the supervision of Prof Thomas Schröder
- Write-up: Jackson Lord under the supervision of Prof Thomas Schröder and Dr Rohan Naidoo

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Systematic Review

Measuring Autobiographical Memory: A Review of the Current Psychometric and Methodological Issues.

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Abstract

Autobiographical memory (ABM) is a unique form of human memory, that plays a crucial role in understanding many clinical disorders, but also how we learn and develop a sense of self. Various methods have been used to study ABM; however, there is a lack of evidence of the psychometric properties of the existing measures, and there is a concern that the existing measures do not assess ABM fully. Through reviewing the literature, more contemporary measures assess more factors of ABM. This paper conducts a systematic review of self-and observer-rated measures of ABM**,** and appraises existing measures making suggestions for future research. A definition of content validity was constructed from the measures reviewed in this paper. Three databases were searched (Medline, Web of Science, and PubMed) and nine measures were included and rated for quality. Measures were grouped into three categories, narrative, cue word, and self-report. Quality ratings ranged from 3 to 7 out of 16, with low ratings due to content validity, factor structure, and internal consistency for narrative measures. For self-report and cue word measures, low ratings were given for the reliability, validity, and floor/ceiling effects. Overall, scores were generally inadequate for the content validity of the measures. Therefore, there is a need for further testing of the validity of existing measures, and the development of more narrative measures. A final recommendation from this review is the development of an observer-rated measure quality appraisal tool.

Keywords: Autobiographical Memory, Psychometric Properties, Systematic Review

Introduction

Autobiographical memory (ABM) is a unique form of human memory, defined as mental representations of events from one's past and semantic information about the self (Fivush, 2011; Griffith et al., 2012). Fivush (2011) builds on this definition stating it moves beyond the recall of events, to integrate perspective, interpretation, and evaluation of the self across time, creating personal history. ABM is a higher-order cognitive process, made up of a set of integrated systems, including episodic and semantic memory processes (Fivush 2011; Levine et al., 2002; Squire, 2004; Tulving, 2002). Tulving (1972) differentiated between semantic and episodic memories. Semantic memory is explicit knowledge of the world and based on the belief of the memory content, for example, knowing the capital of France is Paris. Episodic memories are specific with a time and place, for example, the summer I visited Big Ben during a trip to London. Tulving (1972;2002) highlighted a distinction between episodic and semantic memory, episodic memory has elements of reliving the event due to autonoetic consciousness; the ability to have an awareness of the self-having experienced the event, and then to mentally time travel.

Memory can be split into two systems, declarative, and non-declarative. Non-declarative memory is made up of multiple systems including procedural knowledge of skills and actions with little conscious awareness, such as most forms of conditioning and priming (Fivush, 2011, Schacter et al., 2008; Squire, 2004). Declarative memory is conscious and is the explicit representations of past experiences (Fivush, 2011). In terms of retrieval, there is a consensus that ABM is organised in a hierarchical structure, where memory types are split into extended, summarised, and specific event categories. The events vary in their level of specificity and length in time, with extended events at the top of the hierarchy, and specific at the bottom (Belli, 1998). Retrieval occurs through an integration of multiple pathways in a top-down approach through the hierarchy and is done sequentially within life themes (notable events in a persons' life) that combine extended events, and in parallel across life themes involving sequential and contemporaneous events (Belli, 1998). During recall, the hierarchical structure posits that more general events are recalled first, before more specific and detailed events.

Memory phenomenology plays a crucial role in understanding many clinical disorders, such as dementia, depression, and post-traumatic stress disorder (PTSD). Research into ABM and psychopathology has focused on the relationship between over-general ABM (OGM; difficulty recalling and describing specific events) and depression, as people with a greater OGM are more likely to experience depression (Williams et al., 2007). A higher level of OGM has been shown to predict the likelihood of experiencing PTSD after a trauma (Kleim & Ehlers, 2008). As ABM has been established to play a role in the development and maintenance of depression and PTSD (Brewin & Holmes, 2003; Dalgleish & Werner-Seidler, 2014; Vanderveren et al., 2020), understanding the processes of ABM that contribute to psychopathology is crucial. Narrative coherence, one facet of ABM, has been linked to symptoms of psychopathology (Vanderveren et al., 2020), in particular low narrative coherence has been shown to be related to depression (Vanderveren et al., 2019), PTSD (Brewin, 2014), and obsessive-compulsive disorder (Rasmussen et al., 2017). ABM can differ on many qualities (e.g. vividness, and coherence), comprehensive measures that assess the wide range of ABM are needed, if these measures do not exist the implications of ABM and psychopathology will remain unknown (Sutin & Robins, 2007). It would be illuminating to see how ABM changes over the course of treatment for PTSD, and analysing trauma narratives gained as part of therapy may allow for a more nuanced understanding of memory (Kangaslampi & Peltonen, 2019). In non-clinical populations ABM is essential as it supports a persons' ability to learn from previous experiences, building a sense of self over time, serves social and emotional functions including self-regulation and relation with others (Bluck & Alea, 2002; Conway & Pleydell-Pearce, 2000; Fivush, 2011).

Various methods have been used to study ABM; structured interviews - the Autobiographical Memory Interview (AMI; Kopelman et al., 1989), cue word tasks - the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), to narrative measures - The Autobiographical Memory Coding Tool (ABMCT; Kovach, 1993). As a wide range of measures have been created their psychometric properties need to be examined. Well-validated interviews such as the Autobiographical Interview (AI; Levine et al., 2002) have been designed to assess the differences in ABM between healthy and in-patient populations. However, interviews are time and labour intensive

and impractical to use in larger-scale research designs (Palombo et al., 2013). Structured questionnaires such as the Assessment of the Phenomenology of Autobiographical Memory (APAM; Vannucci et al., 2020) have also been used; however, these measures are limited to either assessing the memory of a single event or using single-item ratings. Memory narratives, however, provide a promising alternative method as they can address several limitations of self-report and cue word methodologies. Narratives are less fallible to demand characteristics and may better reflect the recollection process of naturalistic memory (Kangaslampi & Peltonen, 2019; Sumner et al., 2013).

Little attention has been paid to the psychometric properties of the existing measures, leaving several questions about their quality unanswered. As Boyacioglu and Akfirat (2015) and Sutin and Robins (2007) note, most of the existing measures have not been well developed or had their psychometric properties adequately evidenced. Two of the most used measures, the Autobiographical Memories Questionnaire (AMQ; Rubin et al., 2003), and the Memory Characteristics Questionnaire (MCQ; Johnson et al., 1988) use single-item ratings resulting in issues of reliability and validity, as neither measure had their psychometric properties examined (Boyacioglu & Akfirat, 2015; Sutin & Robins, 2007) they were not reviewed in this paper.

In addition to the lack of evidence of the psychometric properties of the existing measures, there is a concern they do not assess ABM holistically (Sutin & Robins, 2007; Vannucci et al., 2020). ABM can differ across many qualities in its level of content, vividness, imagery, and sensory details. Most of the existing questionnaires have assessed these concepts with single-item ratings, either by creating ad hoc items or taking them from existing measures (Boyacioglu & Akfirat, 2015; Sutin & Robins, 2007; Vannucci et al., 2020). There has been a growing understanding of the importance of assessing the wide range of phenomenological constructs of ABM; however, the study of these areas has been scarce suggesting a need for measures to assess ABM holistically.

There is a consensus of the definition and structure of ABM, however, there has been little agreement of the dimensions to assess, as when Sutin and Robins (2007)

and Boyacioglu and Akfirat, (2015) conducted literature reviews to create their measures they found ten and seventeen dimensions. Despite there being differences in the agreement and number of dimensions assessed by the existing measures, through reviewing the literature, a trend has appeared; the earlier measures generally assessed fewer factors, whereas the more contemporary measures assess a wider number of areas (Table 1).

This paper has two aims, the first, to conduct a systematic review of self-and observer-rated measures of ABM, which has not been done before. The second, to appraise existing measures and make suggestions for future research.

Table 1 *Measure with Year Created and Number of Factors*

MEASURE	NUMBER OF FACTORS ASSESSED	NAME OF FACTOR ASSESSED
THE AUTOBIOGRAPHICAL MEMORY TEST (AMT; WILLIAMS & BROADBENT, 1986)	4	PD, S, Sem, & Va
THE AUTOBIOGRAPHICAL MEMORY INTERVIEW (AMI; KOPELMAN, WILSON & BADDELEY, 1989)	4	PD, S, Sem, & Vi
THE AUTOBIOGRAPHICAL MEMORY CODING TOOL (ABMCT; KOVACH, 1993)	2	LA, & Val
THE AUTOBIOGRAPHICAL INTERVIEW (AI; LEVINE ET AL., 2002)	8	EI, PD, Re, S, SD, Sem, Sp, & Vi
THE MEMORY EXPERIENCES QUESTIONNAIRE (MEQ; SUTIN & ROBINS, 2007)	10	A, Co, D, EI, PD, Pe, SD, Sh, Va, & Vi
THE SURVEY OF AUTOBIOGRAPHICAL MEMORY (SAM; PALOMBO, WILLIAMS, ABDI & LEVINE, 2013)	8	BA, FT, PD, R, S, Sem, Sp, & Vi
THE AUTOBIOGRAPHICAL MEMORY QUESTIONNAIRE (AMQ; FITZGERALD & BROADBRIDGE, 2013)	4	BA, I, R, & Re
THE AUTOBIOGRAPHICAL MEMORY CHARACTERISTICS QUESTIONNAIRE (AMCQ; BOYACIOGLU & AKFIRAT, 2015)	17 initially proposed through literature search 14 validated in final measure	A, BA, Co, D, EI, PD, Pe (2), Pre, R, S, SD, Va, & Vi
ASSESSMENT OF THE PHENOMENOLOGY OF AUTOBIOGRAPHICAL MEMORY (APAM; VANNUCCI, CHIORRI & MARCHETTI, 2020)	13	A, AM, BA, Cl, Co, D, EI, Pe, Re, S, SD, Sp, & Vi

Elements of autobiographical memory: A= Accessibility, AM= Age of Memory, BA= Belief in Accuracy, Cl= Clarity, Co= Coherence, D= Distancing, EI= Emotional Intensity, FT= Future Thinking, I= Impact, La= Lamenting Interpretations of Memory, PD= Place Details, Pe= Perspective, Pre= Preoccupied with Emotions, R= Recollection, Re= Rehearsal, S=Specificity, SD= Sensory Details, Sem= Semantic, Sh= Sharing, Sp= Spatial, Va= Valence, Val= Validating Interpretations of Memory, and Vi= Vividness.

Method

Inclusion/Exclusion Criteria

Measures were included if:

- Available in English.
- Explicitly measure ABM.
- The paper had to either aim to develop a measure and include psychometric data or evaluate the psychometric properties of a measure.
- The measure had to be a self-report, observer-rated, or an interview measure.

Papers were excluded if:

- They did not measure ABM (or only assessed one facet of ABM).
- ABM was assessed objectively via biological or neuropsychological methods.
- The paper was not available in English and not able to be translated.

Information Sources

Databases searched were Medline, Web of Science, and PubMed from 12 June 2020 to 26 June 2020. Most recent versions of the measures were included at the time of writing the paper (Figure 1).

Search Strategy (Search terms)

All articles including the word "autobiographical memory" or ‘and’ "measure*", or "scales*", or "instruments*", or "questionnaire*", or "test*", or "constructs*" in either the title, abstract, or keywords were identified. Papers and the reference lists of those that met the inclusion criteria were searched to identify further measures.

Assessment of Quality

Terwee et al.'s (2007) quality criteria for health status measures was used to assess the quality and psychometric properties of each measure. This tool was used as it explicitly states what constitutes good measurement properties, and its

generalisability across measurement types when compared to COSMIN tools. The areas assessed are: 1) content validity; 2) internal consistency; 3) criterion validity; 4) construct validity; 5) test re-test reliability; 6) responsiveness; 7) floor and ceiling effects; 8) interpretability; 9) criterion validity. Barker et al.'s (2002) framework named the "rule of thumb" was also used, providing a framework to evaluate psychological measures accounting for the size of correlation co-efficient for the test re-test reliability criterion, and correlation size for the convergent and discriminant validity criterion. Using Barker et al.'s framework provided guidance when evaluating the reliability and validity of measures. Factor structure was also included in this paper.

To provide an overall rating and to aggregate the scores of each measure, measures were given a score of 0 (negative) if the criterion was not met or no relevant data were reported, 1 (intermediate) if the criterion was partially met, and 2 (positive) if the criterion was fully met. Measures were assessed and rated on the following criteria:

Content Validity

The extent to which the construct of interest was comprehensively sampled and assessed by items of the questionnaire. To appraise content validity, the researcher made a list of all areas assessed in the papers included in the review. Qualitative data reduction was then used to refine the number of areas assessed (Table 2); allowing the researcher to join areas which were assessing the same constructs but differed in how they were labelled.

An example of qualitative data reduction is in the MEQ (Sutin & Robin, 2007) sensory details were defined as "the extent to which sensory details are re-experienced during retrieval of the memory. This dimension measures every sense except sight, which is…vividness" (Sutin & Robins, 2007, pp.393). Whereas, in the APAM (Vannucci et al., 2020) sound, smell, taste, touch, sensory, and auditory details were all measured by single items. As these concepts shared the same properties, they were combined into the sensory details category. Following qualitative data reduction, a tally chart showing the number of times a factor was

assessed was created, visual analysis was applied to the number of factors assessed by each measure. When deciding on how to appraise the quality of measures based on the number of factors assessed; a score of 0 was given to measures assessing 0-4 constructs; 1 for 5-10; 2 for 11+.

Terwee et al. (2007) stated members of the target population alongside experts should be consulted in the item generation process of the measure. To fully meet this criterion, members of the public and experts had to be consulted in generating items for the measure and 11 or more areas had to be assessed.

Factor Structure

Relates to whether the factor structure of the measure has been examined. A score of 0 was given where no factor analysis was conducted, or where confirmatory factor analysis (CFA) or exploratory factor analysis (EFA) was conducted but did not support the proposed factor structure. A score of 1 was given if EFA had been conducted and supported the factor structure. A score of 2 was given when EFA was followed by CFA and had been conducted on independent samples and analyses supported the proposed structure, or if CFA or an appropriate test had been conducted and the factor structure supported by previous research.

Internal Consistency

Is the degree of inter-relatedness measured by inter-correlations among items in (sub)scales, meaning they assess the same construct. For a score of 2 Terwee et al. (2007) stated factor analyses had to be performed on adequate sample size (defined as at least seven items and over 100 participants) and Cronbach's alpha for each factor must be between 0.70 and 0.95 for each factor.

Table 2
Frequency of Times Factors Assessed in Measures post Qualitative Data Reduction

Factor Assessed	Times Assessed
Vividness	6
Emotional Intensity	5
Sensory Details	5
Coherence	4
Belief in Accuracy	4
Accessibility	3
Perspective (Observer & Field)	3
Distancing	3
Place Details	3
Recollection	3
Clarity	2
Sharing	2
Valence	2
Rehearsal	2
Specificity	2
Preoccupied with Emotions	1
Impact	1
Age of Memory	1
Semantic	1
Spatial	1
Future Thinking	1
Validating Interpretations of Memory	1
Lamenting Interpretations of Memory	1

Reliability

Test re-test reliability is the measure's ability to produce the same results over time. Reliability had to be at least r=0.70 based on Barker et al.'s (2002) 'rule' for this criterion to be fully met. As this paper includes a variety of measures, other measures of reliability were included in place of test re-test reliability where appropriate.

Convergent and Discriminant Validity

The extent to which scores on a scale relate to another established measure. Convergent validity assesses if the measure correlates well with another measure of the same construct. Discriminant validity compares measures of two different constructs to see if they do not correlate. To assess convergent validity Terwee et al. (2007) stipulated that the measure's authors create specific hypotheses about the correlations and at least three-quarters of the results are what is expected. To demonstrate convergent validity, Barker et al. (2002) stated at least two correlations of a minimum r=0.50 between two constructs are needed.

Floor and Ceiling Effects

Shows the number of participants attaining the lowest or highest possible scores on the measure; Terwee et al. (2007) stated no more than 15% of the sample should receive either the top or bottom score on a scale.

Interpretability

The degree to which one can assign qualitative meaning from the quantitative scores gained on the measure, or how differences in the scores can be interpreted. To assess interpretability Terwee et al. (2007) requires the means and standard deviations of scores from at least four subgroups or participants to be reported. Terwee et al. also required minimal important change to be defined, as this was not relevant to the measures in this review, authors feedback of how scores on the scales can be interpreted was used instead.

Criterion Validity

Reflects the degree to which scores on a measures scale relate to a ‘gold standard’ measure. As there is no ‘gold standard’ measure, if the measure was compared to an existing measure, and scored above r=0.50, a rating of 2 was given.

Responsiveness

Responsiveness was not included, as this is similar to clinically meaningful change, something that the majority of measures of ABM were not created to do.

The results of the analysis are displayed in Table 3 and 4.

Figure 1

PRISMA (2009) Flow Diagram (Moher et al., 2009)

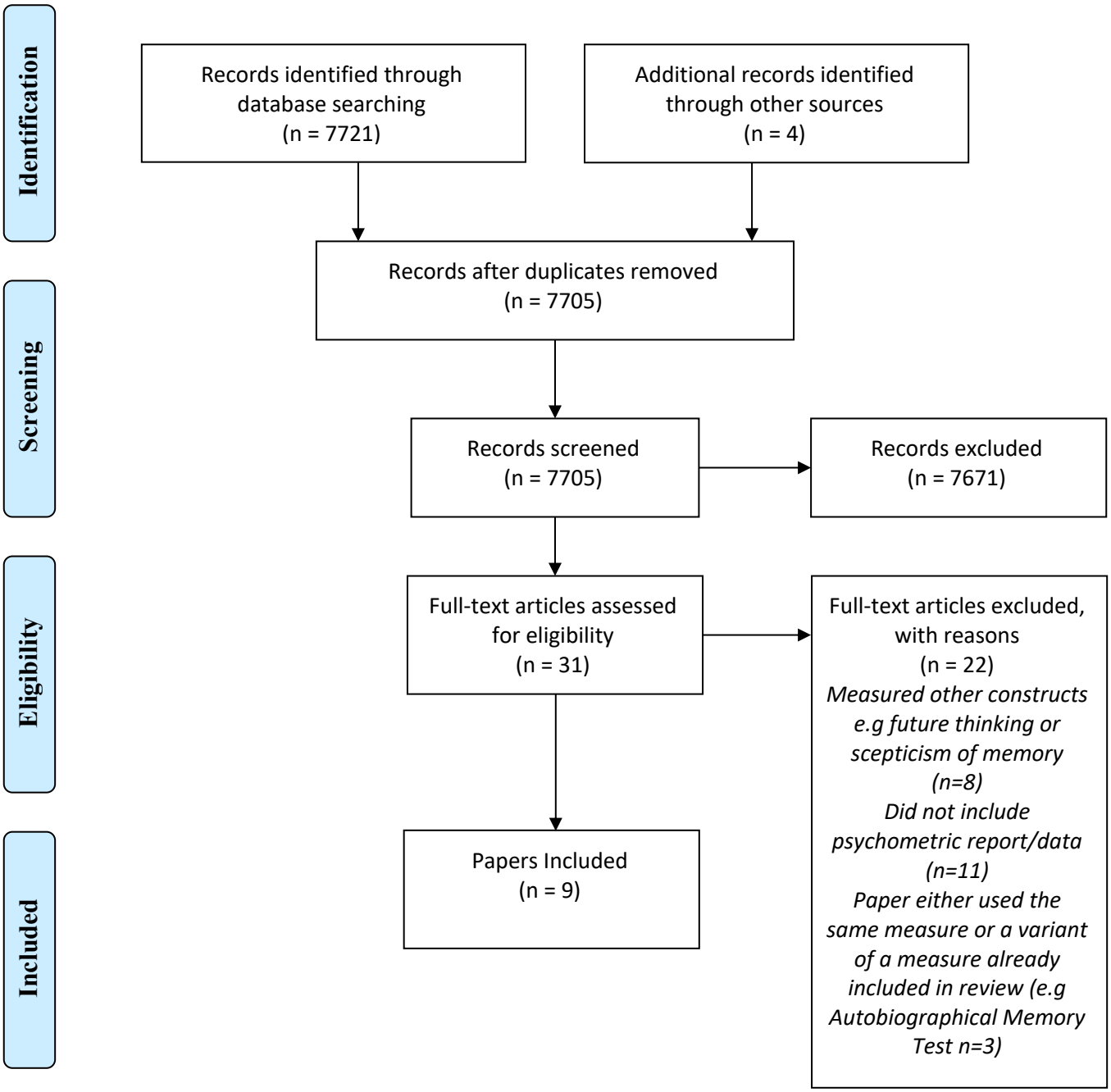

Table 3
Quality Ratings of Measures of Autobiographical Memory

Measure	Content Validity	Factor Structure	Internal Consistency	Reliability	Convergent/discriminant validity	Criterion Validity	Floor/Ceiling effects	Interpretability	Total/ 16
AMI	0	0	0	2	1	1	0	1	5
AI	1	0	0	1	2	0	0	1	5
ABMCT	0	0	0	2	0	0	0	1	3
AMT	0	2	2	2	0	0	0	1	7
APAM	1	1	1	1	0	0	0	1	5
AMQ	0	2	0	0	0	0	0	1	3
SAM	1	1	1	0	1	1	0	1	6
MEQ	1	2	2	0	0	0	0	1	6
AMCQ	2	2	2	0	0	0	0	1	7

Note. Rating: 0= Criterion not met or insufficient data to rate criterion; 1=criterion partially met; 2=criterion fully met
AMI= The Autobiographical Memory Interview; AI= The Autobiographical Interview; ABMCT=The Autobiographical Memory Coding Tool; AMT= The Autobiographical Memory Test; APAM= Assessment of the Phenomenology of Autobiographical Memory; AMQ= The Autobiographical Memory Questionnaire; SAM= The Survey of Autobiographical Memory; MEQ= The Memory Experiences Questionnaire; AMCQ= The Autobiographical Memory Characteristics Questionnaire

Table 4
Psychometric Properties of Measures

Measure	Content validity: Number of Factors	Content validity: item generation (Literature/ expert group and recipients consulted?)	Proposed factor structure	Type of analysis conducted to support factor structure (EFA/CFA)	Internal consistency: sample size adequate for factor analysis?	Internal consistency: Cronbach alpha (for total scale and subscale)	Reliability: Test re-test (r) or interrater
Narrative							
#1. AMI	4 (PD, S, Sem, & Vi)	Recipients= No Experts= Yes	Not reported	Not reported	Not appropriate	Not reported	Interrater reliability of r=0.83 for descriptive richness and specificity in time and place. Crovitz schedules r=0.74 Comparison of autobiographical schedules between Korsakoff and

							Alzheimer patients with two other raters, r=0.84 and 0.86
#2. AI	8 (EI, PD, Re, S, SD, Sem, Sp, & Vi)	Recipients= No Experts= Yes (AMI & MEQ)	Not reported	Not reported	Not appropriate	Not reported	Interrater reliability, internal r=0.88, external r=0.96, recall r=0.89, specific probe r=0.94. Agreement on rating composites, was high for recall (0.79), but not specific probe (0.41). Coefficients ranged from 0.60-0.90 for detail categories bar place and time details after specific probing
#3. ABMCT	2 (La & Val)	Recipients= No Experts= Yes	Not reported	Not reported	Not appropriate	Not reported	r = 1.00 for coding of dominant themes and

							validating and lamenting categories Intercoder reliability α = 0.87, α = 0.87, and α = 0.89 for units of analysis Intercoder reliability α = 0.93, α = 0.93, and α = 0.95 for lamenting style Intercoder reliability α = 0.83, α = 0.83, and α = 0.86 for dominant theme
Cue Word							
#4. AMT	4 (PD, S, Sem, & Va)	Recipients= No Experts= Yes	One factor	CFA on three separate samples, all were a variant of one and two factor models; evidence gained for one factor model.	Yes (Sample 1: N= 333, Sample 2: N= 405, Sample 3: N= 336)	No data reported for sample 1 Sample 2 correlations between two factors =.91	Inter-rater Kappa ranges. Sample 1, Kappa =0.78 for within and cross site reliability.

						Sample 3 correlations between negative and positive word factor =.93	Sample 2, Kappa = 0.83-0.96 Sample 3, not appropriate.
#5. APAM	13 (A, AM, BA, Cl, Co, D, El, Pe, Re, S, SD, Sp, & Vi)	Recipients= No Experts= Yes (Items taken from MCQ, AMQ, & MEQ)	Not reported	Principal Component Analysis was used, all component item loadings bar item 24 were above 0.25; therefore, item 24 was excluded	Yes (Study 1: N = 138, Study 2: N = 90).	Total α not reported for study 1 or 2. Item αs <0.70 for 24/28 items in study 1, bar items 20, 24, 25, and 26 = 0.60- 0.69	In place of test re-test reliability, the measure assessed the consistency of scores across cues. Four items alphas fell below 0.70 and 96.4% of participants (p=138) retrieved a memory for all 12 cues
Self-Report							
#6. AMQ	4 (BA, I, R, & Re)	Recipients= No Experts= Yes	Four factors	Conducted over a preliminary and primary study:	Yes (Preliminary sample: N= 132, Primary Study: 192)	Not reported	Not reported

	Primary Study: Independent CFA-demonstrated model had adequate fit for each memory type. Pattern invariant confirmed was similar for all memory types. Factor invariant model established that the items were loading onto the constructs with a similar magnitude across memory types. Structural equivalence- the structural model fits well for all four memory types.	

#7. SAM	8 (BA, FT, PD, R, S, Sem, Sp, & Vi)	Recipients= No Experts= Yes	Four factors	Multiple Correspondence analysis- Four-dimension structure best summarised the data, no follow up CFA.	Yes N= 598	R^2 values Episodic and semantic = 0.39, episodic and future = 0.21, semantic and other memory types =.14, future and spatial =.07 R^2 converted to r, episodic and semantic r=0.62, episodic and future r=0.46, semantic and other memory types r=0.37, future and spatial r=0.26.	Not reported
#8. MEQ	10 (A, Co, D, EI, PD, Pe, SD, Sh, Va, & Vi)	Recipients= No Experts= Yes (Items taken from MCQ, AMQ)	Ten factors	CFA (Four models tested, model one tested one factor, model two tested two factors, model three tested eight, and model four tested ten;	Yes (Study 2: N = 510, Study 3: N = 212)	Total α not reported for study 1, 2 or 3. Subscale αs <0.70 for 5/10 subscales in study 1, and subscales = 0.60- 0.80+	Not reported

		the ten-factor structure was an excellent fit in two studies)	Subscale αs <0.70 for 10/10 subscales in study 2, and subscales = 0.72- 0.97 for general memory and subscales = 0.72- 0.96 for childhood memory. Subscale αs <0.70 for 10/10 subscales in study 3, and subscales = 0.74- 0.96 for general memory and subscales = 0.73- 0.95 for childhood memory. Intercorrelations between scales: Median intercorrelation for general

						memory was .30 (rs ranged from -0.40 to ,71, M-0.22); earliest childhood memory was .24 (rs ranged from -.44 to .70, M=0.19)	
#9. AMCQ	14 A, BA, Co, D, EI, PD, Pe (2), Pre, R, S, SD, Va, & Vi)	Recipients= Yes Experts= Yes	Not reported	Refined over four studies, final study: CFA, maximum likelihood was run on all items, and provided support for 14 factor model.	Yes Study 1: N = 305, Study 2: N = 197, Study 3: N= 262, Study 4: N=764)	Total α not reported for study 1, 2 or 3. Subscale αs range <0.70 for 4/14 subscales in study 1, and subscales = 10/14 with αs range between 0.40- 0.80. Subscale αs <0.70 for 5/14 subscales in study 2, and subscales = 9/14 with αs range 0.30- 0.82	Not reported.

				Subscale αs <0.70 for 6/14 subscales in study 3, and subscales = 8/14 with αs range 0.51-0.83 Subscale αs <0.70 for 14/14 subscales in study 4.

Psychometric properties of measures of autobiographical memory (content validity, factor structure, internal consistency, and test-retest reliability)

AMI= The Autobiographical Memory Interview; AI= The Autobiographical Interview; ABMCT=The Autobiographical Memory Coding Tool; AMT= The Autobiographical Memory Test; APAM= Assessment of the Phenomenology of Autobiographical Memory; AMQ= The Autobiographical Memory Questionnaire; SAM= The Survey of Autobiographical Memory; MEQ= The Memory Experiences Questionnaire; AMCQ= The Autobiographical Memory Characteristics Questionnaire
Elements of autobiographical memory: A= Accessibility, AM= Age of Memory, BA= Belief in Accuracy, Cl= Clarity, Co= Coherence, D= Distancing, EI= Emotional Intensity, FT= Future Thinking, I= Impact, La= Lamenting Interpretations of Memory, PD= Place Details, Pe= Perspective, Pre= Preoccupied with Emotions, R= Recollection, Re= Rehearsal, S=Specificity, SD= Sensory Details, Sem= Semantic, Sh= Sharing, Sp= Spatial, Va= Valence, Val= Validating Interpretations of Memory, and Vi= Vividness.
NB Papers from this point onwards will be referred to by the number assigned to them.

Results

Narrative Measures

#1. The Autobiographical Memory Interview (AMI; Kopelman et al., 1989)

#1 is a semi-structured interview consisting of two components. The first, an autobiographical incidents schedule requiring participants to produce a memory of a specific event from childhood, early adult life, and a recent event. Interview transcripts are rated on a scale from 0-3, in terms of descriptive richness of the event and specificity in time and place.

The second, is the personal semantic memory schedule. Participants answer questions related to their past, (e.g., parents' birthdates) to assess knowledge of facts about their life. The schedule is split into four sections, background information, childhood, early adult, and recent events.

The Princes Test (Wilson, 1987), The Famous Personalities Test (Stevens, 1979), and The Crovitz Test (Crovitz & Schiffman, 1974) were used in the study. However, will not be appraised in this review. The study used amnesiac and healthy control participants.

Content Validity

The measure assessed four areas (Table 1) achieving a negative rating, no information on how the memory interview or schedule was created was provided.

Factor Structure and Reliability

Factor structure and internal consistency was not assessed. The inter-rater reliability of interviews was high (Table 4), resulting in a positive score.

Convergent Validity and Interpretability

Convergent validity was assessed against The Crovitz Test (Crovitz & Schiffman, 1974) a cue word methodology assessing ABM, a correlation of .27 was found, an intermediate score given. Older amnesiac adults showed a more pronounced temporal gradient than younger amnesiac adults, resulting in an intermediate score for interpretability.

Criterion Validity

Criterion validity was supported by significant correlations in the expected direction. Correlations between performance on the tests, all positively correlated with existing measures but weakly with the national average reading test score. The famous personalities score had a stronger correlation with the semantic test scores. As no hypotheses were given and the reliability of the scales with established tests varied from .02-.63, an intermediate score was given.

Floor and Ceiling Effects

Ceiling effects were highlighted, resulting in a negative score.

#2. The Autobiographical Interview (AI; Levine et al., 2002)

#2 is an interview where a person is asked to recall events from five life periods: early childhood, adolescence, early adulthood, middle-age, and the previous year. If a younger adult takes part, they are asked to select two events from early adulthood. To aid recall a list of typical life events is offered. After recalling the details, participants revisit the events and are probed to provide more detail. The study used younger and older healthy adults.

Transcripts are analysed, and memories split into internal and external groups. Internal details are related directly to the main event described by the participant; they are specific to time, place and reflect episodic re-experiencing. Internal details are split into five categories: event, place, time, perceptual, and emotion/thought.

External details reflect semantic information. Ratings assigned on a scale of 0-3 for time, place, perception, emotion/thoughts, and time integration, whereas episodic richness is rated on a 0-6 scale.

Content Validity

#2 was created by reviewing the existing literature and measures (#1; MCQ, Johnson et al., 1988). As the scale assesses eight areas (Table 1) but did not include the target population in its development, an intermediate rating was given.

Factor Structure and Reliability

Factor structure and internal consistency was not assessed. The inter-rater reliability was examined and scored 0.8 or above on all areas. However, rating composites fell between 0.41 and 0.79, and the coefficients for scoring categories between 0.6-0.9, resulting in an intermediate score.

Convergent Validity and Interpretability

The scale was compared to #1, a significant relationship with detail and rating composites was found, as ratings were above 0.5, a positive score was given for convergent validity. As the sample was split into older and younger subgroups, an intermediate score was given for interpretability.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Ceiling effects were highlighted resulting in a negative score.

#3. The Autobiographical Memory Coding Tool (ABMCT; Kovach, 1993)

#3 took 39 transcripts and applied content analysis to them, developing a coding tool. Two categories were identified: validating and lamenting interpretations of ABM. Areas covered positive self-appraisal, choices, social connections, joys, past to present comparisons, regrets, lack of choice, difficulties, and neutral/informative recall. No details of how to score these categories were provided. The measure used healthy adults.

Content Validity

Content validity was assessed by two experienced nurses reviewing the categories and themes created; a further 18 reminiscence transcripts were taken from two other studies as a point of comparison. A negative rating was given as only two factors were assessed (Table 1).

Factor Structure and Reliability

Factor structure and internal consistency was not assessed, but the test re-test and inter-coder reliability was examined; both measures of reliability scored high (Table 4), resulting in a positive score.

Convergent Validity and Interpretability

Convergent validity was not assessed. An intermediate score was given for interpretability as men reported more descriptions of work, sports-based joys, and more positive self-appraisals.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

Cue Word

#4. The Autobiographical Memory Test (AMT; Griffith et al., 2009)

#4 was created by Williams & Broadbent (1986); participants are asked to produce a specific memory of a recent or distant event when presented a cue word, varying on emotional valence. The test assesses the level of specificity of ABM. The original version's psychometric properties were assessed by Griffith et al. (2009), participants were provided with a stimulus book including 16 cue words related to depression and anxiety. The measure used a student sample.

Responses are coded as one of several categories: specific memories (up to one day); extended memories (longer than one day); categoric memories (related to general events); semantic associates (semantic information), and omissions (no response in the time limit).

Content Validity

The test assesses four areas (Table 1), only consulting experts therefore, a negative rating is given.

Factor Structure and Reliability

A one-factor structure was supported by Van Vreeswijk & de Wilde (2004). CFA was conducted on three separate samples and yielded support for a one-factor model; therefore, a positive rating was given. Inter-rater kappa ratings were all above 0.7, resulting in a positive score for reliability. Internal consistency gained a positive rating as alphas in both samples were 0.90+ for both factors.

Convergent Validity and Interpretability

Convergent validity was not assessed. Item response theory was used and found that individual differences in people may impact performance on the test, dependent on the variant of the test used; an intermediate rating was given for interpretability.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

#5. Assessment of the Phenomenology of Autobiographical Memory (APAM; Vannucci et al., 2020)

#5 is a mix of cue word methodology with a self-report questionnaire. Participants retrieve an ABM associated with a cue word and are given 12 booklets each with a cue word and 27 questions assessing the phenomenological features of each memory on a 7-point scale. Items used in this measure were adapted from the MCQ (Johnson et al. 1988), #6 and #8.

Content Validity

#5 assesses thirteen areas (Table 1), as no members of the target population were consulted in item generation, an intermediate rating was given.

Factor Structure and Reliability

Principal component analysis was used to assess the factor structure /dimensionality of the measure and one item was removed; therefore, an intermediate score was given. Internal consistency was assessed, four items fell below 0.70, therefore an intermediate rating was given. In place of test re-test reliability, the measure used a deductive single item approach that assesses the consistency of scores across cues as a substitute to assess reliability (Woods & Hampson, 2005), as four items alphas fell below 0.70 and 96.4% of participants (p=138) retrieved a memory for all 12 cues an intermediate rating was given.

Convergent Validity and Interpretability

Convergent validity was not assessed. Information on the interpretability was provided and an association was found with the Object-Spatial Imagery Questionnaire (Blajenkova et al., 2006), suggesting higher levels of object imagery were associated with stronger autonoetic experiences, resulting in an intermediate rating.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

Self-Report

#6. The Autobiographical Memory Questionnaire (AMQ; Fitzgerald & Broadbridge, 2013)

#6 assesses four latent constructs: belief, recollection, impact, and rehearsal, across four memory periods (earliest childhood, cue word, highly vivid, and most stressful). Participants write detailed accounts about each memory, and then complete the rating scales hypothesised to indicate one of the four latent constructs while keeping the memory in mind.

For early childhood, the participants are asked to describe their earliest memory and age the event took place. Cue-word is assessed by prompting memories of everyday experiences and asking participants to describe the first event that comes to mind and estimate its date. For highly vivid, a ‘flashbulb memory’ is prompted with an estimated time of event. For the most stressful, participants are told to think of either their most traumatic or stressful memory; however, they are given the option not to provide a description. The measure consists of 18 questions, with a scale of 1-

7, they assess a person's desire to testify how true the memory is; how often they think/talk about the event; their spatial recall, and time the event took place. The measure used a student sample.

Content Validity

#6 assesses four areas (Table 1) building on work from Conway et al. (1996), and Rubin et al. (2003). No members of the public were involved in item generation phase; therefore, a negative score was given.

Factor Structure and Reliability

A four-factor model was proposed on theoretical grounds and tested over two studies. In the primary study, CFA was used and demonstrated an adequate fit across all memory types. Pattern invariant analysis confirmed the measurement model was similar for all memory types; factor invariant modelling confirmed items loaded onto the constructs with a similar magnitude across memory types. Structural equivalence was assessed and confirmed the structural model fits well for all four memory types. As there was a theoretical basis for the model, and CFA was conducted, a positive score was given. Reliability and internal consistency were not assessed.

Convergent Validity and Interpretability

Convergent validity was not assessed, an intermediate score was given for interpretability.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

#7. The Survey of Autobiographical Memory (SAM; Palombo et al., 2013)

#7 assesses naturalistic episodic autobiographical, semantic, spatial, and future thinking. The original measure consists of 102 items, and participants rate the extent to which an item applies to their memory using a five-point scale. For episodic memory, participants are told questions should be applied to multiple events that happened over the last three-four weeks. Depression is assessed by asking if the person has had depression which significantly interfered with their functioning.

The measure was completed online attracting a wide range of volunteers, from University students to older adults; participants were excluded if they had any condition other than anxiety or depression that affected their cognitive ability.

Item analysis yielded a 26 and 10 item version, titled the SAM and B-SAM.

Content Validity

#7 assesses eight areas (Table 1), item generation only included experts, an intermediate rating was given.

Factor Structure and Reliability

A four-dimension factor structure supported by the literature was proposed. Multiple Correspondence Analysis (MCA) was used and shown that the four-dimension model best summarised the data, an intermediate rating was given. Internal consistency was assessed, and r values between subscales were calculated. As the r values fell below 0.70, an intermediate rating was given. Reliability was not assessed.

Discriminant Validity and Interpretability

Discriminant validity was assessed against a self-reported history of depression and sex differences. When comparing #7 against depression, the effect sizes were

generally small, supporting previous research as individuals with a history of depression scored lower on episodic memory. Males scored higher on spatial memory, but females outperformed males in episodic memory; the effect sizes were generally small. An intermediate rating was given.

Limited data was provided for interpretability, an intermediate rating was given.

Criterion Validity

#7 was compared against the Recognition Memory Test (Rudebeck et al., 2009) and #2. The Recognition Memory Test was positively correlated with, dimension 1 (r-value of .34), and dimension 4 (r-value of .27). Comparing #7 with #2 dimension 3, was significantly positively correlated with internal place details (r=.37, p=.007), place ratings (r=.44, p=.001), time ratings (r=.33, p=.001), perceptual ratings (r=.27, p=.001), episodic richness scores (r=.32, p=.002), and total ratings after probing (r=.32, p=.02). As none of the values were above 0.50, an intermediate rating was given.

Floor and Ceiling Effects

Not assessed.

#8. The Memory Experiences Questionnaire (MEQ; Sutin & Robins, 2007)

Sutin and Robins (2007) identified relevant dimensions, created a comprehensive item pool, conducted reliability analysis of the items and scales, before determining the factor structure. Through reviewing the literature, 10 phenomenological dimensions were found.

Participants are asked to write about a general self-defining memory and rate how much they agree with the item for the memory on a 5-point scale. The MEQ consists of 63 items, with 10 scales. The measure is based on a student sample.

Content Validity

#8 assesses ten areas (Table 1) items were generated by taking them from existing measures (MCQ, Johnson et al., 1988; #6) and from reviewing the literature. As no items were generated by consulting members of the target population, an intermediate rating was given.

Factor Structure and Reliability

A ten-factor model was proposed; however, four different models were tested. Models one, two, and four were supported by literature, and model three supported by the findings of the earlier parts of the study. CFA was conducted over two separate studies, and model 4 (ten-factor) was an excellent fit. As CFA was used and the model had support from literature, a positive rating was given for factor structure. In the final study all 10 subscales had an alpha score above 0.7, the measure gained a positive rating for internal consistency. Concerns were raised about highly intercorrelated scales: vividness, coherence, and accessibility; suggesting these scales may not be measuring different constructs. Reliability was not assessed.

Convergent Validity and Interpretability

Convergent validity was not assessed. For interpretability, differences with age were found, suggesting that recent memories have a different phenomenology to distant ones. An intermediate score was provided for interpretability.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

#9. The Autobiographical Memory Characteristics Questionnaire (AMCQ; Boyacioglu & Akfirat, 2015)

Through reviewing the literature 17 dimensions were identified and refined through four studies. The final measure consists of 63 items assessing 14 reliable scales. The study had multiple parts assessing different memory types. Participants were asked to recall and describe either a memory from their childhood, a romantic relationship, or a self-defining memory. After describing the memory, participants rated it on a 7-point scale. The measure was tested on a young Turkish sample.

Content Validity

#9 assesses fourteen areas (Table 1). As both experts and members of the target population were consulted in generating items, it achieves a positive score.

Factor Structure and Reliability

Initial studies conducted EFA and in the final study, CFA was used to support the 14-factor model, a positive rating was given for factor structure. Internal consistency was refined over four studies; in the final study, all fourteen of the final subscales achieved a score above 0.7; a positive rating was given. This should be interpreted with caution, as in the first three studies, several subscales had poor alphas, suggesting as more factors are added to the model the scales may lack reliability. Dimensions: personal implication of the event, emotional persistence, visceral reactions, and time details were eliminated due to issues with multicollinearity, low item correlations, and factor loading problems. Reliability was not assessed.

Convergent Validity and Interpretability

Convergent validity was not assessed. As only males and females were compared, interpretability was given an intermediate score.

Criterion Validity

Not assessed.

Floor and Ceiling Effects

Not assessed.

Discussion

The first aim of this paper was to conduct a systematic review to include self-and observer-rated measures of ABM. The second, was to appraise existing measures and make suggestions for future research creating a comprehensive and psychometrically sound measure. The findings of this review suggest a new measure is needed. The maximum score achieved was seven out of sixteen, suggesting that no scale comprehensively measures ABM with acceptable levels of validity and reliability. Despite Boyacioglu and Akfirat (2015) and Sutin and Robins (2007) highlighting issues with the psychometric properties of existing measures, little has been done to resolve this.

Quality ratings were low for a variety of reasons. For narrative measures poor scores for content validity, factor structure, and internal consistency reflect contextual differences in creating a coding tool as opposed to a self-report measure. For the rest of the measures included, and despite progress in contemporary measures assessing more factors of ABM addressing Sutin & Robins (2007) and Vannucci et al.'s (2020) critique, most of the measures scored poorly on content validity due to no service user involvement in item generation. Contemporary measures had support for content validity, and generally factor structure, with #9 being the best measure in this area. Internal consistency in cue word and self-report measures was generally ok. In #8 and #9 as scales either improved as different factor models were tested, or had high inter-correlations, both sets of authors noted concerns with multicollinearity. Issues with multicollinearity suggests that while there is an improvement by adding more factors to existing measures to assess a wider

area of ABM, it leads to issues with validity and reliability. It is established from multiple studies that particular memory dimensions are highly correlated (Boyacioglu & Akfirat, 2015; Fitzgerald & Broadbridge, 2013; Sutin & Robins, 2007; Talarico et al., 2004). Surprisingly, the reliability of all the self-report measures was not assessed, whereas the narrative measures performed well. Despite the importance of validity, there was a paucity of testing the existing measures as scores were either weak or absent for all but one (#2). The lack of testing existing measures of ABM against different measures indicates either there is a lack of a gold standard to compare to, or the psychometric properties of existing measures are not robust enough to give a fair point of comparison. An important step forward is to test the construct validity of measures, if the existing measures' convergent/discriminant validity was tested, it may help answer the concerns raised regarding the factor structure of contemporary measures.

The two strongest measures identified were #9 and #4 in the self-report and cue-word categories; for narrative measures, #1 and #2 tied.

Strengths and limitations

A strength of this review is it has taken a holistic approach to incorporate a wide range of measures used to assess ABM. Through this, it has highlighted the strongest measures that exist in the narrative, self-report, and cue word categories. This may assist in the choice of measures for future research. Another strength that the paper identified is a trend as more contemporary measures assess more areas of ABM. However, it has highlighted the issues raised in assessing more areas: as factors increase the reliability and validity of measures may decrease. Further can be done by testing the validity of existing measures.

A limitation of this paper is applying Terwee et al.'s (2007) and Barker et al.’s (2002) frameworks to narrative measures. In hindsight it results in needing to take into account that they may not be the most appropriate tools to use when interpreting the findings of this paper. This is due to narrative measures scoring poorly on most areas assessed by the tools. The poor scores may reflect contextual differences in creating and validating narrative measures, and applying an inappropriate tool as

opposed to suggesting the measures are poor. However, it does emphasise the urgent need for a quality appraisal tool to be created for observer-rated measures, as when reviewing the existing appraisal tools, the researcher was unable to find one. If an appropriate tool was created this would allow for more valid inferences on the quality of the existing narrative measures.

Future Research

This review has highlighted that the existing measures of ABM are not psychometrically sound. Future research should be focused on either validating the existing measures, by either testing the self-report measures validity, or by creating an appropriate tool to rate observer-rated measures. If a new self-report measure was created, the paper has identified that older measures assessed too few areas of ABM, whereas more recent measures run the risk of assessing too many areas. Anywhere from two-fourteen factors have been assessed by the measures included in this paper, and evidence to support factor structures from four up to fourteen were found. The factor structure of ABM in a new measure could be further evidenced and refined. A new measure could focus on using and developing the factors that were assessed more than once from the existing measures (Table 2). The recommended method of constructing a measure based on Terwee et al.'s (2008) framework would be to conduct EFA followed by CFA on independent samples, and consulting members of the target population when generating items would result in higher content validity. Including members of the target population in item generation could also improve the form, wording, and types of responses gained, more accurately capturing the lived experience of ABM (Schinka et al., 2003). When creating a measure, researchers may find it helpful to consult the established procedures laid out by Angleitner and Wiggins (1986), Jackson (1970), and Simms and Watson (2006). As scales of ABM are often highly inter-correlated researchers should expect this to happen (Boyacioglu & Akfirat, 2015; Fitzgerald & Broadbridge, 2013; Sutin & Robins, 2007; Talarico et al., 2004). The solution to this may be a pragmatic one of accepting it, and keeping the theoretically and statistically important scales, or edit them by generating new items or improving the wording of the existing items as Boyacioglu & Akfirat (2015) did when creating #9.

A review of the literature reveals there is a lack of research into narrative measures; this could be due to their utility, as self-report and cue word measures can be used in research and epidemiological studies with ease, whereas, narrative measures are more labour intensive (Palombo et al., 2013). If researchers wanted to explore one facet of ABM, they would be able to take existing scales from an existing measure that demonstrated high levels of reliability and apply it to the population of interest. Narrative measures can overcome some of the issues that self-report and cue word methodologies face, as they can give a more in-depth insight into the content of the individuals ABM (Kangaslampi & Peltonen, 2019; Sumner et al., 2013). A narrative measure may allow for an in-depth investigation into ABM and the effects of treatment to ABM overtime. If narratives were examined it could potentially be helpful in further exploring the links demonstrated between ABM and PTSD (Kleim & Ehlers, 2008), depression (Williams et al., 2007), adding much to the field of psychopathology. Analysing trauma narratives with an observer-rated index would overcome the issue of using self-report measures, as these are subject to demand characteristics, meaning the person's report of their trauma could represent the frequency of their symptoms as opposed to memory quality (Kangaslampi & Peltonen, 2019; McKinnon et al., 2017). Using a narrative measure gives a nuanced understanding of the trauma memory based on its content (Kangaslampi & Peltonen, 2019); it may also help to uncover the role of ABM in psychopathology. Autobiographical memory integration is a posited mechanism of change in Narrative Exposure Therapy (NET; Schauer et al., 2011) which is a National Institute for Health and Care Excellence (NICE, 2018) recommended treatment for complex PTSD. However, despite NET's successes, the element of autobiographical memory integration has not been evidenced empirically (Kangaslampi & Peltonen, 2019), possibly due to the existing measures not being robust enough to evidence NET's posited mechanism of change.

Due to the contextual differences when creating a rating tool, they may be able to overcome the issues that self-report measures have with factor structure. If a new coding tool were created and based on an existing self-report measure which created its factors from a literature review and confirmed them through factor analysis (such as #9), the coding tool would have an evidenced-based set of factors.

Then all that is needed would be to define and operationalise the categories and scoring criteria.

Conclusion

This review demonstrated the shortcomings of existing measures. The existing body of research reflects a consensus on the definition, systems, and structure of ABM; however, how it is assessed, and its number of factors are yet to be agreed. ABM can be assessed in a variety of ways; most existing measures focus on self-report, cue-word, or interview methodologies; however, there is a notable paucity of narrative measures. Therefore, we now call for the development of narrative measures. Further testing of the validity of existing measures is needed, or the development of further measures with a refined factor structure, and members of the target population involved in item generation. A final recommendation is the development of an observer-rated measure quality appraisal tool.

Systematic Review References

Angleitner, A., & Wiggins, J.S. (Eds.). (1986). Personality assessment via questionnaires. *Current Issues in Theory and Measurement*. Springer-Verlag. https://doi.org/10.1007/978-3-642-70751-3

Barker, C., Pistrang, N., & Elliot, R. (2002). *Research methods in clinical psychology*. Wiley. https://doi.org/10.1002/0470013435

Belli, F, R. (1998). The structure of autobiographical memory and the event history calendar: Potential improvements in the quality of retrospective reports in surveys, *Memory, 6*(4), 383-406, https://doi.org/10.1080/741942610

Blajenkova, O., Kozhevnikov, M., & Motes, M. A. (2006). Object-spatial imagery: A new self-report imagery questionnaire. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, *20*(2), 239-263. https://doi.org/10.1037/t64015-000

Bluck, S., & Alea, N. (2002). Exploring the functions of autobiographical memory: Why do I remember the autumn*?* In J. D. Webster & B. K. Haight (Eds.), *Critical advances in reminiscence work: From theory to application* (pp. 61–75). Springer Publishing Company. https://psycnet.apa.org/record/2002-17458-004

Boyacioglu, I., & Akfirat, S. (2015). Development and psychometric properties of a new measure for memory phenomenology: The autobiographical memory characteristics questionnaire. *Memory*, *23*(7), 1070-1092. https://doi.org/10.1080/09658211.2104.953960

Brewin, C. R. (2014). Episodic memory, perceptual memory, and their interaction: foundations for a theory of posttraumatic stress disorder. *Psychological Bulletin*, *140*(1), 69. https://doi.org/10.1037/a0033722

Brewin, C. R., & Holmes, E. A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review*, *23*(3), 339-376. https://doi.org/10.1016/s0272-7358(03)00033-3

Conway, M. A., Collins, A.F., Gathercole, S. E., & Anderson, S. J. (1996). Recollections of true and false autobiographical memories. *Journal of Experimental Psychology: General*, 125, 69-95. https://doi.org/10.1037/0096-3445.125.1.69

Conway, M. A., & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review,* 107, 261-288. https://doi.org/10.1037//0033-295X.107.2.261.

Crovitz, H. F., & Schiffman, H. (1974). Frequency of episodic memories as a function of their age. *Bulletin of the Psychonomics Society, 4,* 517-518. https://doi.org/10.3758/bf03334277

Dalgleish, T., & Werner-Seidler, A. (2014). Disruptions in autobiographical memory processing in depression and the emergence of memory therapeutics. *Trends in Cognitive Sciences*, *18*(11), 596-604. https://doi.org/10.1016/j.tics.2014.06.010

Fitzgerald, J. M., & Broadbridge, C. L. (2013). Latent constructs of the autobiographical memory questionnaire: A recollection-belief model of autobiographical experience. *Memory*, *21*(2), 230-248. https://doi.org/10.1080/09658211.2012.725736

Fivush, R. (2011). The development of autobiographical memory. *Annual Review of Psychology*, *62*(1), 559-582. https://doi.org/10.1146/annurev.psych.121208.131702

Griffith, J. W., Sumner, J. A., Debeer, E., Raes, F., Hermans, D., Mineka, S., Zinbard, E. R., & Craske, M. G. (2009). An item response theory/confirmatory factor analysis of the autobiographical memory test. *Memory*, *17*(6), 609-623. https://doi.org/10.1080/0965821090293948

Griffith, J. W., Sumner, J. A., Raes, F., Barnhofer, T., Debeer, E., & Hermans, D. (2012). Current psychometric and methodological issues in the measurement of overgeneral autobiographical memory. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, S21-S31. https://doi.org/10.1016/j.jbtep.2011.05.008

Jackson, D. N. (1970). *A sequential system for personality scale development: Current topics in clinical and community psychology*. (pp.61-96). Academic Press. https://doi.org/10.1016/b978-0-12-153502-5.5008-4

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1998). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology*: *General, 117*(4), 371-376. https://doi.org/10.1037/0096-3445.117.4.371

Kangaslampi, S. & Peltonen, K. (2019). Changes in traumatic memories and posttraumatic cognitions associate with PTSD symptom improvement in treatment of multiply traumatized children and adolescents. *Journal of Child & Adolescent Trauma, 13,* 103–112. https://doi.org/10.1007/s40653-019-00255-3

Kleim, B., & Ehlers, A. (2008). Reduced autobiographical memory specificity predicts depression and post-traumatic stress disorder after recent trauma. *Journal of Consulting and Clinical Psychology*, 76, 231-242. https://doi.org/10.1037/0022-006X.76.2.231

Kopelman, M. D., Wilson, B. A., & Baddeley, A. D. (1989). The autobiographical memory interview: A new assessment of autobiographical and personal semantic memory in amnesic patients. *Journal of Clinical and Experimental Neuropsychology*, *11*(5), 724-744. https://doi.org/10.1080/016886389400928

Kovach, C. R. (1993). Development and testing of the autobiographical memory coding tool. *Journal of Advanced Nursing*, *18*(4), 669-674. https://doi.org/10.1046/j.1365-2648.1993.18040669.x

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging*, *17*(4), 677-689. https://doi.org/10.1037/0882-7974.17.4.677

McKinnon, A., Brewer, N., Meiser-Stedman, R., & Nixon, R. D. V. (2017). Trauma memory characteristics and the development of acute stress disorder and post-traumatic stress disorder in youth. *Journal of Behavior Therapy and Experimental Psychiatry*, 54, 112–119. https://doi.org/10.1016/j.jbtep.2016.07.009.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Public Library of Science: Medicine, 6*(7), https://doi.org/10.1371/journal.pmed.1000097

National Institute for Health and Care Excellence (2018). *Post-traumatic stress disorder. Guideline NG116.* https://www.nice.org.uk/guidance/ng116/chapter/Recommendations

Palombo, D. J., Williams, L. J., Abdi, H., & Levine, B. (2013). The survey of autobiographical memory (SAM): A novel measure of trait mnemonics in everyday life. *Cortex*, *49*(6), 1526-1540. https://doi.org/10.1016/j.cortex.2012.08.023

Rasmussen, A. S., Jørgensen, C. R., O'Connor, M., Bennedsen, B. E., Godt, K. D., Bøye, R., & Berntsen, D. (2017). The structure of past and future events in borderline personality disorder, eating disorder, and obsessive–compulsive disorder. *Psychology of Consciousness: Theory, Research, and Practice*, *4*(2), 190. https://doi.org/10.1037/cns0000109

Rubin, D. C., Schrauf, R. W., & Grenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, *31*(6), 887-901. https://doi.org/10.3758/bf03196443

Rudebeck, S. R., Scholz, J., Millington, R., Rohenkohl, G., Johansen-Berg, H., & Lee, A, C. (2009). Fornix microstructure correlates with recollection but not familiarity memory. *Journal of Neuroscience: The Official Journal of the Society for Neuroscience, 29*(47), 14987-14992. https://doi.org/10.1523/jneurosci.4707-09.2009

Schacter, D L., Addis, D, R., & Bucker, R.L. (2008). Episodic stimulation of future events: concepts, data, and applications. *Annals of the New York Academy of Sciences, 1124(1),* 39-60. https://doi.org/10.1196/annals.1440.001

Schauer, M., Neuner, F., & Elbert, T. (2011). *Narrative exposure therapy: A short-term treatment for traumatic stress disorders* (2nd rev. and expanded ed.). Hogrefe Publishing

Schinka, J. A., Velicer, W. F., & Weiner, I. B. (2003). *Research methods in psychology*. Wiley.

Simms, L. J., & Watson, D. (2006). The construct validation approach to personality scale construction. In R. W. Robins, R.C. Fraley, & R. F. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology.* Guilford Press.

Squire, L. R. (2004). Memory systems of the brain: A brief history and current perspective. *Neurobiology of Learning and Memory*, *82*(3), 171-177. https://doi.org/10.1016/j.nlm.2004.06.005

Stevens, M. (1979). Famous personality test. A test for measuring remote memory. *Bulletin of the British Psychological Society, 32*, 211.

Sumner, J. A., Mineka, S., & McAdams, D. P. (2013). Specificity in autobiographical memory narratives correlates with performance on the autobiographical memory test and prospectively predicts depressive symptoms. *Memory*, *21*(6), 646-656. https://doi.org/10.1080/09658211.2012.746372

Sutin, A. R., & Robins, R. W. (2007). Phenomenology of autobiographical memories: The memory experiences questionnaire. *Memory*, *15*(4), 390-411. https://doi.org/10.1080/09658210701256654

Talarico, J. M., Labar, K. S., & Rubin, D. C. (2004). Emotional Intensity predicts autobiographical memory experience. *Memory & Cognition*, *32*, 1118-1132. https://doi.org/10.3758/BF03196886.

Terwee, C. B., Bot, S. D., de Boer, M. R., van der Windt, D. A., Knol, D. L., Dekker, J., Bouter, M. L., & de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, *60*(1), 34-42. https://doi.org/10.1016/j.jclinepi.2006.03.012

Tulving, E. (1972). Episodic and semantic memory. In Tulving, E., and Donaldson, W. (eds.), *Organization of Memory* (pp. 381-403), Academic Press.

Tulving, E. (2002). Episodic memory: From mind to brain. *Annual Review of Psychology*, *53*(1), 1-25. https://doi.org/10.1146/annurev.psych.53.100901.135114

Vanderveren, E., Bijttebier, P., & Hermans, D. (2019). Autobiographical memory coherence and specificity: Examining their reciprocal relation and their associations with internalizing symptoms and rumination. *Behaviour Research and Therapy*, *116*, 30-35. https://doi.org/10.1016/j.brat.2019.02.003

Vanderveren E, Bijttebier P, & Hermans D (2020) Autobiographical memory coherence in emotional disorders: The role of rumination, cognitive avoidance, executive functioning, and meaning making. *Public Library of Science: One,* 15(4): e0231862. https://doi.org/10.1371/journal.pone.0231862

Vannucci, M., Chiorri, C., & Marchetti, I. (2020). Shaping our personal past: Assessing the phenomenology of autobiographical memory and its association with object and spatial imagery. *Scandinavian Journal of Psychology, 61*(5), 599-606. https://doi.org/10.1111/sjop.12639

Van Vreeswijk, M. F., & de Wilde, E. J. (2004). Autobiographical memory specificity, psychopathology, depressed mood, and the use of the autobiographical memory test: a meta-analysis. *Behaviour Research and Therapy, 42*(6), 731-743. https://doi.org/10.1016/s0005-7967(03)00194-3

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology, 95*(2), 144-149. https://doi.org/10.1037/0021-843x.95.2.144

Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin, 133*(1), 122-148. https://doi.org/10.1037/0033-2909.133.1.122

Wilson, B. A. (1987). *Rehabilitation of memory.* The Guilford Press.

Woods, S. A. & Hampson, S. E. (2005). Measuring the Big Five with single items using a bipolar response scale. *European Journal of Personality, 19*(5), 373-390. https://doi.org/10.1002/per.542

JOURNAL PAPER

Exposing Narrative Exposure Therapy. Investigating Autobiographical Memory Integration and the Process of Exposure and Habituation in Narrative Exposure Therapy.

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Journal Abstract

The study investigated Narrative Exposure Therapy's (NET) Autobiographical Memory Integration (ABMI), and exposure and habituation mechanisms of change alongside its potential effectiveness, acceptability, and feasibility for adults accessing secondary care services in the UK. A mixed-methods A-B design was conducted with three females. A tool to measure ABMI was created and applied to therapy transcripts. To assess exposure and habituation heart data and subjective units of distress were captured. Participants completed questionnaires and took part in post-treatment interviews. Post intervention two participants experienced reduction in trauma with one experiencing a reliable change (RC), and another a clinically significant change (CSC). Treatment effects were noticed in psychological distress for two participants, with small reductions in depression, anxiety, and stress across all participants, and a RC and CSC for one in anxiety. Two participants consistently experienced in session habituation. Results of the study do not support NET's claims of integrating contextual ABMI as a mechanism of change. NET seemed acceptable as the only adaption suggested was to include more sessions. Participants noted it was difficult to recall context when discussing trauma memories. Future research developing the coding tool is needed to allow the role of ABM in trauma to be better understood.

Keywords: PTSD, CTPSD, Autobiographical Memory, Narrative Exposure Therapy, NET

Trail Registration Number: NCT05383846

Introduction

Traumas include witnessing or being at the risk of, death, violence, and sexual violation (American Psychological Association; APA, 2013). Experiencing trauma can lead to psychological and physiological changes (Frustaci et al., 2010), resulting in a diagnosis of post-traumatic stress disorder (PTSD); 10-20% of people develop enduring symptoms, with effective treatment being a challenge (Bisson et al, 2015). PTSD has four categories of symptomology: (1) intrusive and distressing images in the form of flashbacks and/or nightmares; (2) physical and/or cognitive avoidance of distressing reminders; (3) arousal dysregulation; (4) negative thoughts such as guilt or blaming the self or others (APA, 2013)[1].

Whilst exposure to trauma does not directly lead to PTSD as other factors are involved, there is a dose-response relationship between the severity and duration of traumatic events and developing PTSD (Dohrenwend et al., 2006)[2]. If a person experiences multiple traumatic events this can lead to them developing complex post-traumatic stress disorder (CPTSD). CPTSD occurs when a person is subjected to multiple prolonged traumas of an interpersonal nature, where escape is impossible (Mørkved et al., 2014; The International Classification of Diseases and Related Health Problems -11, World Health Organisation, 2019). While sharing the primary symptoms of PTSD, CPTSD includes an increased difficulty in regulating emotions, dissociation, inter-personal problems, and somatization (Cloitre et al., 2013). This added complexity suggests different treatment approaches are needed for PTSD and CPTSD (Cloitre, 2009; Cloitre et al., 2019)[3].

Cognitive Behavioural Therapy (CBT) is an effective treatment for PTSD (Cukor et al., 2010; NICE, 2018)[4]. Narrative Exposure Therapy (NET) has received support for treating CPTSD (Schauer et al., 2011)[5]. NET is a National Institute for Health and Care Excellence (NICE, 2018) recommended short-term manualised therapy

1 See extended paper section 1.1 for discussion about diagnosing PTSD.
2 See extended paper section 1.2 for discussion of pre, peri, and post risk factors for PTSD.
3 See extended paper section 1.3 for discussion of CPTSD.
4 See extended paper section 1.4 for more information on treatments for PTSD.
5 See extended paper section 1.5 for further details of NET.

and designed to work with refugee and asylum seeker populations[6]. There is emerging evidence of NET's effectiveness across many cultures for CPTSD and even depression (Jongedijk, 2014; Lely et al., 2019; Raghuraman et al., 2021; Schauer et al., 2011; Siehl et al., 2021a). Whilst the meta-analysis conducted by Lely et al. (2019), Raghuraman et al. (2021), and Siehl et al. (2021a) agree that NET is an effective treatment for CPTSD, they come to different agreements on how effective it is and if it should be a recommended treatment or not (Raghuraman et al., 2021; Siehl et al., 2021b). There is research into NET's applicability in western samples as Robjant et al. (2017) found NET was effective in reducing the severity of PTSD and general psychological distress for women in the UK who were victims of human trafficking. However, the sample was made up of women from varying cultures who settled in the UK and not with women from the UK. NET is effective in reducing symptoms of PTSD across diverse populations but is most effective with refugee populations who have been victims of war or organised violence (Raghuraman et al., 2021; Lely et al., 2019). While Lely et al. (2019) suggests NET is highly efficacious for non-refugees, Raghuraman et al. (2021) warns there is not enough evidence of NET being effective with non-refugee populations. There is a dearth of research in this area and particularly within the UK as when reviewing the literature, the only UK based study the researcher could find was Robjant et al. (2017). Further research into NET with non-refugee samples is needed to warrant it being a recommend treatment for PTSD (Lely et al., 2019; Raghuraman et al. 2021); therefore, the study aims to fill this gap by using NET with a UK based secondary care sample.

NET draws on Dual Representation Theory (DRT; Elbert & Schauer, 2002) and Emotional Processing Theory (EPT; Foa & Kozark, 1986)[7]. The central aim of a NET treatment is re-integration of contextual information (cold memory) and the traumatic memory (hot memory) into an autobiographical lifeline; occurring through narrating the memory, involving prolonged exposure and habituation (Schauer et al., 2011), integrating the trauma memory into an autobiographical context (Elbert et al., 2015; Lely et al., 2019; Schauer et al., 2011)[8]. However, during traumatic events, the

6 See extended paper section 1.6 for summary of evidence base for NET.
7 See extended paper section 1.7 for discussion of trauma theories.
8 See extended paper section 1.8 for further information on NET's mechanisms of change.

emotionally salient and sensory details (i.e., hot memory) are encoded at the cost of contextual details (i.e., cold memory; Burke et al., 1992; Elbert et al., 2015; Elbert & Schauer, 2002; Foa & Kozark, 1986; Lane et al., 2015), leading to the development of a fear network (Elbert et al., 2015). Despite NET's successes, its mechanisms of change have not been evidenced, especially the element of contextualisation and integration of trauma into ABM (Kangaslampi & Peltonen, 2019). Zalta (2015) argued identifying the mechanisms of change within therapy is crucial for further development, effective dissemination, and improving future treatments. The current study aims to address this gap.

ABM plays a role in the development and maintenance of PTSD (Sutin & Robins, 2007; Vanderveren et al., 2019). There is a need to understand how memory phenomenology contributes to therapeutic change (Lane et al., 2015), and PTSD (Sutin and Robins, 2007)[9]. NET focuses on narration; the process of speaking about trauma allows implicit emotions, behaviours, and body sensations to be put into consciousness, integrating them into a self-narrative (Barret et al., 2007; Lane, 2008; Lane et al., 2015; Schauer et al., 2011; van der Kolk, 1995). The mechanism of change that has been proposed in NET is through speaking about trauma, the ABM of events are updated and re-encoded through memory consolidation. Reconsolidation of memory leads to therapeutic change via transformation of the original memories' components in the context of a safe environment, allowing for new experiences to be integrated changing the content, rules, schemas, and emotions of the memory (Hardt et al., 2010; Lane et al., 2015)[10]. Contextualising traumatic experiences through narratives are important (Liberzon & Sripada, 2007), as constructing a coherent narrative is associated with feelings of continuity and meaning (McAdams & McLean, 2013). Foa et al. (1995) found people in trauma therapy who constructed more coherent accounts profited the most. However, during traumatic events as the memory encoding process is impacted people with PTSD are unable to place events appropriately in time and place (Schauer et al., 2011), and less coherent accounts are associated with PTSD (Brewin, 2014; Rubin et al., 2016). People with PTSD can find it difficult to narrate traumatic events in a coherent and chronological manner

9 See extended paper section 1.9 for information on how PTSD impacts memory.
10 See extended paper section 1.10 for information on memory reconsolidation and therapeutic change.

(Burke et al., 1992; Lane et al., 2015; Schauer et al., 2011), as their accounts are more fragmented and disorganised (Foa et al., 1995; Harvey & Bryant, 1999), more distanced and less emotionally intense (Libby & Eibach, 2002; Thompson et al., 1996). However, people can have vivid recollections including many sensory details (Schauer et al., 2011). Vividness is one of the most defining features of intrusive memories of PTSD (Sutin & Robins, 2007), with emotional ABM being found to have more visual imagery than neutral ones (El Haj et al., 2017). Vividness of visual imagery predicts the richness of sensory details and clarity of temporal information (D'Argembeau & van der Linden, 2006), and higher visual object imagery is associated with stronger autonoetic experiences meaning people were able to recall and reexperience a clearer, more vivid, sensory and emotional memory (Vannucci et al., 2020).

Gray and Lombardo (2001) compared trauma and non-trauma narratives and found trauma memories became less fragmented, and shorter in word length as treatment progressed, whereas Foa et al. (1995) found word count increased. Kangaslampi and Peltonen (2019) found a correlation between improving quality of trauma memories and symptom reduction, highlighting the lack of evidence for the mediating role the quality of the traumatic memory holds in the treatment of PTSD. A limitation of this study was trauma memory being measured via self-report questionnaire. An issue with assessing trauma narratives via quantitative measures, are that they do not accurately capture the qualitative nature of the trauma. Self-reports can be influenced by demand characteristics, and the memory could be seen more as a person's perception of their memory quality, representing the frequency of their symptoms (Kangaslampi & Peltonen, 2019; Pasupathi et al., 2007). Analysing trauma narratives with an observer-rated index allows for a more nuanced understanding of the trauma memory based on its content (Kangaslampi & Peltonen, 2019); ultimately allowing a researcher to see the effects of treatment on narratives over time, and to see if they are integrated into the autobiographical lifeline. Limited research into changes in trauma narratives through therapy was provided by Lane (2019). Lane (2019) took an existing coding measure from Jaeger et al. (2014)[11] and applied it to compare trauma narratives gained from NET. However, as the measure did not include constructs of ABM, it would not be appropriate to measure the Autobiographical Memory Integration (ABMI) change mechanism posited by NET.

11 See extended paper section 1.11 for more on Jaeger et al.'s (2014) measure.

This study builds on previous research from Lane (2019) by developing Jaeger et al.'s. (2014) framework, adding constructs of ABM which can be tested as a process measure. The other mechanism of change that has been proposed in NET is imaginal exposure. NET uses imaginal exposure to a feared stimulus which activates the fear network, allowing new information to be added (Foa et al., 2007). Exposure reduces avoidance, as the traumatic memories and reminders are confronted, with the aim of processing the memories further to reduce trauma symptoms (Mørkved et al., 2014). NET is based on the learning and fear conditioning model (Mclean & Foa, 2011), which suggests repeatedly exposing a person to a traumatic memory and limiting avoidance aids habituation. Habituation is a reduction in anxiety over time when a person stays in a fear-provoking situation. Habituation reduces symptoms of trauma and facilitates cognitive change, revealing to the person their anxiety will naturally reduce (Foa et al., 2007; Mørkved et al., 2014). Exposure and habituation are typically measured through a Subjective Unit of Distress Scale (SUDS; Foa & Kozack, 1986; Wolpe & Lazarus, 1966), a person's subjective account of distress on a set scale. Annett (2002) critiqued the subjective nature of SUDS, as when a person is in a fear-inducing situation their appraisal of threat becomes fallible, lacking objectivity. To avoid this, Frustaci et al. (2010) recommended using physiological measures to evaluate the mechanisms of change in therapy. Exposure and habituation can be measured via Heart Rate (HR), and Heart Rate Variability (HRV)[12], allowing for a stable, empirical, and objective outcome measure (Pignotti & Steinberg, 2001). HRV measures the variation of intervals between heartbeats, and the balance between the sympathetic and parasympathetic systems of the Autonomic Nervous System (ANS; Pignotti & Steinberg, 2001). As emotions, are associated with regions of the brain and the ANS (Damasio et al., 2000), measuring heart data gives an objective measure of a person's emotional state (Pignotti & Steinberg, 2001). Low HRV indicates poor health, is a predictor of mortality, (Bigger et al., 1992; Dekker et al., 2000; Tsuji et al., 1996), is associated with anxiety (Friedman & Thayer, 1998), and people with PTSD have lower HRV even when not exposed to traumatic stimuli (Cohen et al., 1998). Frustaci et al. (2010) and Sack et al. (2007) found increases in HRV during therapy reflected a change in parasympathetic tone and arousal reduction. Pignotti and Steinberg (2001) found increases or decreases (if HRV was excessively high) showed therapy regulated the

12 See extended paper section 1.12 for more on the use of heart data in psychological research.

ANS into its optimal state. Tracking HR and HRV as a process and outcome measure in the current study, as opposed to using SUDS, will give a more objective measurement of the exposure and habituation process mechanisms within NET.

A single case series design (SCD) mixed-method study was undertaken to investigate the posited exposure and ABMI components of NET. To examine the mechanisms of change the NET protocol was adapted, and routine outcome measures were collected to examine effectiveness. This also provides research into NET's effectiveness within an under researched population. Change interviews (CI) were conducted after completing therapy to gauge the acceptability of a modified course of NET termed NET+. Improving an existing measure to include areas of ABM and applying it as a process measure to trauma narratives to investigate ABMI is something that has never been done before. The hope is this will further develop NET and can provide a theoretical contribution by either proving or refuting the process measures.

Aims

The primary aim of the study was to investigate NET's posited mechanisms of change.

The study had five aims:

1. To develop an existing measure to assess ABMI.
2. To investigate the process of ABMI specific to NET.
3. To investigate the exposure change process of NET by measuring HR, and HRV.
4. To investigate the potential effectiveness of NET+ for trauma symptoms and general psychological distress within a clinical population.
5. To explore participants' experiences and acceptability of NET+.

Method[13]

Design[14]

The study adopted a mixed-method, naturalistic, sequential measurement, single case design (SCD), A-B and follow up design (Barlow et al., 2009). A non-treatment baseline phase (A) was followed by up to a twelve-week treatment phase (B) and then a follow up (FU) phase. To examine the mechanisms of change the NET protocol was adapted, and routine outcome measures were collected to examine effectiveness. Change interviews (CI) were conducted after completing therapy to gauge the acceptability of a modified course of NET, named NET+ (Table 8). The quantitative element will allow for the mechanisms of change to be investigated, and the CIs can give qualitative data helping explain the quantitative findings (McLeod, 2000). Using an AB design allows for the process and outcome variables to be examined in depth (Kazdin, 2010). A SCD rigorously explores the relationships between variables and can have good levels of generalisability (Lobo et al., 2017). Generalisability is supported by the use of a naturalistic setting (NHS mental health clinic) as the study site.

Participants[15]

Participants were eligible if they: (a) were between the ages of 18-65; (b) able to give fully informed consent; (c) experiencing traumatic stress resulting from multiple traumatic events; (d) able to communicate verbally and fluent in English; (e) have no on-going therapy; (f) referred to the recruitment site. People were excluded if they were: (a) under the age of 18; (b) above the age of 65; (c) experiencing psychosis; (d) diagnosed with an intellectual disability; (e) actively suicidal; (f) non-fluent in English; (g) misusing substances. Regarding point (c) no diagnosis of CPTSD was needed as the services were not diagnostically driven. Potential participants were assessed by clinical psychologists within the service and if participants were showing symptoms of CPTSD they were deemed eligible for the study.

13 See extended paper section 2.1 for study epistemology.
14 See extended paper section 2.2 for overview of study design including rational and critique.
15 See extended paper section 2.3 for justification of inclusion and exclusion criteria.

Measures[16]

The primary outcome measure is ABMI. An existing coding framework (Jaeger et al., 2014; Lane, 2019) has been adapted to create a new measure for the purpose of the study. The initial step in developing the autobiographical memory integration coding tool (AMBICT) was to conduct a systematic literature review of how ABM is assessed whilst critiquing the psychometrics and methodological issues[17]. Various methods have been used to study ABM; however, memory narratives provide a promising option as they can address several limitations of self-report and cue word methodologies. Through completing the systematic literature review the researcher identified the constructs that were assessed most often (Table 5). Any construct that was assessed four or more times was deemed a core factor. As vividness, emotional intensity (labelled emotional distancing when operationalised in ABMICT), sensory details, and narrative coherence were all deemed to be core factors they were included in the ABMICT. Time and place details were assessed three times; however, as a key aspect of NET is adding contextual information through narration it was included in the AMBICT. Fragmentation, disorganisation, and total word count were included due to being part of Jaeger et al.'s (2014) measure. Belief in accuracy was not included in the ABMICT due to the researcher's concern that challenging a person's veracity of their memory may be invalidating, and due to trauma memories often being fragmented. The next step reviewed the existing definitions to operationalise the areas for the coding tool. Areas of the ABMICT were scored on a four-point Likert scale (Table 6). Emotional distancing, fragmentation, and disorganisation from the ABMICT were reversed scored. Total word count of the transcripts were taken which allowed the researcher to code the percentage of areas within a transcript. For example, if there were three instances of time and place details being discussed, and each time they were discussed 20 words were spoken, the researcher added these words together to get 60. If the total word count of the transcript was 600, this would then be divided by 60 and turned into a percentage to get 10%, meaning time and place details accounted for 10% of the transcript. If 10% of the transcript was coded as time and place details with a score of +2, the researcher multiplied these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each area the average score was calculated. Scores

16 See extended paper section 2.4 for additional information and rationale for study measures.
17 See extended paper section 2.5 for more information on the development of the ABMI measure.

were then categorised as an increase, decrease or no change regardless of how small the change was. The measure was used in the intervention phase to code transcripts on a session-by-session basis and is therefore a process measure.

Table 5

Frequency of Times Factors Assessed in Measures

Factor Assessed	Times Assessed
Vividness	6
Emotional Intensity	5
Sensory Details	5
Coherence	4
Belief in Accuracy	4
Accessibility	3
Perspective (Observer & Field)	3
Distancing	3
Place Details	3
Recollection	3
Clarity	2
Sharing	2
Valence	2
Rehearsal	2
Specificity	2
Preoccupied with Emotions	1
Impact	1
Age of Memory	1
Semantic	1
Spatial	1
Future Thinking	1
Validating Interpretations of Memory	1
Lamenting Interpretations of Memory	1

Table 6

Scoring Criteria of the ABMICT

Score	Description
4	A highly specific, rich, and detailed recall of the event, generally giving a sense of re-living the memory allowing the coder to have a detailed insight into the ABMIA measured. A highly specific, rich, and detailed recall of the event, generally giving a sense of re-living the memory allowing the coder to have a detailed insight into the ABMIA measured.
3	A detailed description that falls short of 4 in terms of its specificity and richness but covers most of the ABMIA measured. There is clearly some direct evidence that this ABMIA applies to the experience recalled by the participant.
2	A general and non-specific recall of an event, including some details of the ABMIA measured. There is little or no direct evidence that this area applies to the experience recalled by the participant.
1	A recall which provides no specific or general information, which may be due to the recall being unstructured. The recalled event does not give enough detail that allows the coder to examine the ABMIA measured. There is no evidence that this area applies to the experience recalled by the participant.

The secondary measures aimed to assess if the adapted NET protocol had any impact on its effectiveness.

The Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997) is a self-report measure assessing symptoms of PTSD and was used weekly throughout the baseline and intervention phase and once during FU. As there is no existing measure assessing trauma symptomology of multiple events, the IES-R instructions were adapted, so “(the event)” became “(the events)”.

The Depression Anxiety And Stress Scale 21 (DASS-21; Lovibond & Lovibond, 1995) was used weekly throughout the baseline and intervention phase and once during FU to assess general psychological distress, depression, anxiety, and stress. It is a self-report questionnaire ranging over the last seven days and measures general psychological distress as an outcome measure.

The Life Events Checklist (LEC-5; Weathers et al., 2013) was used to collect the number and type of traumatic events a person has experienced and was completed in the baseline phase.

To allow for a stable, empirical, and objective outcome measure exposure and habituation were measured via HR, and HRV in the current study. To do so the Polar H10 chest strap was used data during the intervention phase, with participants completing ultra-short 2-minute breathing exercises towards the start and end of sessions to gather heart data. Gathering the number of heart beats per minute (bpm) is a measure of physiological arousal and measures exposure and habituation as a process measure. HRV measures physiological arousal and is the variation in time between heartbeats. HRV was used as a process and outcome measure of exposure and habituation. Heart data was transmitted by the Polar H10 to an encrypted tablet and the data was collected by an app (HRV Elite). The process of exposure and habituation are typically measured through SUDS (Foa & Kozack, 1986; Wolpe & Lazarus, 1966), which is a person’s subjective account of distress on a set scale. SUDs were collected alongside heart data. Participants were asked to rate their level of distress on a scale from 0 (no distress) to 10 (maximum distress), at the start and end of their trauma narrations and when re-read their narrative from the previous session throughout the intervention phase.

The Body Perception Questionnaire Short Form (BPQ-SF; Cabrera et al., 2018; Porges, 1993) is a self-report measure assessing a person's experiences of reactivity in their organs and tissues regulated by the ANS. The measure was collected at the start and end of the intervention phase.

Participants were able to complete measures either face to face or online via Jisc Online Surveys. At the end of the intervention participants were asked to take part in a CI (Elliott et al., 2001) to gather their views of the study, their experience of receiving NET+, and any changes noticed. The interview was conducted by a third party who was not involved in the study. Table 7 provides an overview of measures, administration schedule, and psychometric properties.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
IES-R (Weiss & Marmar, 1997)	Self-Report. Intrusion, Avoidance & Hyperarousal in PTSD-questionnaire over the last seven days. Measures trauma stress as an outcome measure (primary aim of study).	22 Divided into three subscales, with 8 items on intrusion and avoidance: 6 on hyperarousal.	I tried to remove it from my memory.	0 = Not at all; 1 = A little bit; 2 = Moderately; 3 = Quite a bit; 4 = Extremely. No specific cut-off scores; however, scores over 24 indicate concern, with higher scores related to higher levels of distress.	Test-retest reliability (Motlagh, 2010): r = –0.89 to 0.94. Cronbach's alpha (Creamer et al. (2003): Intrusion = 0.87 to 0.94, avoidance = 0.84 to 0.97, hyperarousal = 0.79 to 0.91.	Concurrent validity when compared to IES, (Beck et al., 2008): Intrusion (r = 0.86) and avoidance (r = 0.66) subscales.	Measured every session.
DASS-21 (Lovibond & Lovibond, 1995)	Self-Report. Depression, Anxiety & Stress- self-report questionnaire over the last seven days. Measures general psychological distress as an outcome measure (secondary aim of study).	21 Divided into 3 subscales with 7 questions for each subscale.	I felt I wasn't worth much as a person.	0= Did not apply to me at all; 1= Applied to me to some degree, or some of the time; 2= Applied to me to a considerable degree or a good part of time; 3= Applied to me very much or most of the time. 10 and above indicates mild difficulties with depression; 8 and	Internal consistency (Crawford, & Henry, 2003; Norton, 2007): depression: α=.829-.947, anxiety: α=.778-.947, stress: α=.871-.933; total α=.966.	Convergent validity of the DASS depression scale compared with sAD measure: r=0.78 (Crawford & Henry, 2003). Convergent validity of the DASS anxiety	Measured every session.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
				above indicates mild difficulties with anxiety, and 15 and above indicated mild difficulties with stress.		scale compared with sAD measure: r=0.72 (Crawford & Henry (2003). Convergent validity of the DASS stress scale compared with PANNAS measure: r=0.67 (Crawford & Henry, 2003).	
Heart Rate (HR)	Measures physiological arousal and is the beats of the heart per minute. Measured by chest-strap (Polar H10).	Not applicable.	Not applicable.	Ultra-short 2 - minute segments of heart rate recordings were collected, giving the number of beats per minute (bpm) which were visually analysed.	The Polar H10 has been shown to be a reliable measure of HRV; even when compared to an ECG as gold standard	The Polar H10 has been shown to be a valid measure of HRV; even when compared to an ECG	Measured at start (pre-narration) and end (post-narration) of session.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
	Measures exposure and habituation as process measure (primary aim of the study).			When narrating or listening to a stone HR is expected to increase reflecting a surge in physiological arousal and then decrease after to evidence habituation.	(Gilgen-Ammann, et al., 2019; Speer et al., 2020).	as gold standard (Gilgen-Ammann, et al., 2019; Speer et al., 2020).	
Heart Rate Variability (HRV)	Measures physiological arousal and is the variation in time between heartbeats. Measured by chest-strap (Polar H10). Measures exposure and habituation as a process and outcome measure (primary aim of study).	Not applicable.	Not applicable.	Ultra-short 2 - minute segments of heart rate recordings were collected, giving from the root mean square of the successive differences between R-R intervals (rMSSD) which were visually analysed. Increases in rMSSD would reflect habituation. However, for people who have excessively high HRV reductions can indicate habituation.	The Polar H10 has been shown to be a reliable measure of HRV; even when compared to an ECG as gold standard (Gilgen-Ammann et al., 2019; Speer et al., 2020).	The Polar H10 has been shown to be a valid measure of HRV; even when compared to an ECG as gold standard (Gilgen-Ammann et al., 2019; Speer et al., 2020).	Measured at start (pre-narration) and end (post-narration) of session.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
Subjective Units of Distress (SUDS)	A person's subjective account of distress on a set scale.	Not applicable.	"On a scale from 0-10 with 10 being the highest and 0 being the lowest how would you rate your distress right now?"	0-10; 0=no stress, 10= maximum distress	Called into question due to its subjective nature (Annett, 2002).	Not applicable.	Every session throughout the intervention phase. At the start and end of the participant's trauma narrations and when being re-read their narrative from the previous session.
BPQ-SF (Cabrera et al., 2018; Porges, 1993)	Self-Report Assesses a person's perception of body awareness and autonomic reactivity. The measure has two domains both with separate subscales. The first domain measures the sensitivity of internal bodily	46 Items First domain is 26 items. Second domain is 15 items.	First domain "Swallowing frequently". Second domain "My heart often beats irregularly".	Responses are scored on a 5-point Likert type scale ranging from 1= "never" to 5= "always" High scores on the first domain reflect hypersensitivity, whereas low scores reflect low hyposensitivity. Higher scores on the subscales	Test-retest reliability-spearman correlations subscales ranging from 0.74-0.78 (Poli et al., 2021).	Good levels of convergent validity with similar measures found to have a consistent factor structure across samples (Cabrera et al., 2018).	At the start and end of treatment.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
	functions (e.g., muscle tension). The second domain, Autonomic Reactivity has two subscales, Supradiaphragmatic Reactivity which measures the responses of autonomically-innervated organs above the diaphragm (e.g., sweat in armpits) and reflects the calm resting state and sympathetic "fight or flight" responses.			suggest a destabilised autonomic reactivity which is associated with lower parasympathetic activity, higher resting heart rate, and less parasympathetic and sympathetic flexibility in response to a challenge.		Convergent validity- BPQ-SF scales moderately correlated with other measures (Poli et al., 2021).	
Autobiographical Memory Integration Coding Tool (ABMICT; Lord et al., 2023)	An existing coding measure has been adapted for the purpose of the study, to create a new measure including more areas measuring phenomenological constructs of autobiographical memory. The coding measure	7 Separate Constructs. With Narrative Coherence combining three constructs to make a global area.	Disorganisation: Repetition of phrase "I couldn't get away…I couldn't get away" Confusion "I don't understand how it happened"	1-4-point Likert scale (1932) with normal and reverse scoring. Reverse scored areas are emotional distancing, fragmentation, and disorganisation. A score of 4 reflects a higher score and a more	The transcribed narratives were scored independently by one member of the research team but reviewed for coherency and applicability	No research available, as coding measure has been adapted for purpose of this study.	All pre and post narratives were transcribed and subsequently coded.

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
	covers areas such as: Total word count of narratives- Gray and Lombardo (2001). Disorganisation- informed by Harvey and Bryant (1999): repetition of phrases, confusion, and disjointedness. Fragmentation- informed by Foa et al. (1995): Unfinished thoughts, repetition of words, speech filler. Vividness- how clear, detailed, and specific the mental image is conveyed by participant. Time and place details- the amount of contextual information that places the memory in time and place.		Disjointedness "he was go over I" Fragmentation: Unfinished thoughts "So I….." Repetition of words " I I I couldn't" Speech Fillers "um, er". Vividness-Not applicable. Time and place details- Not applicable. Emotional distancing- Not applicable. Sensory details- Not applicable.	detailed, specific, and rich recall, providing evidence of the ABMI area. A score of 1 is a lower score reflecting a weaker recall, giving less evidence of the ABMI area. To score transcripts if a section is identified to represent a construct it can then be scored appropriately. Once scored a percentage score of each construct for the transcript as a whole can be calculated. After calculating a percentage score for each construct, the percentage is multiplied by its scored area to gain a total score (e.g., If 10% of the transcript is coded as Time and Place	by an external clinician (refer to extended paper section 2.4).		

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
	Emotional distancing- the amount the person distances themselves from the emotion of the event. Sensory details- the amount of sensory details recalled apart from visual imagery as this is vividness. Narrative Coherence- is a categorical dimension, if there are decreases in fragmentation and disorganisation and increases in time and place details on the second narration it is considered to be more coherent. Measures ABMI on a session-by-session basis and is therefore a process			Details with a score of +2, the researcher would multiply these numbers together to get a score of 20). To calculate the overall score for each construct, the average score should be calculated by adding up the total scores and dividing it by four.			

Table 7
Overview, Administration, and Psychometric Properties of Measures

Measure	What it measures	Number of Items	Example Item	Scale	Reliability	Validity	How often was it be collected?
	measure (primary aim of study).						
Change Interview	Explored participant's views and experiences of NET+, the specific factors they found helpful/unhelpful, and any changes identified due to NET+ or other factors.	Multiple questions covering the following topics: Acceptability/Feasibility; Change; Participant Resources; Helpful Aspects; Unhelpful Aspects.	"What were the helpful aspects of therapy?"	N.A	N.A	N.A	Once-after intervention phase has been completed.

Notes. IES-R=The Impact of Events Scale-Revised; DASS-21= The Depression Anxiety And Stress Scale-21; BPQ-SF = The Body Perception Questionnaire Short Form

Procedure

Ethics[18]

The study was approved by the University of Nottingham Research Governance team, the Derby Research Ethics Committee (REC), and The Health Research Authority (HRA) within the NHS (IRAS: 295623). The research department of the trust the study took place in supported it.

Recruitment and Consent[19]

Participants were recruited from a secondary care mental health service within the UK between September 2021-May 2022. If a person was deemed eligible at assessment, they were informed of the study and provided with an information sheet and a consent to contact form. After a minimum twenty-four-hour period, the person was contacted by the researcher by telephone, and if verbal consent was gained, an initial appointment was booked to discuss the study, and receive written consent. The field supervisor reviewed the services waiting list and wrote to people deemed suitable, and if the people responded to the service showing interest the process above was followed. Written consent allowed for the sessions to be audio recorded, and if necessary, the service agreed to provide further support to participants after completion.

Baseline

A minimum of three baseline measures were taken at: (1) initial assessment; (2) consent session (3) at the beginning of the psychoeducation session prior to the intervention beginning. If participants had a gap between their consent and psychoeducation session, they were asked to complete additional baseline measures for those weeks. Ideally in AB designs, intervention starts after a stable

18 See extended paper section 2.6 for an overview of study ethical approval and registration, confidentiality, anonymity, and data storage.
19 See extended paper section 2.7 for more information on sample size, recruitment, and consent and withdrawal process, debrief, participant safety and payment.

baseline has appeared (Morley, 2018); however, ethically this was not possible in the study as it meant delaying treatment for people experiencing distress.

Intervention

The NET intervention used was a modified version of the protocol provided in Schauer et al.'s (2011) manual. See Table 8 for a comparison of NET and NET+. The adaptations took place at the start of the sessions and included a person wearing a chest-strap, allowing for heart data collection. During the narration sessions the therapist consulted the lifeline to determine which trauma should be narrated and said to the participant "Tell me in as much detail as you can about the (traumatic event)". Having participants freely narrate at the beginning of the sessions allowed the therapist to transcribe, compare, and code their trauma. A breakdown of session content is provided in Table 9.

The intervention phase lasted from January 2022- October 2022. Participants received up to 12 weekly 120–180-minute sessions. The number of sessions and length varied dependent on clinical need. If a participant completed six sessions, they were deemed treatment completers. The lead researcher was the therapist for the intervention and received weekly supervision by an experienced NET clinician. All sessions were audio recorded to aid the process of supervision, assessment of treatment fidelity[20], and transcription. At the end of therapy all participants were debriefed. The CI[21] and collection of FU data was arranged to be as close to the end of the intervention as possible so participants could be reviewed by the service, avoiding delays in accessing further support.

20 See extended paper section 2.8 for more on the quality checks.
21 See extended paper section 2.9 for the change interview schedule.

Table 8
Comparison of Routine NET and Adapted Intervention NET+

	Routine			Adapted	
Session	**NET Component**	**Description**	**Session**	**NET Component**	**Description**
1	Psychoeducation	Normalise, legitimisation, description of trauma reaction, explain process of therapy.	1	Psychoeducation	No adaptation.
2	Lifeline	Participant lays a piece of string/rope, places stones to mark traumatic events and flowers for positive ones in chronological order starting from birth.	2	Lifeline	No adaptation.
3	First Narration	Narrate first trauma event.	3	First Narration and Re-narration	Participant wears chest strap to measure heart rate. Participant is asked "Tell me in as much detail as you

					can about the (first traumatic event taken from lifeline)". The participant will give as free an account of their trauma as possible. When the participant has stopped, the normal session content will resume, and the trauma will be narrated as part of the session. No other changes to content of session.
4-10 (as needed)	Re-narration and Narration	Therapist re-reads narrative from previous session and continue subsequent narration and re-reading of narratives for other events.	4	Re-narration and Narration	Person wears chest strap to measure heart rate. The therapist starts by saying "Last time we talked about (previous sessions' trauma), tell me about it

again in your own words". The person freely narrates the previous sessions' trauma, before going through the process of re-narration with the therapist.

The session continues with the therapist asking, "Tell me in as much detail as you can about the (following sessions' traumatic event taken from lifeline)". The participant will give as free an account of their trauma as possible. When the participant has stopped, the normal session content will resume, and the trauma will be narrated as part of the session.

					No other changes to content of session.
11	Relay Lifeline	Relay lifeline using string/rope, placing stones for trauma events, and flowers for positive ones.	11	Relay Lifeline	No adaptations.
12	Giving Whole Narration	Researcher gives participant whole written testimony.	12	Whole Narration	No adaptations.

Table 9

Session Content

Session	Content
1-Psychoeducation	• Review of week (discussion of symptoms, questionnaires, risk assessment) • Normalise, legitimisation, description of trauma reaction, explain process of therapy. • Plan following session and review session.
2-Lifeline	• Review of week (discussion of symptoms, questionnaires, risk assessment). • Construct Lifeline. • Plan following session and review session.
3-First Narration Session	• Review of week (chest strap put on prior to session start, discussion of symptoms, questionnaires, risk assessment). • Breathing exercise (Ultra short 2-minute heart data reading). • Ask participant to freely narrate trauma (therapist pays attention for dissociation). • Narrative exposure begins (starting from bottom of lifeline). • SUDs. • Re-narration of stone with therapist. • End narration in place of safety. • SUDS. • Breathing exercise (Ultra short 2-minute heart data reading). • Session end-plan following session and review session.

4-11- Re-narration and Narration (or any penultimate session)	• Review of week (chest strap put on prior to session start, discussion of symptoms, questionnaires, risk assessment). • Breathing exercise (Ultra short 2-minute heart data reading). • Ask participant to freely narrate trauma from previous session (therapist pays attention for dissociation). • SUDs. • Read narrative from previous session. • SUDs. • Ask participant to freely narrate new trauma (therapist pays attention for dissociation). • Session narrative exposure begins (starting from where left off). • SUDs. • Re-narration of stone with therapist. • End narration in place of safety. • SUDs. • Breathing exercise (Ultra short 2-minute heart data reading). • Session end-plan following session and review session.
11-12- Relay Lifeline or Giving Whole Narration (or any final session)	• Review of week (discussion of symptoms, questionnaires, risk assessment). • Relay of lifeline or re-read of whole narration (as appropriate, SUDs collected if narrative re-read). • Participant given written narrative and both participant and therapist sign it. • Discuss ending and review progress.

Notes. SUDs= Subjective Units of Distress

Analysis[22]

Visual analysis was used to systematically evaluate the trend, level, and stability of the outcome measures, both within and across the phases of the study (Lane & Gast, 2014). To strengthen the analysis, dual criterion (DC) was used to include data post baseline that falls below the mean and projected trend line, limiting bias (Fisher et al., 2003). The number of data points below the mean and baseline trend line in the intervention and FU were counted (Fisher et al., 2003). The Percentage of Data Points Exceeding the Median (PEM; Ma, 2006) was calculated for the IES-R giving an effect size. Clinically Significant Change (CSC) and the Reliable Change Index (RC; Jacobson & Truax, 1991) were calculated for the IES-R and DASS-21 at the end of the intervention and FU, to see if changes were reliable and clinically significant.

Simulation Modelling Analysis (SMA; Borckardt et al., 2008) was used to assess potential temporal and correlational relationships between the IES-R and DASS-21. SMA gives the lag effect and temporal sequences of the measures if a correlation is found. (I.e., If the IES-R score reduces, does that precede a reduction in general psychological distress).

HR and HRV data were collected, no norms of heart data were available for comparison, and the data was visually analysed via graph. The Root Mean Square of Successive Difference (rMSSD) was collected as it is a primary measure of change in HRV (Schaffer & Ginsberg, 2017). Analysing the rMSSD allowed the researcher to see how HRV changed in session and over the course of treatment. Visual analysis was applied to HR data. SUDs were taken graphed, and visually inspected.

ABMI was analysed by applying the ABMICT to the trauma transcripts. Transcripts pre- and post-therapy were scored, and the information graphed and visually analysed. Scores were then categorised as an increase, decrease or no change regardless of how small the change was. See Table 6 for scoring details[23]. An

22 See extended paper section 3.1 for further information on the analyses conducted.
23 See extended paper section 3.2 for more on scoring of the ABMICT.

external clinician reviewed the ABMICT and its scoring and deemed it internally coherent and applicable in its current format.

Content analysis was used with the data gained from the CIs. The CIs explored participants' views and acceptability of NET+, inductive and semantic content analysis was used. An inductive approach is recommended when there is not enough knowledge of a phenomenon (Lauri & Kyngäs, 2005).

Results

Participants and Delivery of NET+

Five adults who met the eligibility criteria were approached and four were recruited. Three female participants aged 28-35 (M = 30.33, SD = 4.04) completed the study, and one male participant aged 40 withdrew after the third session. Participants chose pseudonyms to protect their identities, and clinical and demographic information is provided in Table 10. All participants showed complex clinical presentations representative of CPTSD, due to all experiencing multiple traumatic events and displaying symptoms such as dissociation, somatization, difficulties in regulating emotions, and varying levels of inter-personal difficulties respectively [24].

Three out of four participants completed at least six sessions; Fox completed ten, while Raven and Wolverine completed the full twelve. As the study was working with adults the number of stones (traumatic events) participants included in their lifeline exceeded the twelve recommended sessions by NET (Schauer et al., 2011). Raven was able to complete therapy, whereas Fox and Wolverine finished treatment with another therapist. The intervention was tailored to meet the needs of each participant whilst meeting the established adherence and competence quality checks [25].

24 See extended paper section 4.1 for participant descriptive statistics of measures.
25 See extended paper section 4.2 for more information on the quality checks.

Table 10

Participant Demographics and Clinical Information

Information	Fox	Raven	Wolverine
Age	28	28	35
Gender	Female	Female	Female
Ethnicity	White British	White British	White British
Types of Traumatic Events Witnessed and/or Experienced	Fire or Explosion Transportation Accident Exposure to Toxic Substance Physical Assault Sexual Assault Life Threatening Illness or Injury	Sexual Assault Threat of Physical Violence	Fire or Explosion Transportation Accident Exposure to Toxic Substance Physical Assault Sexual Assault Life Threatening Illness or Injury
Presenting Difficulties	Complex Trauma Depression (Extreme Severity) Anxiety (Extreme Severity) Stress (Extreme Severity)	Complex Trauma Depression (Moderate Severity) Anxiety (Mild Severity) Stress (Moderate Severity)	Complex Trauma Depression (Extreme Severity) Anxiety (Extreme Severity) Stress (Severe Severity)

Notes. Severity assessed by calculating the baseline means of DASS-21 and using its suggested scales

Effectiveness of NET+ for PTSD

The IES-R was completed giving time series data which was inspected visually for any changes across phases and time while paying attention to the level, trend, and variability of data points. Visual displays with trendlines are presented in Figure 2, visual displays with DC in Figure 3 (Fisher et al., 2003). Treatment effect sizes were calculated using the PEM (Ma, 2006) approach. Visual analysis revealed improving baselines for Fox and Raven, no change was observed for Wolverine. Across the intervention phase there were improving trends for Fox and Raven, while no change was noted for Wolverine (Figure 2). Only Raven showed significant variability in the intervention phase. No trend for any participant can be reported for the FU as only one data point was collected. Prior to starting the intervention Fox and Wolverine were above the clinical cut-off for the IES-R. Raven's scores fluctuated between PTSD being a clinical concern and above the clinical cut-off score. At the end of the intervention, Fox and Wolverine remained in the clinical range, whereas Raven was below. DC analysis suggested treatment did not have a systematic effect for either Fox or Raven but did for Wolverine[26]. Results of the PEM analysis suggested an effective treatment effect for Fox, a moderately effective treatment effect for Raven, and debatably effective for Wolverine[27] (Table 11). A RC was found for Fox at FU (Table 9), a CSC was found for Raven at FU; however, sensitivity analysis using the baseline mean instead of the first data point uncovered a RC and CSC[28]. Wolverine worsened at FU; however, this was related to an external event.

26 See extended paper section 4.3 for the dual criterion analysis for IES-R.
27 See extended paper section 4.4 for PEM effect size calculations.
28 See extended paper section 4.9 for Reliable Change and Clinically Significant Change calculations.

Table 11

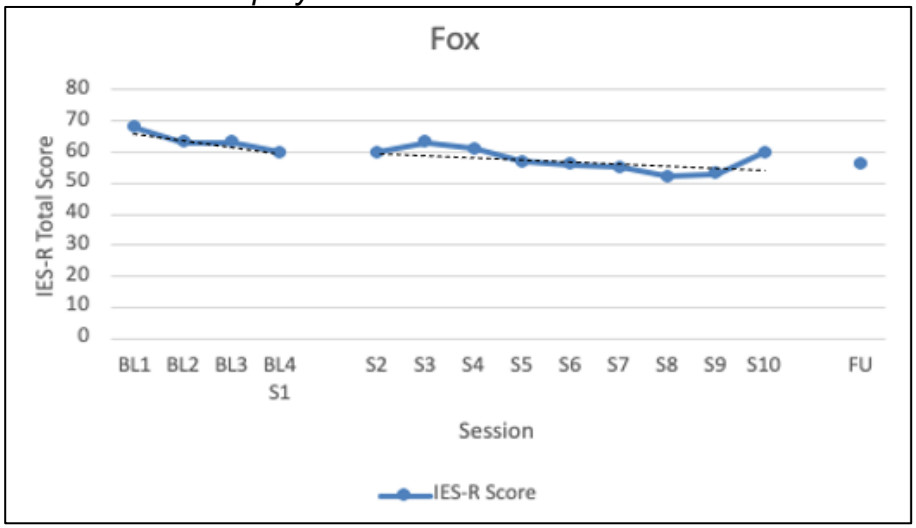
Effect Sizes for IES-R

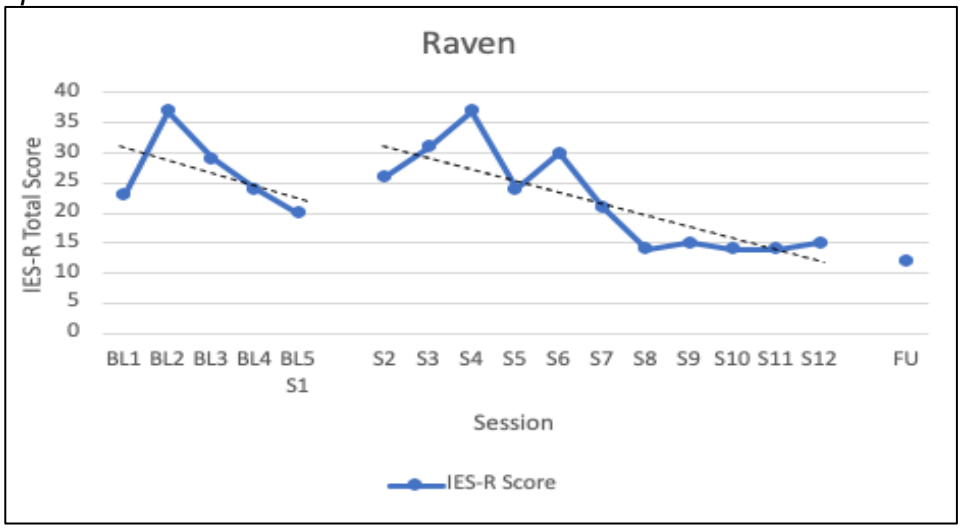
Participant	Effect Size
Fox	0.90
Raven	0.75
Wolverine	0.67

Note. Scruggs & Mastropieri (1998) An effect size of .90 and greater is deemed an effective treatment, .70-.89 moderately effective, .50-.69 debatably effective, less than .50 ineffecti

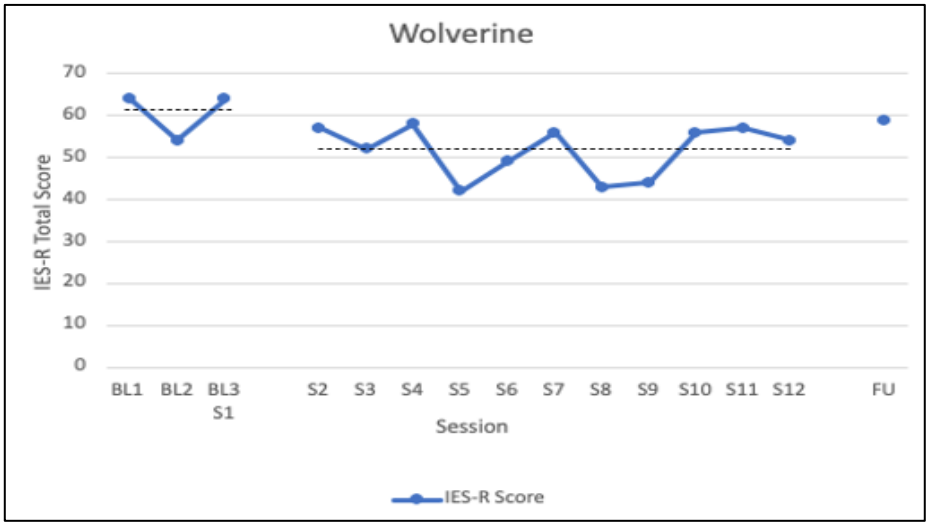
Figure 2

Visual Displays of Post-Traumatic Stress with Trendlines for each Participant





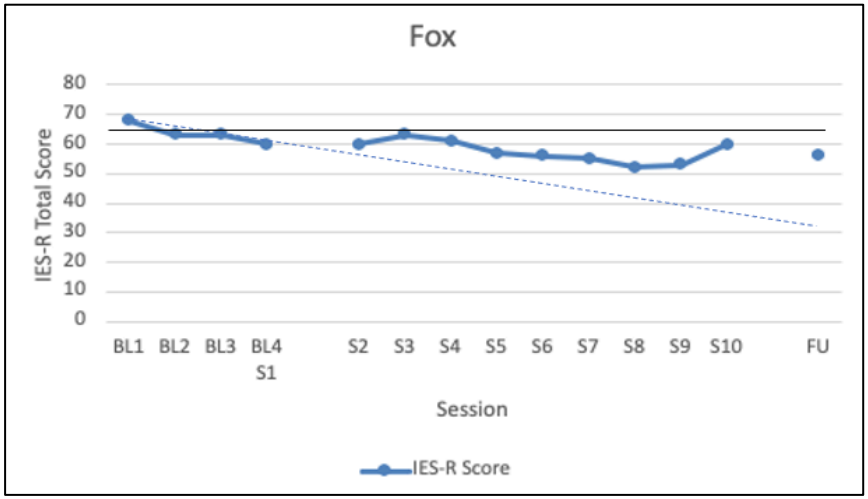
N.B 4-week gap between session 5-6 for Fox

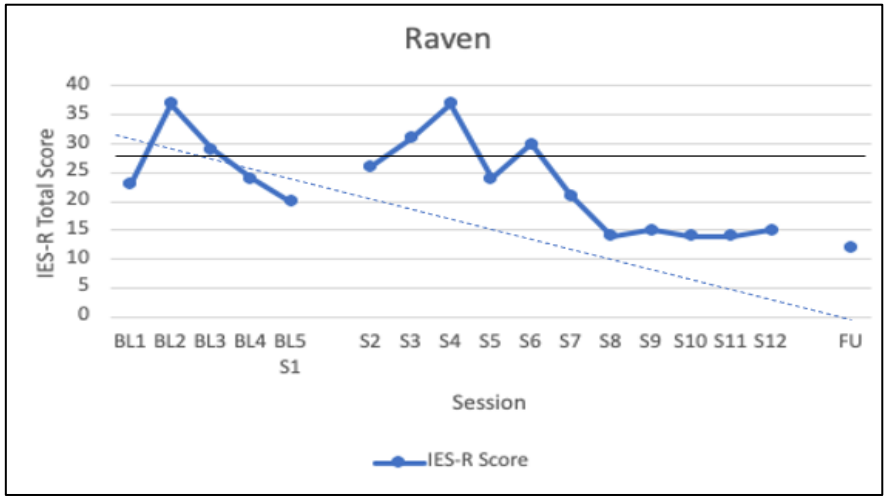


Notes. BL= Baseline; S=Session; FU=Follow Up; IES-R= Impacts of Events Scale Revised; measures completed before session; dotted line= trendline.

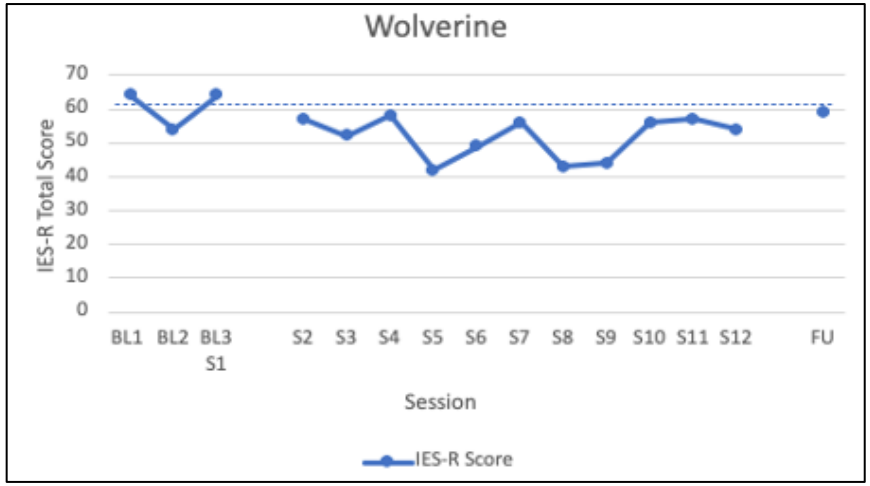
Figure 3

Visual Displays of Post-Traumatic Stress with Dual Criteria Applied for each Participant





N.B 4-week gap between session 5-6 for Fox



Notes. BL= Baseline; S=Session; FU=Follow Up; IES-R= Impacts of Events Scale Revised; measures completed before session; dotted line= BL trend line; sold line= BL mean; N.B BL mean, and trend line are the same for Wolverine

Effectiveness of NET+ for General Psychological Distress

The DASS-21 was completed to give time series data and inspected visually to see if there were changes across phases and time while paying attention to the level, trend, and variability of data points. Visual displays of the total scores with trendlines and DC analysis are presented in Figure 4 and 5, visual displays with trendlines for subscales are applied in Figure 6. Only total scores and not subscales were visually analysed with DC due to the three factor oblique structure proposed by the DASS-21. The three-factor structure posits the three separate subscales (depression, anxiety, and stress), are all only associated with their latent dimensions, and this structure has gained support, as the DASS-21 has good reliability, convergent, and discriminant validity (Gomez et al., 2020; Lovibond & Lovibond, 1995). However, despite support of the DASS-21's psychometric properties, the measure has been critiqued due to seven of its items having significant cross loading (Oei et al., 2013). This is not surprising given the symptoms of depression and anxiety can overlap (Makara-Studzinska et al., 2022), with existing measures often having similar items that lead to high correlations between depression and anxiety symptoms (Bares, 2011). Therefore, as the subscales and total score represent their own constructs with the subscales having significant cross loading and taping into the latent variable i.e., general psychological distress; only the whole scores were examined with DC as it reflects general psychological distress. Visual analysis of the total scores revealed no change in baselines for Fox and Raven; however, a deterioration was noticed for Wolverine. Across the intervention phase there were no changes in trends for Fox, an improvement was noticed for Raven, while Wolverine deteriorated (Figure 4). At FU improvements were noticed for Raven and Wolverine whereas there were no changes for Fox. There were no issues with stability for any participants across any phases. DC analysis suggested treatment did not have an effect for Fox, but effects were found for Raven and Wolverine[29]. Results of the PEM analysis for general psychological distress suggested debatable effective treatment effect for Fox as six out of a possible ten points were below the line which gives a result of 60%[30]. One point was on the line for Fox but was not included to manage bias. A moderately effective treatment was identified for Raven with nine out of a possible twelve points

29 See extended paper section 4.5 for the dual criterion analysis for DASS-21.
30 See extended paper section 4.6 for information on PEM calculations.

below the line giving a result of 75%. A moderately effective treatment for Wolverine was identified with ten out of a possible twelve points below the line giving a result of 83%. One data point was on the line for Wolverine and not included. Table 12 shows the percentages expressed as effect sizes with the criteria to judge them against.

Table 12

Effect Sizes for DASS-21

Participant	Effect Size
Fox	0.60
Raven	0.75
Wolverine	0.83

Note. Scruggs & Mastropieri (1998) An effect size of .90 and greater is deemed an effective treatment, .70-.89 moderately effective, .50-.69 debatably effective, less than .50 ineffective

Visual analysis of the subscale scores revealed deteriorating baselines for all participants for depression, improvements in anxiety were noticed for Fox and Raven whereas there was no change for Wolverine. Deteriorations were noted in stress for Fox and Raven, whereas Wolverine improved. Across the intervention phase there was an improving trend for Fox and depression; trends deteriorated for Raven and Wolverine (Figure 6). Deteriorations in anxiety were noted for Fox and Wolverine, but Raven improved. No change in stress was noted for Fox, there was a deterioration for Raven, but an improvement for Wolverine. At FU improvements were noticed for Raven (apart from depression) and Wolverine across all areas, whereas slight improvements in anxiety, stress were maintained, and a deterioration in depression were noted for Fox.

Through calculating the baseline means Fox was categorised as extremely severe in all subscales, Raven as moderate for depression and stress, and mild for anxiety, Wolverine as extremely severe for depression and anxiety, and severe for stress[31]. At the end of the intervention the only change for Fox was a reduction in stress to severe and this was the same at FU, Raven was non-clinical in all subscales, and this was maintained at FU, no changes were noted for Wolverine, but

31 See extended paper section 4.7 for information on DASS-21 Scoring

there was a reduction in depression to severe at FU. RC and CSC were noted for Raven in stress at the end of the intervention; however, it only remained CSC at FU, there was a RC and CSC in anxiety at FU.

SMA was conducted on the IES-R and DASS-21 subscales (Depression, Anxiety, and Stress)[32] and showed significant correlations between the IES-R and stress for: Fox Lag +1 ($r = .68$, $p=.004$) suggesting a sequential change as decreases in the IES-R are followed by decreases in stress a week later, and Wolverine Lag 0 ($r = .79$, $p=.000$) suggesting changes occurring concurrently.

Reliable and Clinical Change

RC and CSC analyses was completed for the IES-R and DASS-21 subscales pre (baseline), post (final session), and FU[33] (Table 13).

32 See extended paper section 4.8 for information on SMA Analysis.
33 See extended paper section 4.9 for information on Reliable Change and Clinically Significant Change.

Table 13

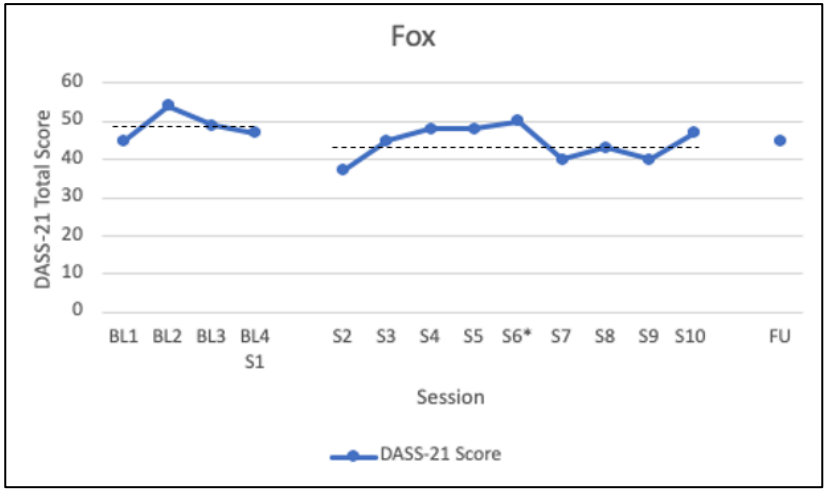
Reliable Change and Clinically Significant Change for the Outcome Measures

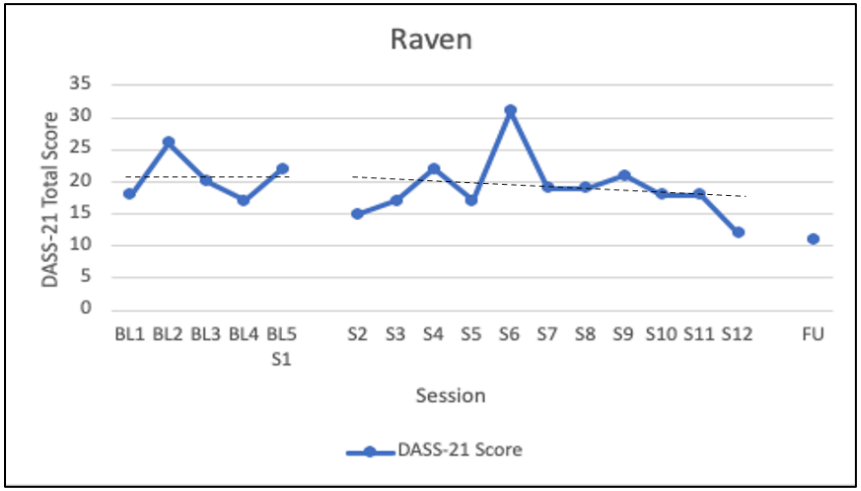
Participant	Time	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress	IES-R
Fox	Pre (B1)	26	32	32	68
	Post (S10)	30	32	30	60
	One Week Follow Up	30	30	30	56^{R}
Raven	Pre (B1)	8	10	18	23
	Post (S12)	8	6	10^{RCSC}	15
	Two Week Follow Up	8	2^{RCSC}	12^{CSC}	12^{CSC}
Wolverine	Pre (B1)	26	30	36	64
	Post (S12)	32	36	32	54
	One Week Follow Up	22	26	28	59

Notes. Calculation completed using non-clinical and clinical norms in published literature. Decreases in IES-R and DASS-21 indicates improvements. DASS-21 scores are doubled when scoring. Pre = first baseline data point. Post = final NET session. R= Reliable Change. RCSC= Reliable and Clinically Significant Change; CSC= Clinically Significant Change

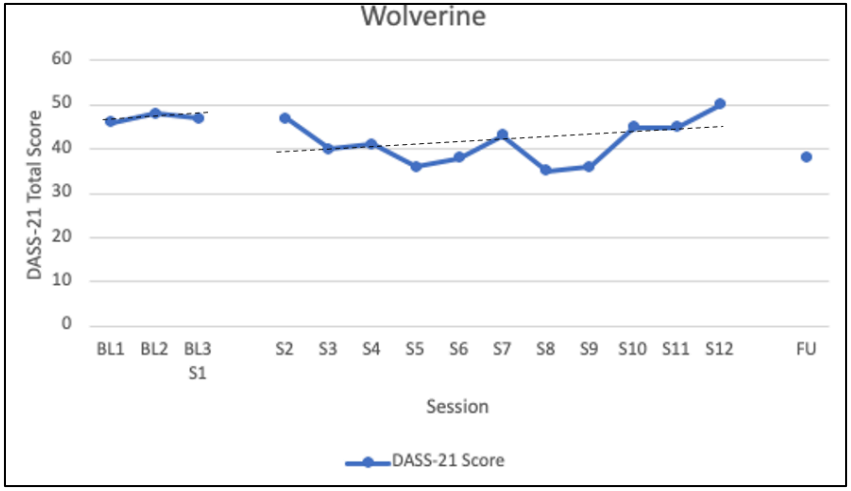
Figure 4

Visual Displays of General Psychological Distress with Trendlines for each Participant





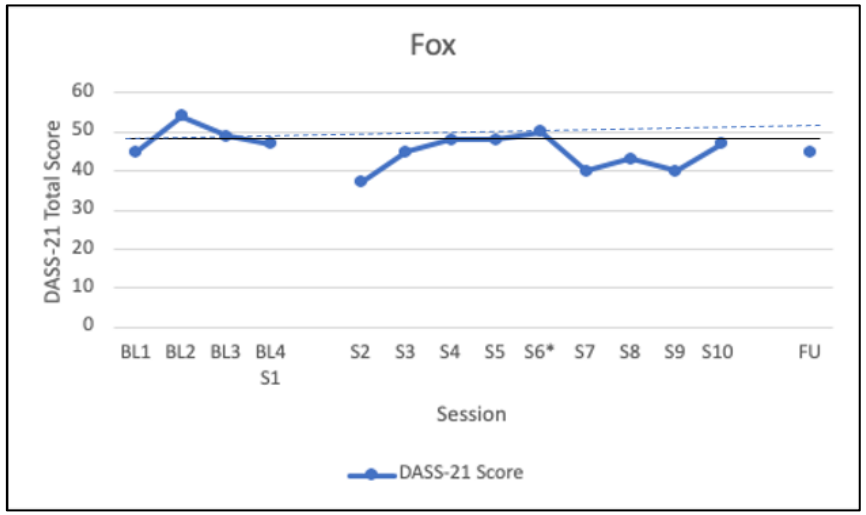
N.B S6* for Fox indicates 4-week gap between session.

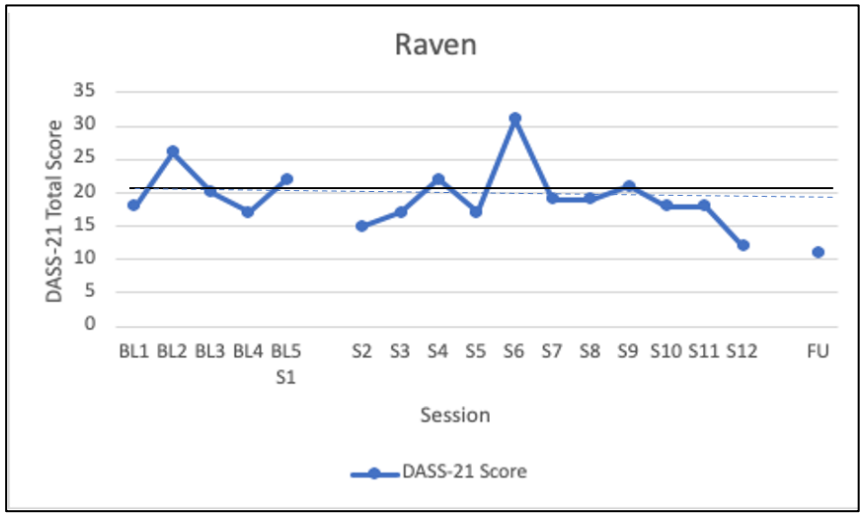


Notes. BL= Baseline; S=Session; FU=Follow Up; DASS21= Depression Anxiety and Stress Scale 21Items; measures completed before session; dotted line= trendline.

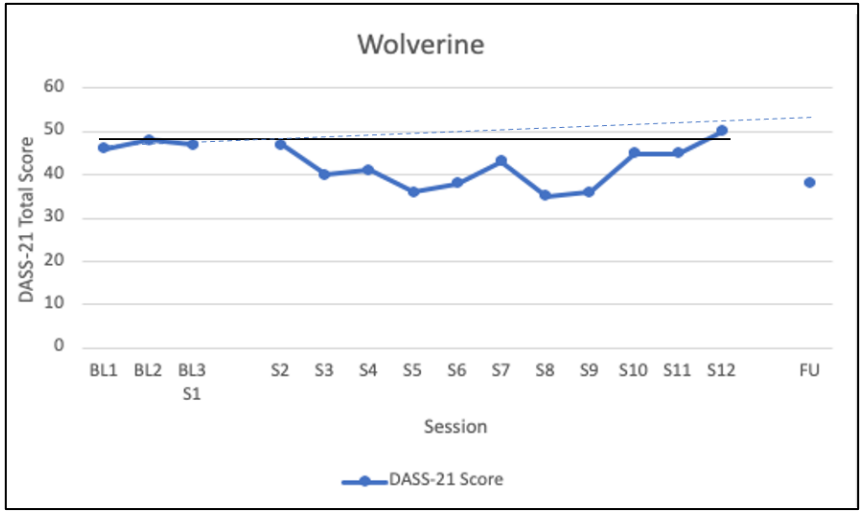
Figure 5

Visual Displays of General Psychological Distress with Dual Criteria applied for each Participant





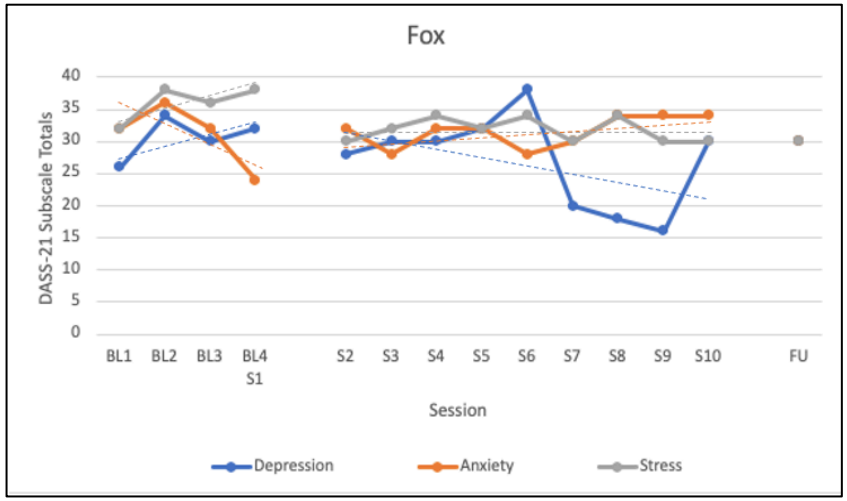
N.B S6* for Fox indicates 4-week gap between session.

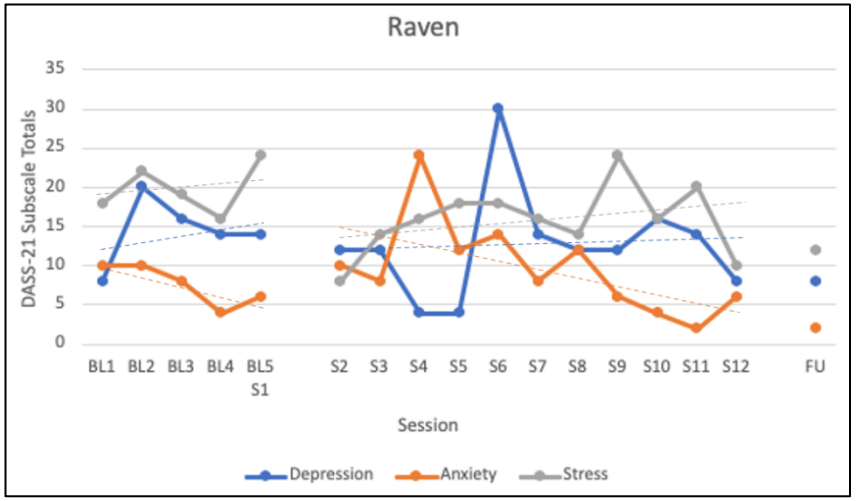


Notes. BL= Baseline; S=Session; FU=Follow Up; DASS21= Depression Anxiety and Stress Scale 21Items; measures completed before session; dotted line= BL trend line; sold line= BL mean

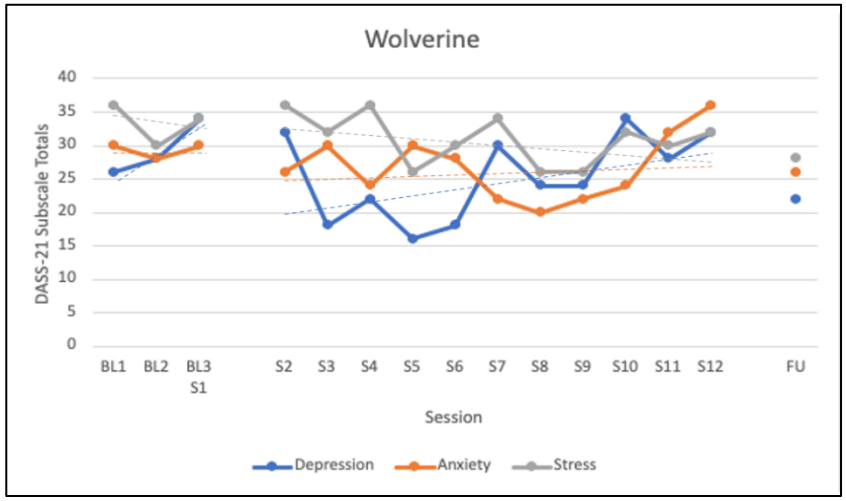
Figure 6

Visual Displays of General Psychological Distress Subscales with Trendlines applied for each Participant





N.B 4-week gap between session 5-6 for Fox and all data points at FU fall on the same point.



Notes. BL= Baseline; S=Session; FU=Follow Up; DASS21= Depression Anxiety and Stress Scale 21Items; measures completed before session; dotted line= trendline.

Mechanisms of Change

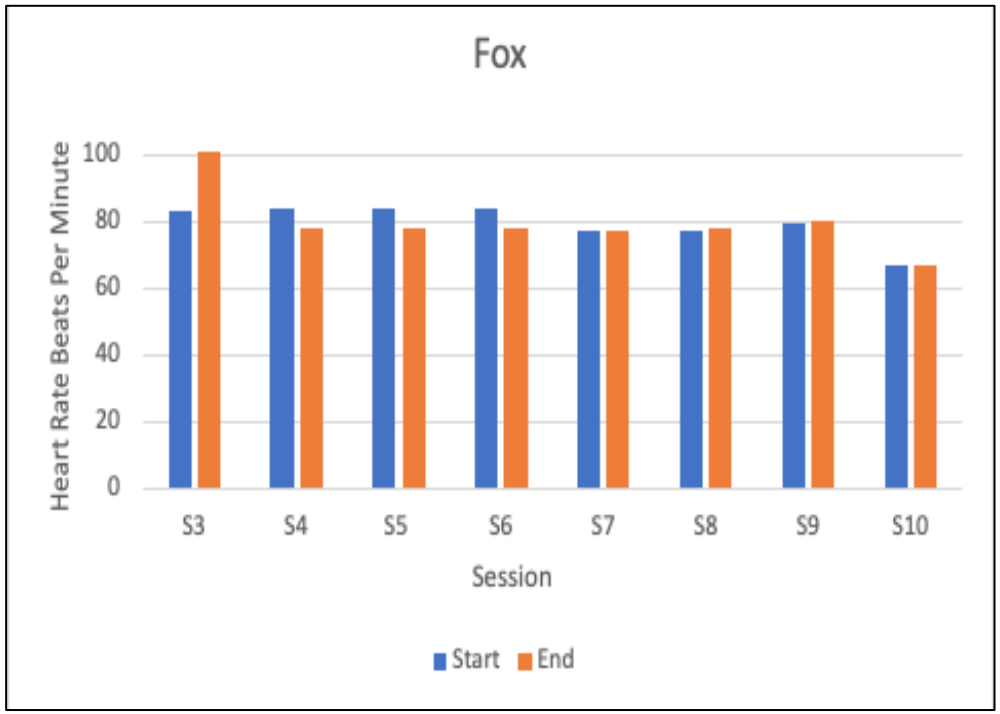
Exposure and Habituation

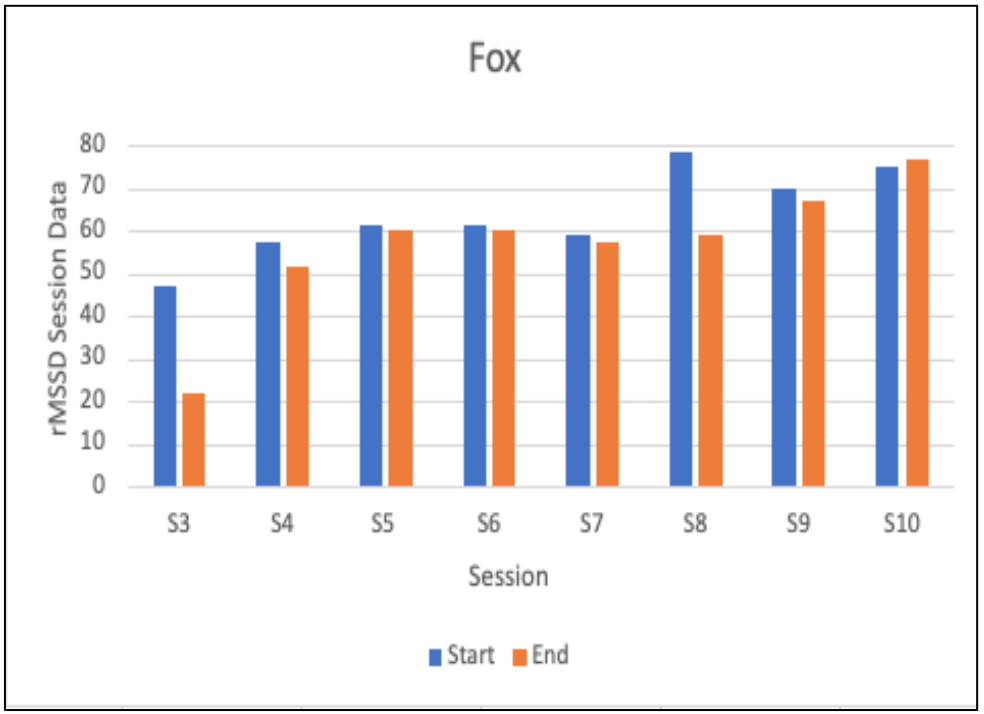
Heart data was collected in the third session when narrations began and until the final narration session. The first set of data was recorded before any trauma narration and the final set after trauma narrations. Visual displays for each participant are provided covering session by session data (Figures 7, 8, 9), and before and after the intervention (Figure 10).

For Fox, there was little evidence of in session habituation when looking at HR, and even a decrease in HRV in 88% of their sessions, supporting Fox's SUDs (Figure 11) in suggesting they only experienced habituation twice. For Raven 50% of their sessions ended in increases and decreases in HR, but when looking at the HRV data 70% of their sessions ended with increases, suggesting evidence of habituation more times than not. However, Raven's SUDS only suggested habituation in four sessions. Focusing on HR for Wolverine only one session ended with an increase in HR, but there were increases in HRV in 56% of sessions suggesting mixed habituation. Despite there being decreases in HR in most sessions and increases in HRV, Wolverine's SUDS increased on all bar one occasion. All participants showed increases in rMSSD and decreases in HR at the start and end of treatment (Figure 10). No significant changes were noted for any participant with the BPQ-SF (Figure 12).

Figure 7

Fox Heart Rate and Heart Rate Variability Session by Session Recordings

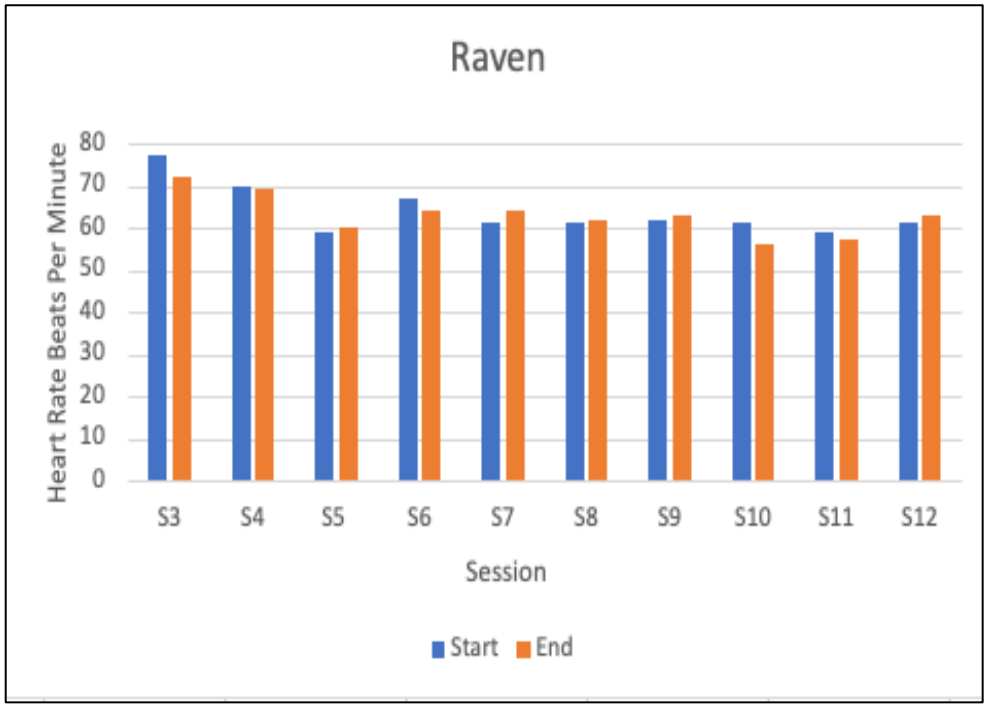


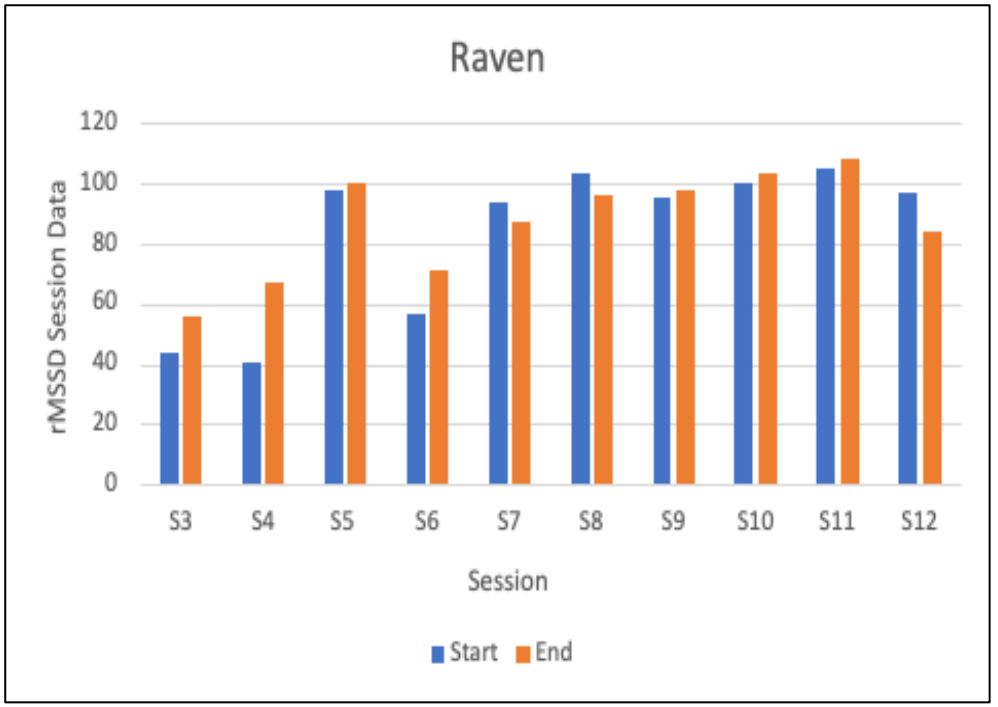


Notes. Left graph = Heart Rate. Right Graph= Root Mean Square of Successive Difference (rMSSD) a measure of HRV. S= Session.

Figure 8

Raven Heart Rate and Heart Rate Variability Session by Session Recordings

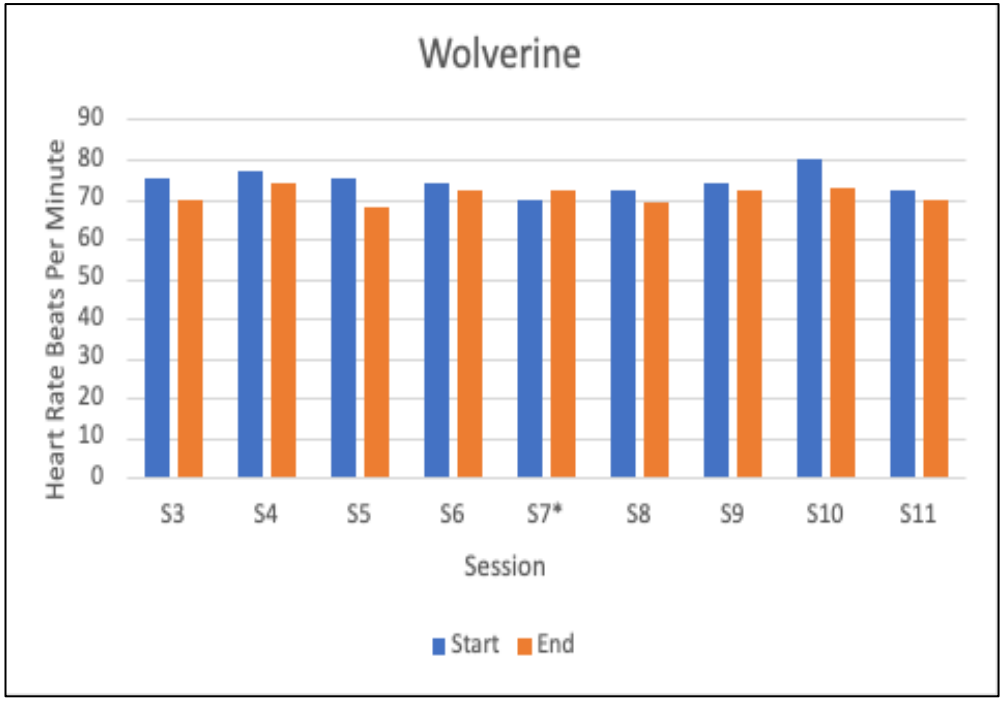


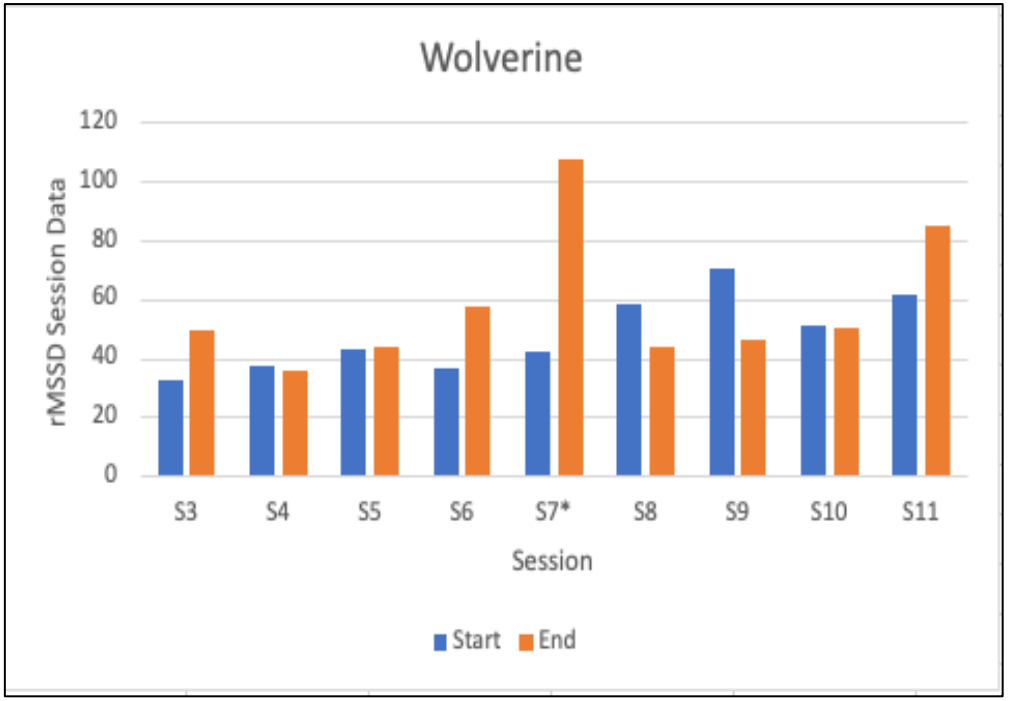


Notes. Left graph = Heart Rate. Right Graph= Root Mean Square of Successive Difference (rMSSD) a measure of HRV. S= Session.

Figure 9

Wolverine Heart Rate and Heart Rate Variability Session by Session Recordings

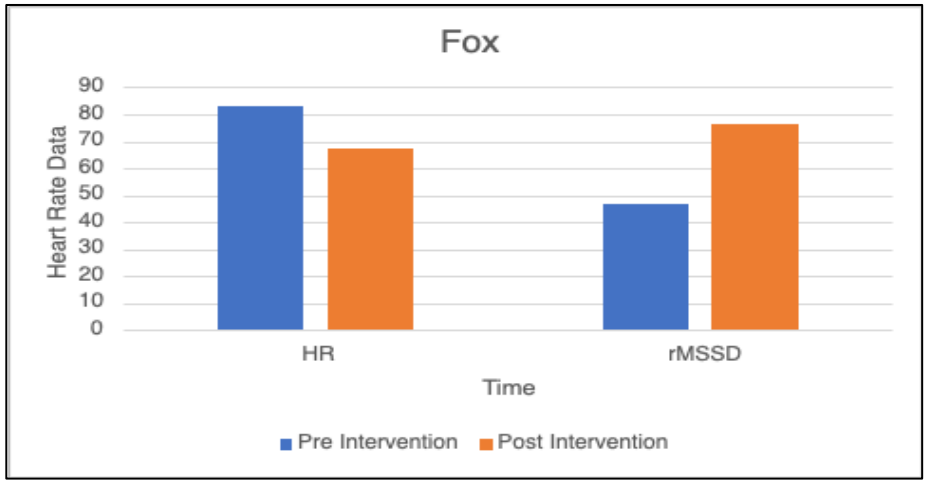


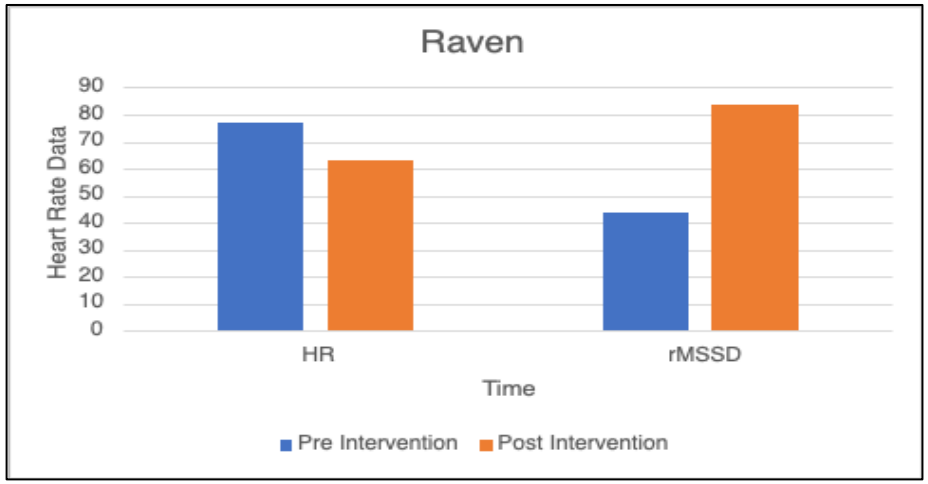


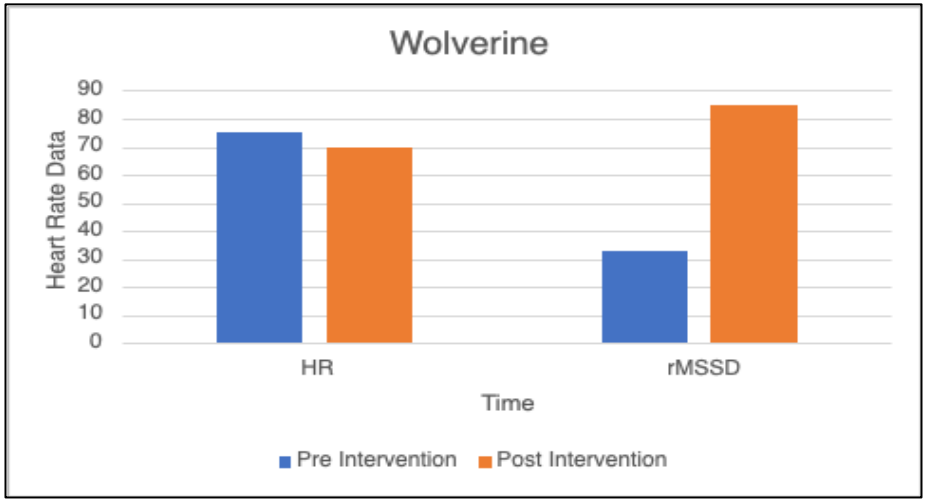
Notes. Notes. Left graph = Heart Rate. Right Graph= Root Mean Square of Successive Difference (rMSSD) a measure of HRV. S= Session. N.S S7* Reflects poor signal quality for session

Figure 10

Participants Heart Data Before and After Intervention Recordings



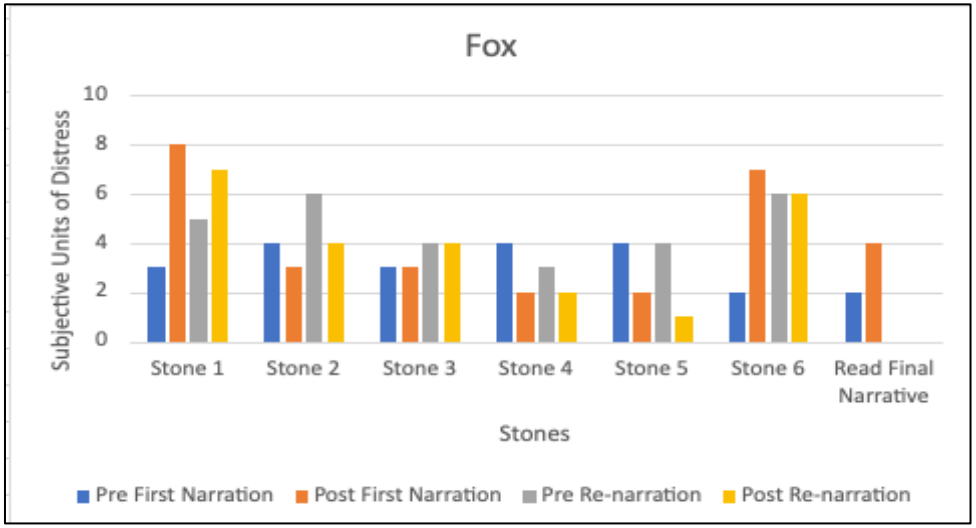


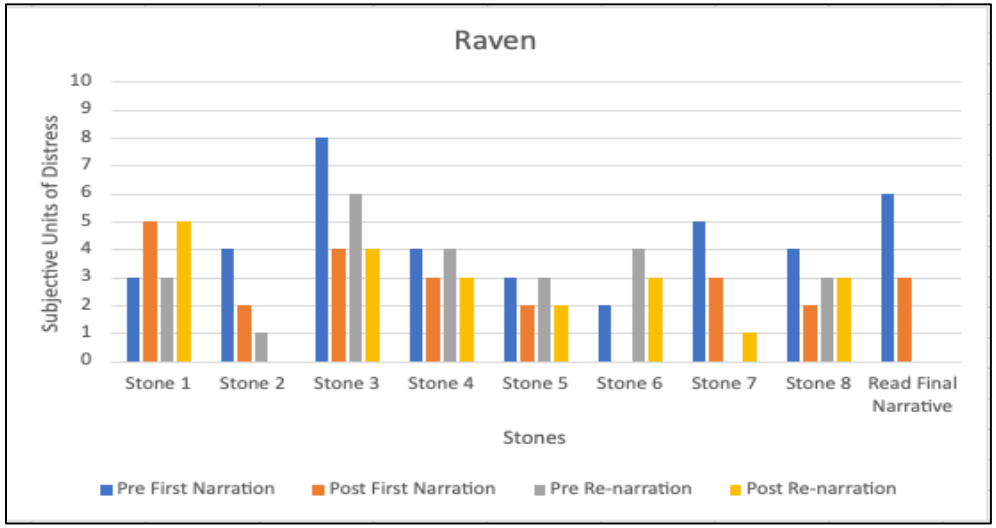


Notes. HR = Heart Rate. HRV= Heart Rate Variability. rMSSD= Root Mean Square of Successive Difference (rMSSD) a measure of HRV.

Figure 11

Participants Subjective Units of Distress Before and After Narration and Re-narration in Following Session





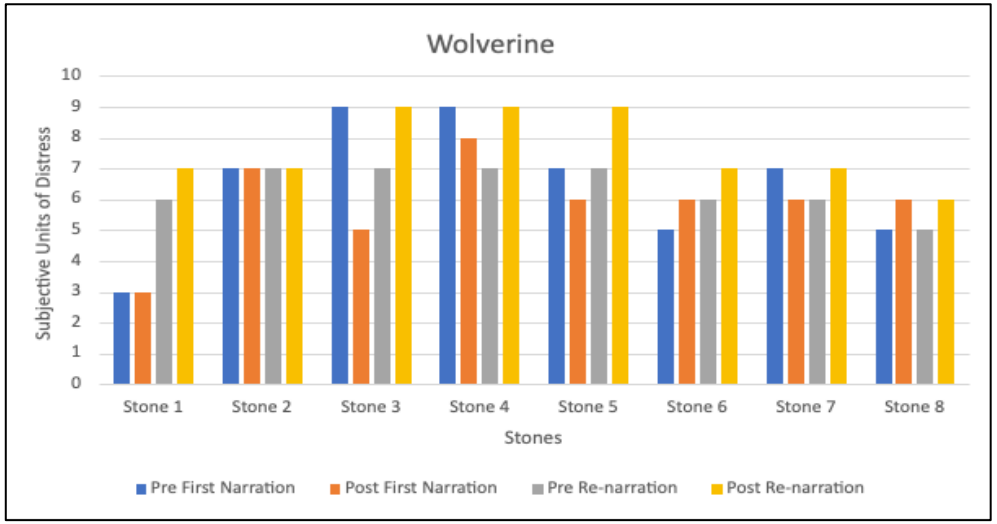
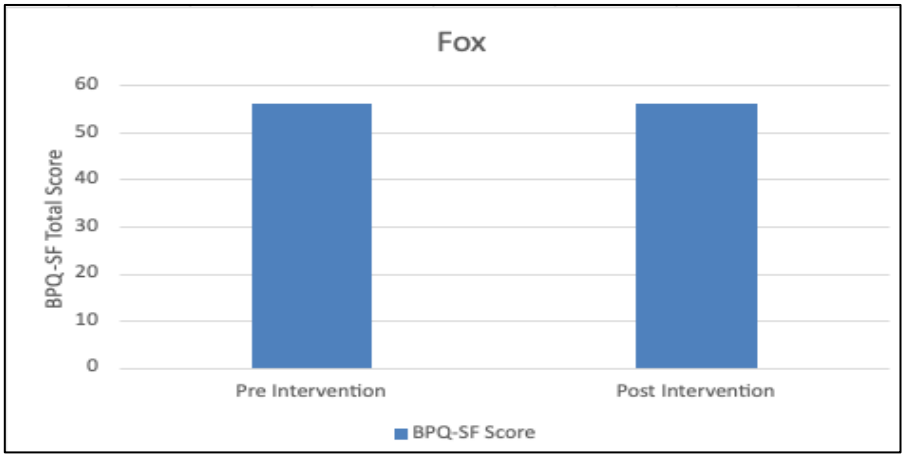
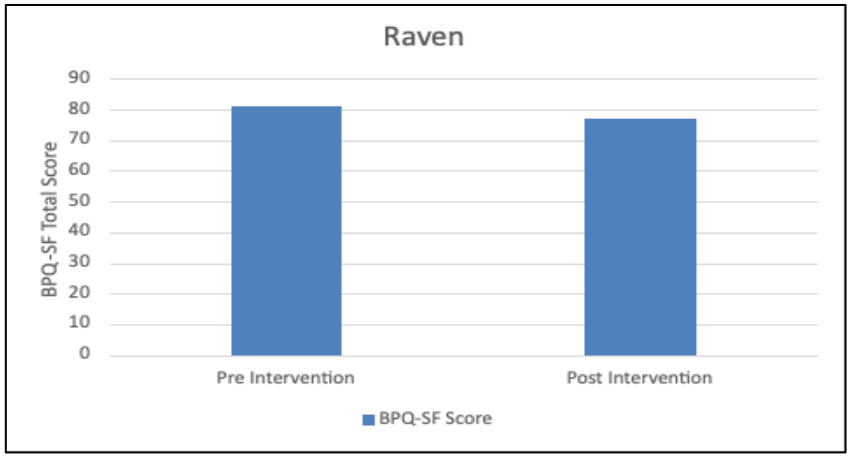
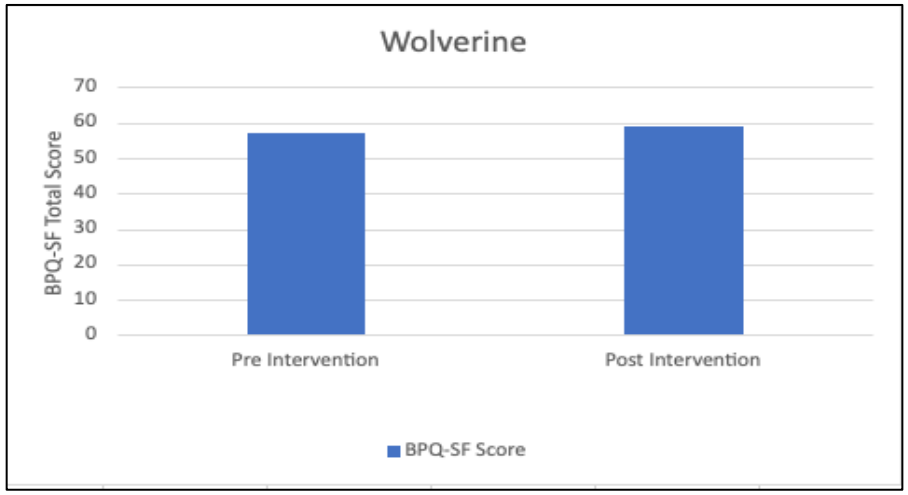


Figure 12

Participants Body Perception Questionnaire Short Form Total Scores Before and After Intervention







Notes. BPQ-SF= Body Perception Questionnaire Short Form

Autobiographical Integration[34]

Visual displays of participants narrations are displayed in Figure 13, 14, 15 showing ABMI, Figures 16, 17, 18 fragmentation and disorganisation, and Figure 19 total word count.

Fox completed six sets of narrations showing increases in vividness and sensory details (SD) five times, and fragmentation four times. There were decreases in time and place details (TPD) and disorganisation five times, and emotional distancing (ED) four times. The criteria for narrative coherence (NC) were not met on any narration, and total word count (TWC) increased and decreased the same amount.

Raven completed eight sets of narrations showing increases in vividness and SD seven times. TPD decreased five times, ED six, disorganisation, and TWC seven. Fragmentation increased and decreased the same amount, and the criteria for NC was met once.

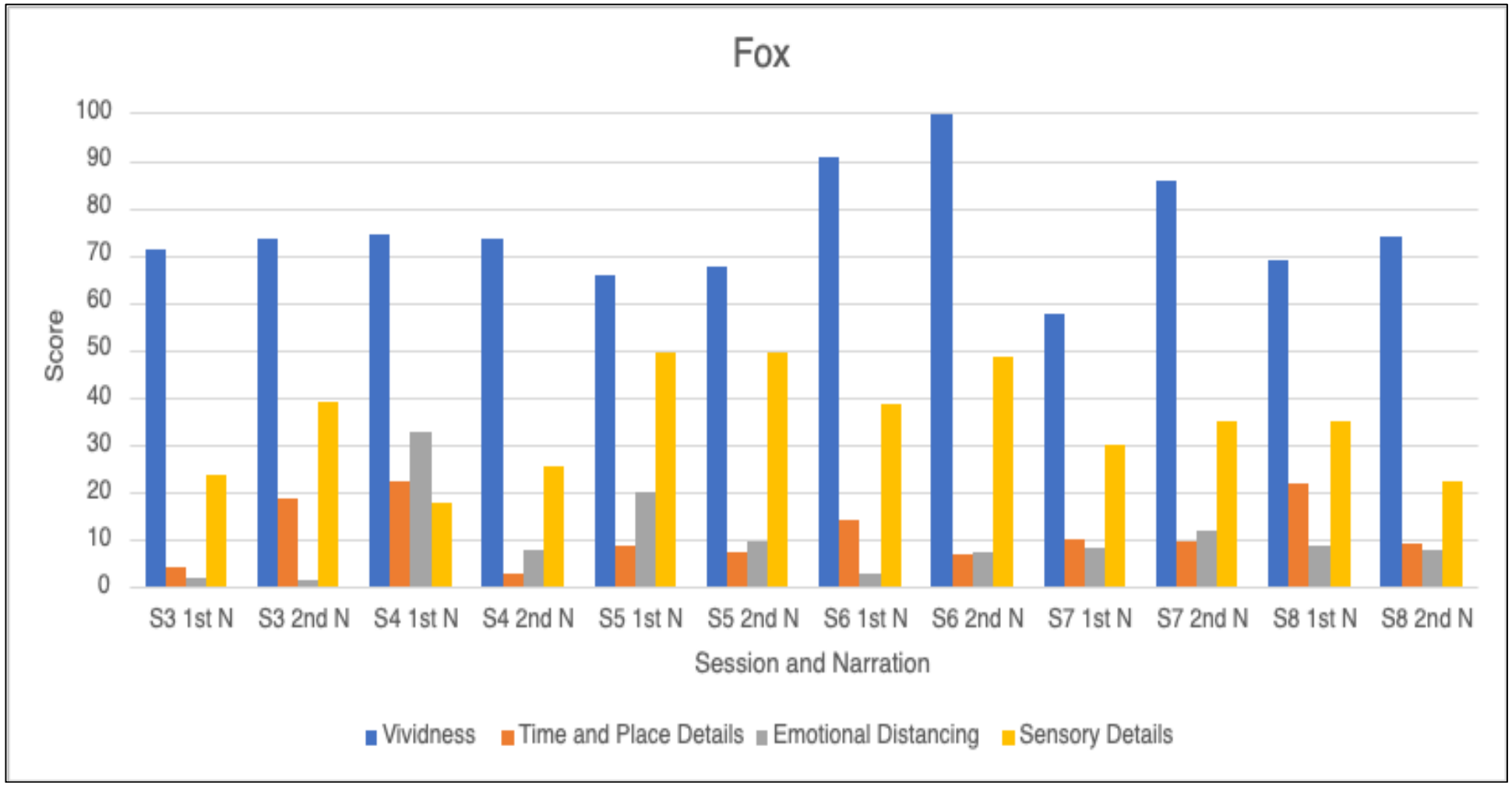
Wolverine completed eight sets of narrations showing increases in vividness and SD seven times, TPD six, and ED five. There were decreases in disorganisation six times, and fragmentation five. NC was met on half of the sessions, and TWC increased and decreased the same amount.

For all participants throughout therapy, there were increases in vividness, SD, and decreases in disorganisation. Two participants had consistent decreases in TPD, ED, and NC. There were mixed results regarding fragmentation as one participant had a decrease across sessions, one an increase, and one had the same number of increases and decreases. For TWC, two participants had the same amount of increases and decreases, whereas only one experienced consistent decreases.

34 See extended paper section 4.10 for information on ABMIA.

Figure 13

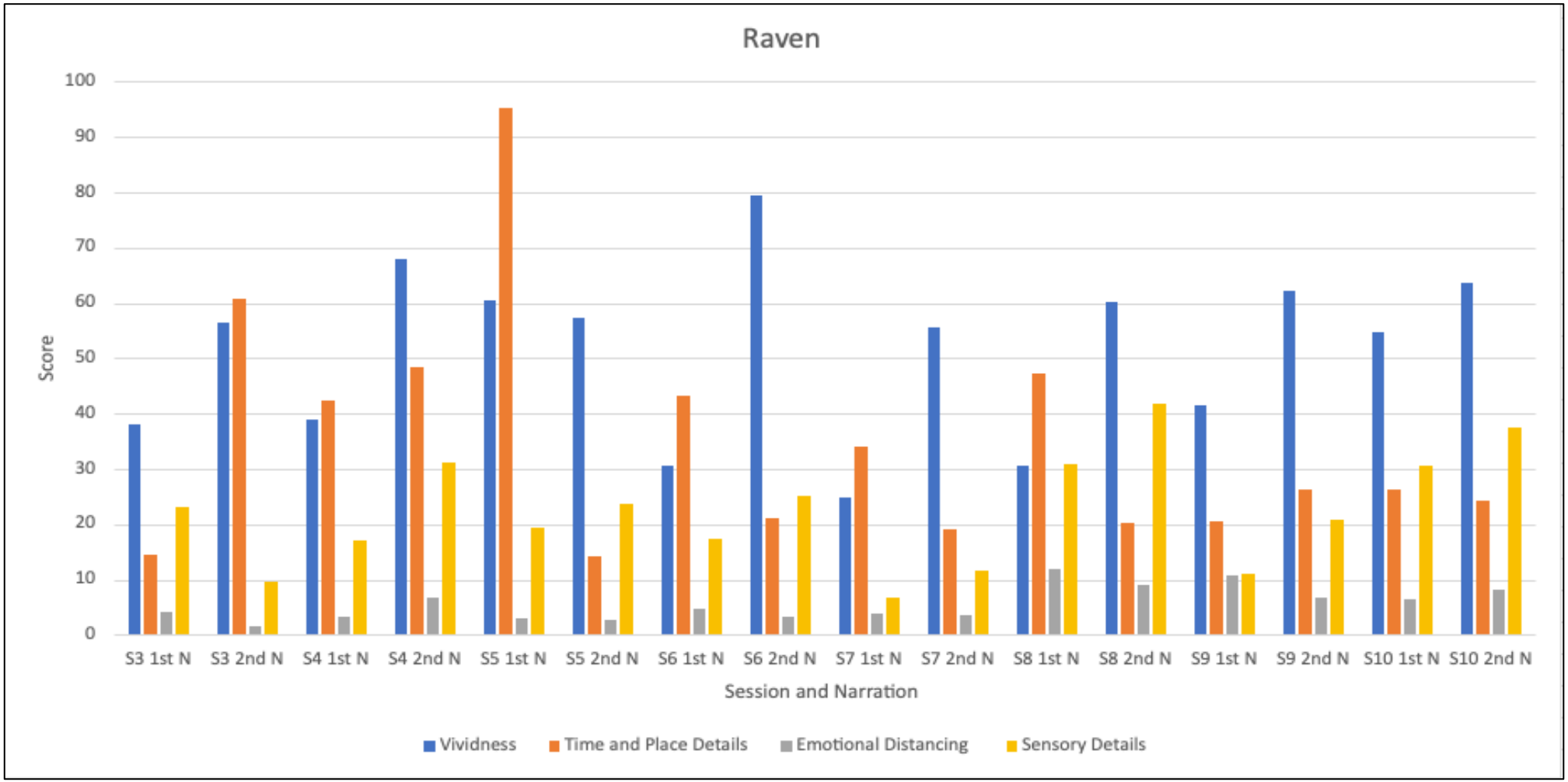
Fox's Overall Scores of Autobiographical Memory Integration



Notes. N=Narration, S= Session, 4-week gap between session 5-6 for Fox

Figure 14

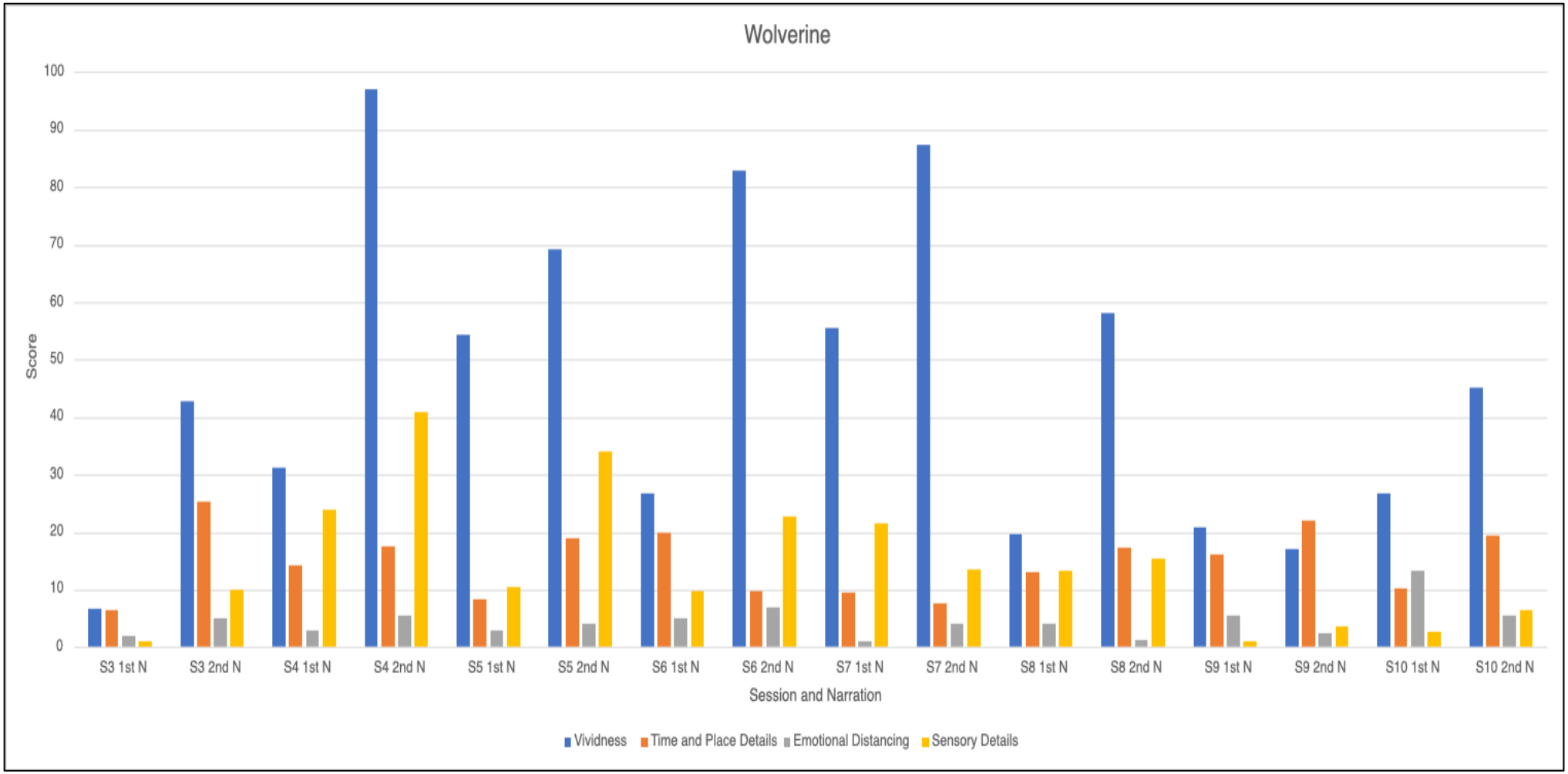
Raven's Overall Scores of Autobiographical Memory Integration



Notes. N= Narration, S= Session

Figure 15

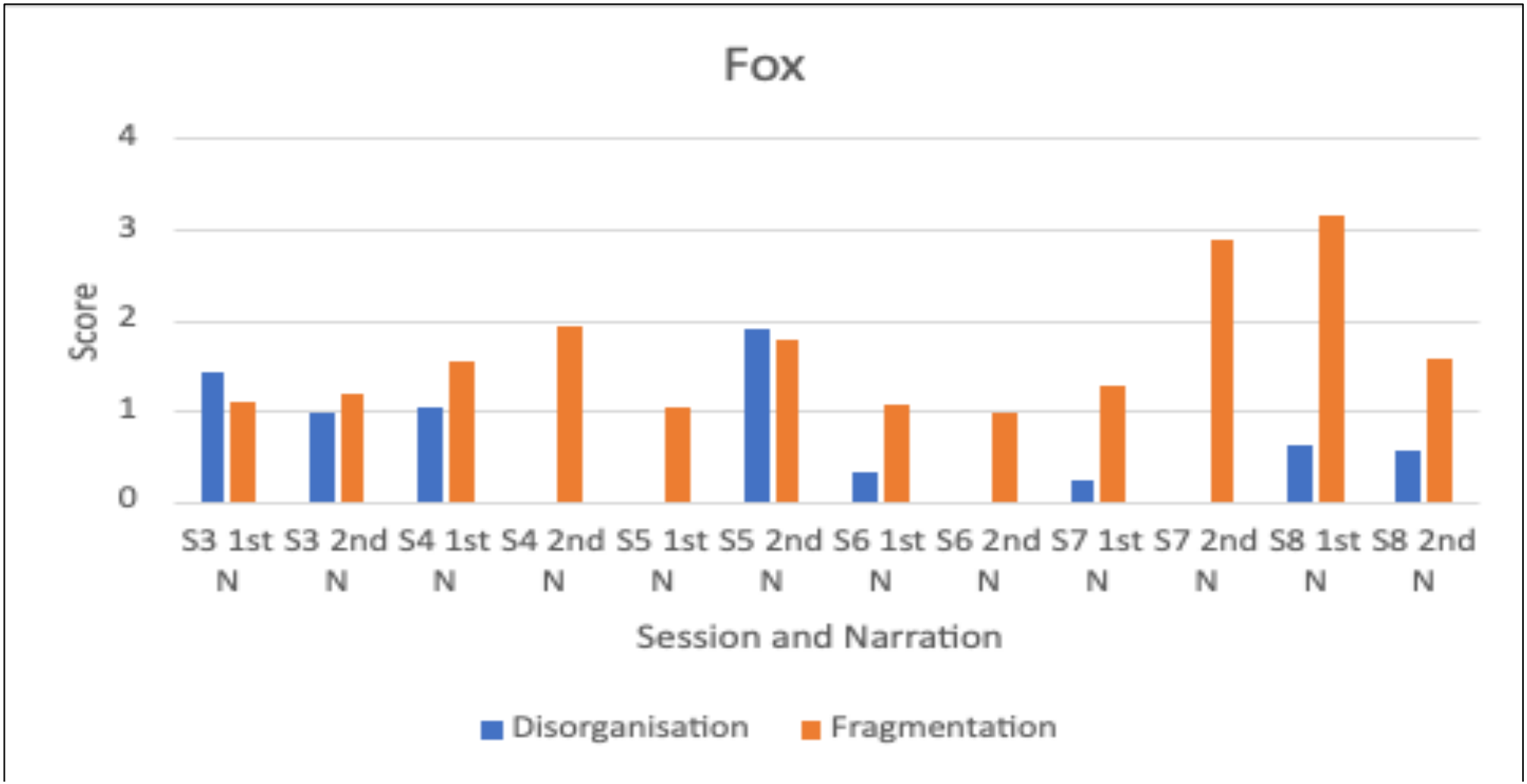
Wolverine's Overall Scores of Autobiographical Memory Integration



Notes. N= Narration. S=Session

Figure 16

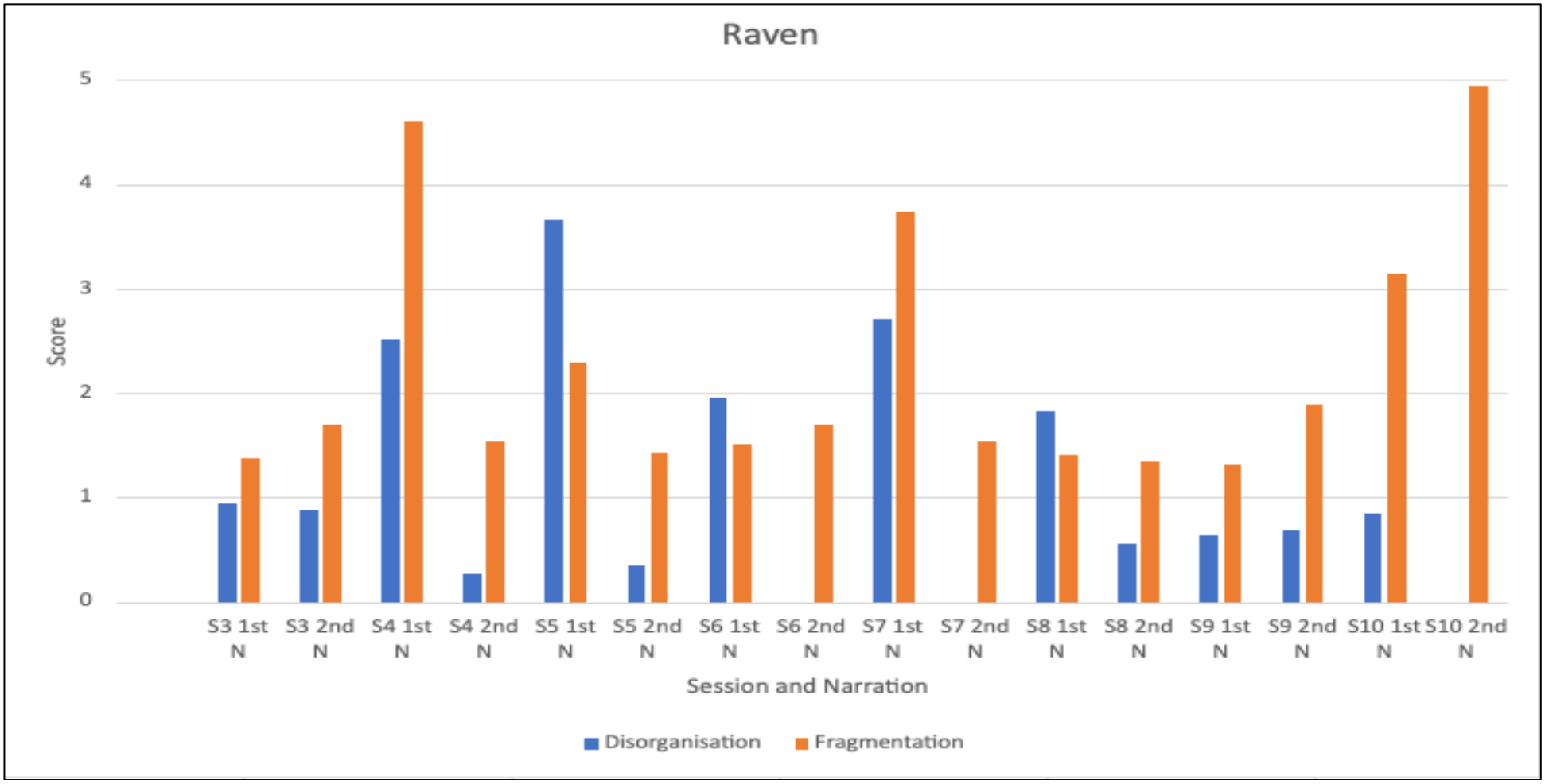
Fox's Disorganisation and Fragmentation Scores



Notes. N= Narration, S=Session

Figure 17

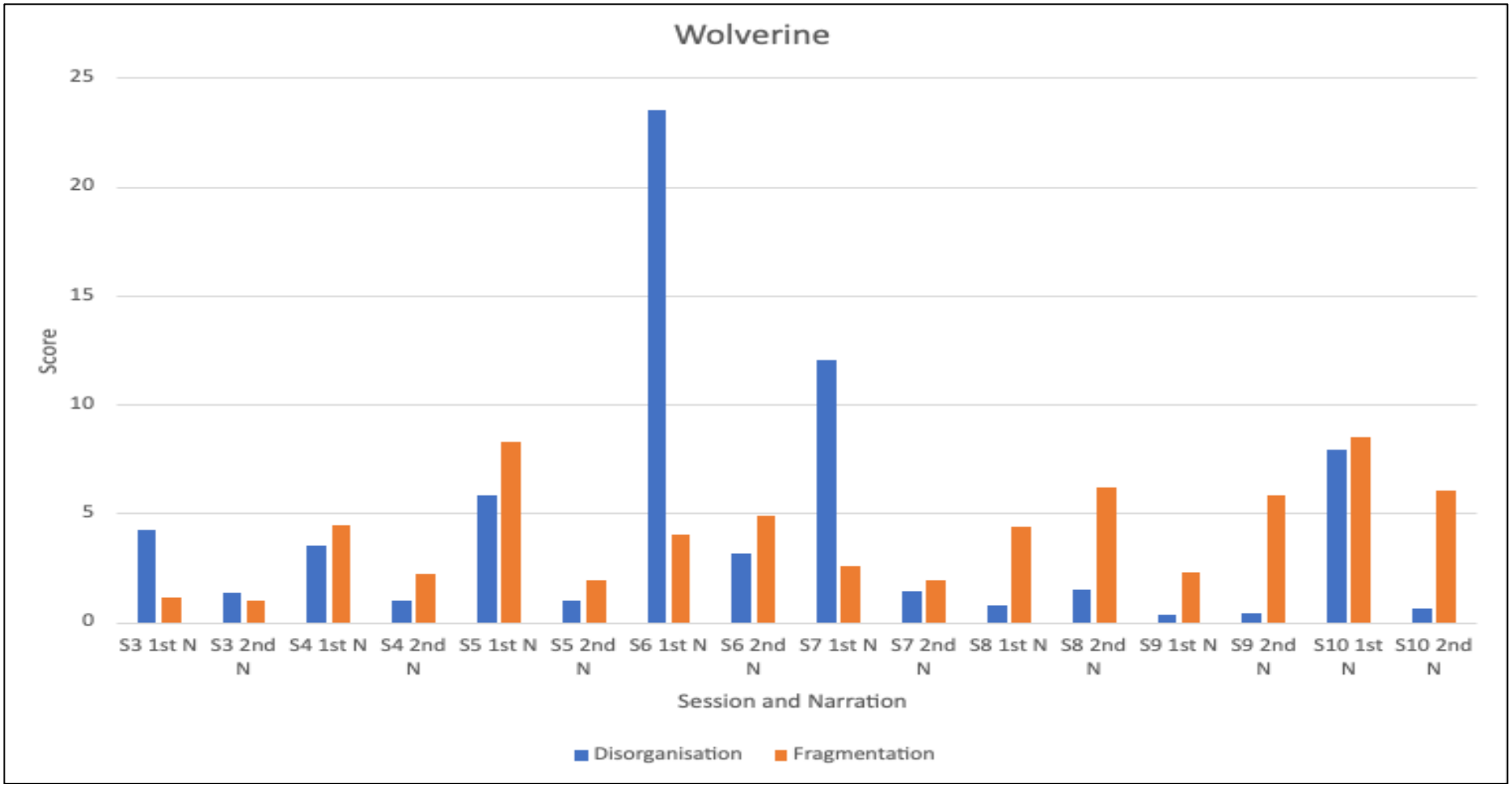
Raven's Disorganisation and Fragmentation Scores



Notes. N= Narration, S=Session

Figure 18

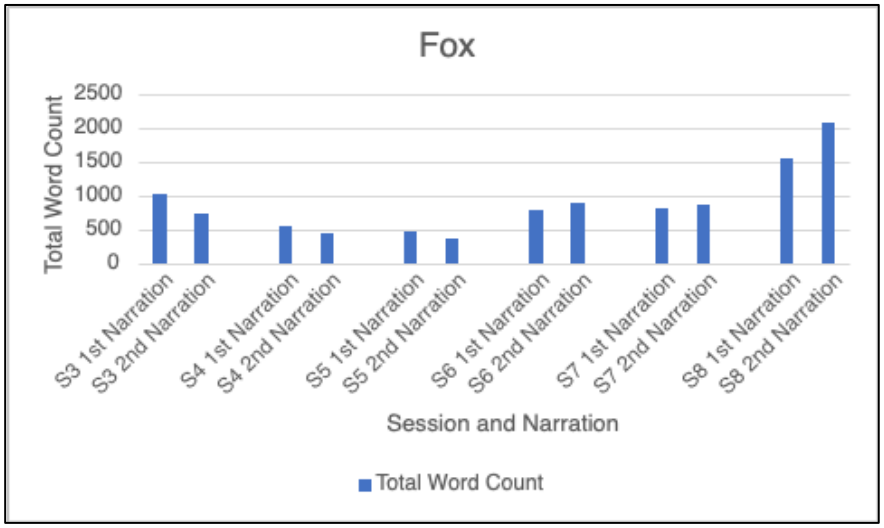
Wolverine's Disorganisation and Fragmentation Scores

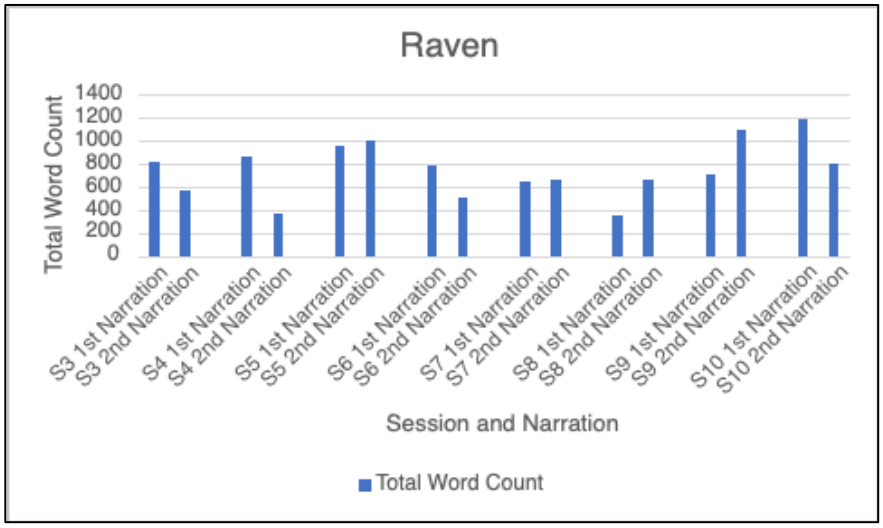


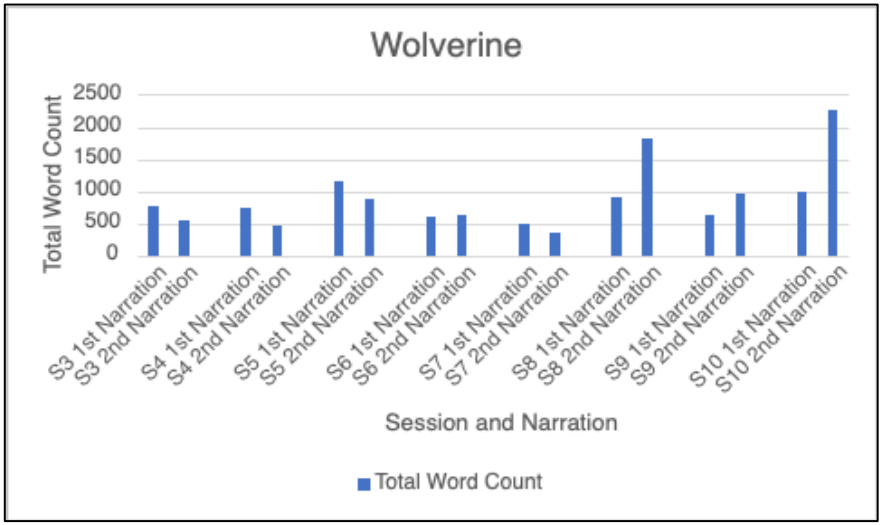
Notes. N= Narration, S=Session

Figure 19

Participants Total Word Count







Notes. S= Session, 4-week gap between session 5-6 for Fox

Change Interviews[35,36]

All three participants took part in the interviews, identifying positives and negatives of therapy. Positives included nightmares reducing for Raven, Fox feeling more motivated, and Wolverine approaching things previously avoided. Negatives included two participants feeling worse after difficult sessions and engaging in self-harm. All participants said hearing their previous sessions narrative read back to them was difficult, with one commenting they tried to mentally avoid it. When speaking about trauma two participants commented how hard it was, with one saying they tried to skip certain stones. When participants spoke about the process of therapy, all said it was *"difficult"*, but two commented on how it was easier to speak or hear about their traumas as therapy progressed, with Wolverine saying, "*narrating it again… tucked away a little bit of the power behind it".* Specific to NET both participants who had their whole narrative re-read to them in their final session said how hard it was, and there were positives and negatives to the structure and time-limited nature of NET. All participants noted positive experiences of the psychoeducation element including having greater insight into symptoms and dissociation. One participant liked the aspect of flowers and having them narrated. One participant felt it was not always relevant to discuss stones regarding bereavement. The participants who had experienced other trauma therapies described NET as better as it was more structured, scaffolded, and for one of them this meant they had to talk about the trauma instead of avoiding it. All participant's attributed their positive changes due to therapy, but also commented on the therapeutic relationship, friends, family, hobbies, and being more ready for therapy. It appeared NET was acceptable to participants, with the only critique being to include more sessions.

Regarding memory vividness, one participant commented that NET was a detailed therapy. Two participants believed they already had detailed memories of the events prior but commented on how narration helped them to remember more details of the events such as room layout, colours, and patterns. One participant commented on SDs stating they were not able to smell or feel things physically but were able to feel emotions and paint a good visual picture. Fox and Raven spoke

35 See extended paper section 4.11 for change interview data.
36 See extended paper section 4.12 for summary results for each participant.

about their difficulties when recalling TPDs, indicating they had a fragmented recall of context and order. Raven frequently said it was difficult to remember events especially when young, and dates were *"topsy turvy".* Fox commented saying *"So I remember all the details of my memory really well….., but I don't remember the times and dates or the seasons very well".* Despite this, Fox said narration helped to add *"a timeline"*, making memories have a clearer order.

Discussion

This study primarily investigated the ABMI, and exposure and habituation change mechanisms of NET. Secondary aims explored the potential effectiveness of NET+ in treating PTSD, general psychological distress, and the participant's views of NET+ and its acceptability and feasibility.

Mechanisms of Change

The increase in vividness and SD across therapy for all participants indicates new information was integrated into memories, supporting the role narration plays in memory consolidation. Two participants identified narration helped to remember more details such as room layout, colours, and patterns, resulting in higher vividness scores. The role of vividness could be explained by El Haj et al. (2017) who found emotional ABMs had more visual imagery (vividness) than neutral ones, reflecting two of the participants' comments stating they had detailed memories of events prior to any intervention which could be due to them being emotional memories. The finding that vividness increased after narration suggests participants were able to describe clearer, detailed, and specific visual images to the therapist. D'Argembeau and van der Linden (2006) found vividness predicts the level of SD, explaining why both increased throughout therapy. The only participant who commented on SD said they were not able to smell or physically feel things, but consistently produced narrations with more SD on recall. Further support comes from Vannucci et al., (2020) who found when using self-report measures, higher levels of visual object imagery were associated with higher levels of SD. The findings from this study support Vannucci et al. (2020), as this is shown qualitatively and appears to be part of the process of NET[37].

37 See extended paper section 5.1 for further discussion of ABMI.

Schauer et al. (2011) suggested people have vivid recollections of traumatic memories including many SD. It may have come as a surprise SD increased, as one may have assumed participants' first narrations would be full of sensory and emotional information. The study's findings regarding vividness and SD may explain this, as research has found when people recall traumatic memories, they are distanced and less emotionally intense (Libby & Eibach, 2002; Thompson et al., 1996). This study found ED scores reduced for two participants, meaning their second narrations were less distanced, including more emotion; Vannucci et al. (2020) found more vivid memories had stronger experiences of emotional reliving. This study supports Vannucci et al. (2020), because as participants' accounts become more vivid, they had stronger emotional experiences. The study also supports Foa et al. (1995) who found the percentage of feelings increased in trauma narratives at the end of therapy. The one participant who did not show an improvement in trauma symptomatology had increases in ED, meaning their accounts became more distanced, including less emotion. Jaeger et al. (2014) found the more emotional words displayed in trauma narratives were associated with lower PTSD symptoms. Therefore, the study's findings of ED decreasing may be explained by the person successfully processing the emotion of the event (Foa & Kozark, 1986), supporting the conversational exposure and habituation change mechanism of NET. Narration may have helped participants experience exposure and habituation and stay present (i.e., little avoidance/dissociation) while recalling and integrating more sensory and emotional information into memories, subsequently recalling more autonoetic information in their re-narrations.

People with PTSD find it difficult to narrate traumatic events in a coherent and chronological manner (Burke et al., 1992; Lane et al., 2015; Schauer et al., 2011), and NET focuses on ABMI by adding contextual information into the fear network (Schauer er al., 2011). Therefore, it was surprising to find TPDs decreased consistently for two participants. One participant experienced more increases in TPD; however, it appeared they became socialised to the model, potentially demonstrating practice effects. The findings from this study would not support NET's claims regarding contextual details being a key aspect of ABMI as a mechanism of change. The two participants who consistently showed decreases in TPD were those

who improved, showing a reduction in trauma symptomatology. Both participants commented on how hard it was to recall dates and times especially while young, while one commented NET added a timeline, they consistently showed decreases in TPD. The decreases in TPD may be explained contextually by the population sampled in the study. NET was developed with refugees and asylum seekers, whereas this study sampled people who have experienced repeated instances of trauma while young. Therefore, it may be easier for a refugee or asylum seeker who has experienced multiple events in adulthood to recall TPDs, than a person who has experienced multiple events since childhood. It could be that NET gave participants a better contextual lifeline, but they did not vocalise it repeatedly during re-narrations, resulting in lower ABMICT scores. Decreases in TPD may be explained by Foa et al. (1995) who found action and dialogue utterances decreased in trauma narratives at the end of therapy. Action utterances would be scored under TPD of the ABMICT, whereas dialogue utterances represent vividness. Foa et al. (1995) suggested this was due to a shift in focusing on processing emotions and meaning as opposed to detail. Foa et al.'s (1995) findings may be explained as they used an intervention called reliving, involving asking the person to repeatedly expose themselves to the memory while engaging with it emotionally. In contrast, NET uses conversational exposure to enquire about autonoetic experiences and cognitions, while asking questions to organise the memory in time and place. Therefore, in NET one would expect TPD to increase, and as the two participants who saw reductions in trauma symptomology had decreases in TPD, this may suggest NET works on different principles than it proposes. For Wolverine, as ED and TPD increased, by focusing on adding TPD it may limit emotional engagement, potentially explaining the smaller reduction in trauma symptomology. According to fear network theory, trauma symptomatology should only decrease once traumatic events are contextualised and integrated into ABM (Elbert & Schauer, 2002; Elbert et al., 2015), which was not the case in this study. The study's findings suggest NET works on the principles of exposure and habituation, and change may result from focusing on emotional, sensory, and visual imagery as opposed to contextual details.

Regarding the structure of narratives, there were mixed results for fragmentation as one participant had a decrease across sessions, another an increase, and another the same amount of increases and decreases. These findings contradict

existing literature which found decreases in fragmentation (Foa et al., 1995), but agree with Brewin (2016) who suggested the evidence on traumatic memories becoming less fragmented and more coherent is mixed. Foa et al.'s findings that reductions in fragmentation are related to recovery are challenged, as recent research has found fragmentation does not decrease with successful treatment (Bedard-Gilligan et al. 2017; Desrochers et al. 2016). Increases in fragmentation may be due to re-narration integrating the most frightening moments into memory (Brewin, 2016), where prior to exposure participants may have avoided it, so when spoken about the second time the narration was more fragmented. These findings question the role of fragmentation and support Jaeger et al. (2014), who suggested the content of trauma narratives is more important than structure, as the one participant who consistently showed decreases in fragmentation was also the one who had little change in trauma symptomology. Disorganisation decreased across narrations for all participants, meaning they were less confused, repeated phrases less, and sentences were more coherent. For TWC, two participants had the same amount of increases and decreases, whereas one experienced consistent decreases. This would contradict Gray and Lombardo's (2001) finding that trauma narratives became shorter and less fragmented as treatment progressed, which was not the case in this study, as the participant who showed consistent decreases in TWC experienced mixed results regarding fragmentation. Increases in TWC can be explained by Foa et al. (1995) who found narratives increased as people were more willing and able to talk about their trauma. This study found TWC varied throughout treatment and most participants' accounts did not become more NC.

There were mixed results regarding within session habitation (WSH). One participant who had a RC in the IES-R did not experience WSH often. As two participants did not complete therapy, strong evidence cannot be provided for the exposure and habitation mechanism of change for NET; however, both commented on experiencing habituation via exposure in the CI. The one participant who completed therapy, experienced WSH the most, seeing a RC&CSC in IES-R score, supporting NET's claims that habituation results from exposure (Schauer et al., 2011)[38]. However, all participants saw increases in HRV at the start and end of therapy and gradual increases in it between sessions, potentially reflecting between session habituation (BSH). The gradual increases in HRV may reflect that BSH

38 See extended paper section 5.2 for further discussion of exposure and habituation.

occurs in the hours and days following processing a traumatic event, which may be explained by the process of memory reconsolidation. Comparing discrepancies between SUDs and heart data would support Annett's (2002) critique of subjective measures, and support Frustaci et al.'s (2010) claims to use objective measures.

Clinical Effectiveness

Two participants showed improvements in PTSD, with one having a RC, another a RC (via sensitivity analysis) and CSC and moving from PTSD being a clinical concern to non-clinical. However, one did deteriorate at FU which may have been explained by an external event. DC analysis reflected only one showing a treatment effect; however, all three participants were below the baseline mean trend at FU. However, only relying on the DC may hide small effects. When analysing effect sizes, one showed a debatable effect with two showing moderate-good results. Kratochwill et al. (2010) and Lobo et al. (2017) state for an SCD to be considered replicable effects of the intervention need to be demonstrated three times, which is not the case for this study. This is not surprising when explained contextually as only one participant completed a whole course of therapy[39].

Fear network theory proposes multiple traumas build stronger sensory perceptual-emotional representations in the network, and as the level of trauma accumulates it weakens the connections with contextual information increasing symptoms of trauma (Elbert & Schauer, 2002; Elbert et al., 2015; Foa & Kozack, 1986; Lang, 1979). For trauma symptoms to decrease the sensory perceptual representations of traumatic events need to be contextualised, and integrated into ABM (Elbert & Schauer, 2002; Elbert et al., 2015) meaning symptoms should only reduce once all traumas are processed. The current study found mixed support for this theory as participants' IES-R scores fluctuated throughout therapy; however, one common experience was participant's IES-R scores increasing when discussing salient traumas. Two participants did not complete therapy and needed extra sessions to continue processing their lifelines, but showed reductions in IES-R scores from the start to the end of the study, which may suggest symptoms of trauma can reduce without processing the whole fear network. For the one participant who completed therapy and processed their whole lifeline their IES-R

39 See extended paper section 5.3 for further information on the clinical effectiveness and IES-R

scores generally reduced throughout the intervention phase, but the two biggest reductions in IES-R scores coincided with processing salient traumas, which may support the theory of having to decommission the whole fear network to reduce symptoms significantly. Participants' scores increased between sessions when expecting to discuss salient traumas as participants often commented on knowing what trauma was next on the lifeline. Larsen et al. (2016) found people experienced exacerbations of trauma symptoms throughout therapy; however, they were unsure if this was related to exposure treatment. The current study suggests the process of trauma therapy and expectation of having to speak about salient events temporarily increased symptoms, as participants commented on feeling bad days after sessions. The exacerbation of symptoms in anticipation of discussing upcoming traumas may be specific to NET due to the lifeline increasing awareness of upcoming stones. This seemed to be the case for the male participant who withdrew from the study, explaining he did not want to discuss one and asked to skip it.

Research has shown NET has positive impacts on areas such as depression (Lely et al., 2019; Raghuraman et al., 2021). This study found a treatment effect in general psychological distress for two participants, a RC in anxiety and CSC in stress for one, with small reductions in depression, stress, and anxiety for the other participants. The reductions in areas other than trauma may be explained by the building block effect, as when people experience multiple traumas, they can integrate experiences such as fear and hopelessness into the fear network (Schauer et al., 2011). When analysing effect sizes of general psychological distress, one participant had a debatable treatment effect with two showing moderately effective treatment effects. Claims of NET's effectiveness in treating general psychological distress cannot be made due to the findings not demonstrating effectiveness across three participants (Kratochwill et al., 2010 & Lobo et al., 2017). However, as there were some improvements in secondary outcomes for some participants further research into NET as a mediating factor for other conditions (Schauer et al., 2011) is warranted, as the SMA analysis for two participants found reductions in stress and not depression[40].

40 See extended paper section 5.4 for further information on the clinical effectiveness of secondary outcomes.

Strengths and Clinical Implications

To the researcher's knowledge, this is the first study to look at how ABM changes qualitatively through trauma therapy and has led to the development of an ABMI measure which did not exist before. Despite two participants not completing therapy, it adds insight into how therapies for CPTSD can feasibly be delivered within the UK healthcare system. Participants commented positively on the structure, and routine, and length of sessions of NET; however, sessions often went over the suggested 90-minute length (Schauer et al., 2011), lasting between 120-180 minutes. The only adaption and negative critique of the structure of NET came from one participant who repeatedly stated they believed more than 12 sessions were needed and setting a 12-week limit on it initially scared them, as they believed they would not be able to build a trusting therapeutic relationship. The above insights would suggest NET at present cannot be delivered in UK secondary care services. The population accessing UK secondary care services have long and enduring mental health conditions which require intensive and long-lasting support, and the recruitment site offers weekly one-hour sessions for up to 6 months. To fit this population's needs, the NET protocol requires adaptation to be longer than 12 sessions. NET does not have a stabilisation phase and as two participants restarted self-harming, adapting the protocol to include one would be prudent. Self-harm was managed in the study by the practitioner discussing various techniques to manage it, and by completing thorough risk assessments every session. Changes in service delivery need to happen to be able to offer longer sessions in order to create a lifeline and appropriately process a stone and avoid potential harm to patients[41].

Limitations and Future Research

One limitation was the one-week FU period impacting the validity of any claims of NETs effectiveness in treating PTSD and general psychological distress. A longer

41 See extended paper section 5.5 for further information on the clinical implications of the study.

FU period would have allowed for stronger conclusions, as people generally report feeling best a year after completing NET (Schauer et al., 2011). The use of the IES-R impacts the validity of the study, as changing the wording of questions impacts the validity of the measure. There is an urgent need to develop a measure which assesses the impact of multiple events and reductions in CPTSD. Issues with technology meant heart data could only be captured at the beginning and end of the sessions, resulting in not being able to examine the heart data as deeply as initially intended[42]. Regarding interpretation of the results, as the analysis was conducted by the researcher who was also the clinician, there is the chance this could increase bias. However, to combat this, the analysis and interpretation were overseen by the chief investigator, and statistical methods of analysis were employed where possible to reduce bias.

As the ABMICT measures ABM it assesses latent constructs that are not naturally observable. An area for future research would be to develop the ABMICT and evidence its psychometric properties. To design valid measures of latent constructs requires they undergo the process of construct validation (Hussey et al., 2020; Loevinger, 1957). The first stage of construct validation is called the substantive phase, which requires the researcher to define the construct and determine how it will be assessed, whilst ensuring the scale is relevant and coherent. During the second phase, called the structural phase, the structure of the construct is developed, and the measure's psychometric properties are tested. The final phase, called the external phase, includes assessing if the measure represents the construct through checking its convergent and discriminant validity, which can be done by comparing it against other measures (Hussey et al., 2020; Loevinger, 1957). The ABMICT needs to have its inter-rater reliability and validity tested and undergo the structural and external phases to further develop it. As the ABMICT has only undergone the substantive phase meaning it is unvalidated, this leads to difficulty in interpreting the results and relating this to theory. Using an unvalidated tool which has only undergone the substantive phase, can lead to unfounded theoretical conclusions (Hussey et al., 2020; Loevinger, 1957). The ABMICT's theoretical basis and psychometric properties need to be examined further to allow the results of the

42 See extended paper section 5.6 for further information for recommendation of future research and heart data.

current study to be externally validated and to continue testing the theory of ABMI. Following refinement of the ABMICT it could then be used with a sample who can complete therapy to see if certain ABM phenomenological constructs relate to recovery, potentially allowing therapies to be tailored to tap into certain ABM constructs[43].

Further limitations include the study design and adapting the NET protocol. The primary aim of the study was to assess the ABMI as a mechanism of change within NET. To do this the NET protocol was adapted, which may have impacted the intervention's effectiveness. Effectiveness of the intervention was measured in the study for ethical reasons to ensure that participants' wellbeing was being monitored, and to see if changing the intervention impacted its effectiveness with CI gathering people's thoughts on the intervention. However, the by-product of doing so was the study provided much needed research into the effectiveness of an adapted NET protocol in a UK sample. If further research into the effectiveness of NET in the UK was wanted a different study methodology could be adopted. When looking at creating complex interventions the stages of them can be split into four: development/identification of the intervention; feasibility; evaluation; and implementation (Skivington et al., 2021). SCDs can look at whether novel interventions are potentially effective and feasible to develop theory, thereby answering the question of whether an intervention will be helpful for an individual.

SCDs are at the lower end of the hierarchy of evidence (Brighton et al., 2003; Morley, 2017). If SCDs show that an intervention is potentially effective it can be evaluated and move up the hierarchy to being used in group designs such as RCTs, which can demonstrate effectiveness on a larger scale (Brighton, 2003; Morley, 2017; Skivington et al., 2021).Therefore, to address the limitation of the current study and to gather more evidence on if NET is effective with the UK Step 4 population, further SCDs could be completed. If NET was found to be potentially effective, group design such as RCTs could be used with NET being compared against existing trauma therapies.

43 See extended paper section 5.6 for further information on the critique of the ABMICT and suggestions for future research.

Conclusion

Claims about NET's effectiveness in treating CPTSD and general psychological distress cannot be made, as the study only demonstrated effects in both areas for two participants instead of the three stipulated by Kratochwill et al. (2010) and Lobo et al. (2017). This may be explained contextually as only one participant completed therapy, potentially demonstrating that changes in the NET protocol are needed to make it applicable to secondary care services within the UK. Participants experienced varying degrees of habituation, but the study provides tentative support for the mechanism of exposure and habituation within NET. NET appeared to be a difficult but acceptable therapy for participants. This study does not support NET's claims of ABMI as a mechanism of change. The results suggest focusing on ABMI areas such as TPD, and structural indices such as fragmentation and coherence in trauma-focused therapies may not be prudent. The study would support Jaeger et al.'s (2014) claims of what people say (e.g., content) is more important than how they say it (e.g., structure), and suggest trauma therapies focus on ABMI areas such as vividness, sensory and emotional details to facilitate change. However, the coding tool's reliability and validity need to be tested and applied to a group of people who can successfully complete therapy to substantiate these claims. Research with a set of people who complete therapy would also help to examine NET's effectiveness within this setting.

Journal Paper References

American Psychiatric Association. (2013). *Diagnostic and statistical Manual of mental disorders. (5th Ed.).* https://doi.org/10.1108/rr-10-2013-0256.

Annett, J. (2002). Subjective rating scales: Science or art? *Ergonomics, 45*(14-15), 966–987. https://doi.org/10.1080/00140130210166951

Bares, C. B., Andrade, F., Delva, J., & Grogan-Kaylor, A. (2011). Examining the factor structure of anxiety and depression symptom items among adolescents in santiago, chile. *Journal of the Society for Social Work and Research, 2*(1), 23–38. https://doi.org/10.5243/jsswr.2011.1

Barlow, D.H., Nock, M.K., & Hersen, M. (2009). *Single case experimental design: Strategies for studying behaviour change* (3rd ed.). Pearson Education Inc.

Barrett, L. F., Mesquita, B., Ochsner, K. N. & Gross, J. J. (2007) The experience of emotion. *Annual Review of Psychology, 58,* 373–403. https://doi.org/10.1146/annurev.psych.58.110405.085709

Beck, J. G., Grant, D. M., Read, J. P., Clapp, J. D., Coffey, S. F., Miller, L. M., & Palyo, S. A. (2008). The Impact of Event Scale-Revised: Psychometric properties in a sample of motor vehicle accident survivors. *Journal of Anxiety Disorders*, *22*(2), 187-198. https://doi.org/10.1016/j.janxdis.2007.02.007

Bedard-Gilligan, M., Zoellner, L. A., & Feeny, N. C. (2017). Is trauma memory special? Trauma narrative fragmentation in PTSD: Effects of treatment and response. *Clinical Psychological Science*, *5*(2), 212-225. https://doi.org/10.1177/2167702616676581

Bigger, J. J., Fleiss, J., Rolnitzky, L., & Steinman, R. (1992). Stability over time of heart period variability in patients with previous myocardial infarction and ventricular arrhythmias. The CAPS and ESVEM investigators. *American Journal of Cardiology, 69*(8), 718-723. https://doi.org/10.1016/0002-9149(92)90493-i

Bisson, J. I., Cosgrove, S., Lewis, C., & Robert, N. P. (2015). Post-traumatic stress disorder. *BMJ (Clinical research ed.)*, *351*. https://doi.org/10.1136/bmj.h6161

Borckardt, J. J., Nash, M. R., Murphy, M. D., Moore, M., Shaw, D., & O'Neil, P. (2008). Clinical practice as natural laboratory for psychotherapy research: A guide to case-based time-series analysis. *American Psychologist, 63*(2), 77-95. https://doi.org/10.1037/0003-066X.63.2.77.

Bornstein, M. H., Jager, J., & Putnick, D. L. (2013). Sampling in developmental science: Situations, shortcomings, solutions, and standards. *Developmental Review: DR*, *33*(4), 357–370. https://doi.org/10.1016/j.dr.2013.08.003

Boyacioglu, I. & Akfirat, S. (2015). Development and psychometric properties of a new measure for memory phenomenology: The Autobiographical Memory Characteristics Questionnaire. *Memory, 23*(7),1070-92. https://doi.org/10.1080/09658211.2014.953960

Brighton, B., Bhandari, M., Tornetta, P., & Felson, D. T. (2003). Hierarchy of evidence: From case reports to randomized controlled trials. *Clinical Orthopaedics and Related Research*, *413*, 19-24. https://doi.org/10.1097/01.blo.0000079323.41006.12

British Psychology Society. (2018) *Code of Ethics and Conduct.* British Psychological Society. Retrieved from: https://www.bps.org.uk/news-and-policy/bps-code-ethics-and-conduct

Brewin, C. R. (2016). Coherence, disorganization, and fragmentation in traumatic memory reconsidered: A response to Rubin et al. (2016). *Journal of Abnormal Psychology, 125*(7), 1011–1017. https://doi.org/10.1037/abn0000154

Brewin, C.R., Gregory, J.D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: Characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*(1), 210-232. https://doi.org/10.1037/a0018113

Brown, A., Fleetwood, S., & Roberts, J. M. (2002). The marriage of critical realism and Marxism: Happy, unhappy or on the rocks? In A. Brown, S. Fleetwood, & J. M. Roberts (Eds.), *Critical realism and Marxism* (pp. 1–22). Routledge.

Borckardt, J. J., Nash, M. R., Murphy, M. D., Moore, M., Shaw, D., & O'neil, P. (2008). Clinical practice as natural laboratory for psychotherapy research: a guide to case-based time-series analysis. *American Psychologist*, *63*(2), 77-95. https://doi.org/10.1037/0003-066X.63.2.77.

Burke, A., Heuer, F., & Reisberg, D. (1992). Remembering emotional events. *Memory & Cognition*, *20*, 277-290. https://doi.org/10.3758/bf03199665

Cabrera, A., Kolacz, J., Pailhez, G., Bulbena-Cabre, A., Bulbena, A., & Porges, S. W. (2018). Body Perception Questionnaire--Short Form. *PsycTESTS Dataset*. https://doi.org/10.1037/t84573-000

Cavanagh, S. (1997) Content analysis: Concepts, methods and applications. *Nurse Researcher,* 4, 5–16.

Cloitre, M. (2009). Effective psychotherapies for posttraumatic stress disorder: A review and critique. *CNS Spectrums, 14*(1), 32–43.

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, *4*, 10. https://doi.org/10.3402/ejpt.v4i0.20706

Cohen, H., Kotler, M., Matar, M., Kaplan, Z., Loewenthal, U., Miodownik, H., & Cassuto, Y. (1998). Analysis of heart rate variability in posttraumatic stress disorder patients in response to a trauma-related reminder. *Biological Psychiatry, 44*(10), 1054-1059. https://doi.org/10.1016/s0006-3223(97)00475-7

Cohen, H., Matar, M., Kaplan, Z., & Kotler, M. (1999). Power spectral analysis of heart rate variability in psychiatry. *Psychotherapy Psychosomatics, 68*(2), 59-66. https://doi.org/10.1159/000012314

Cole, F, L. (1988) Content analysis: Process and application. *Clinical Nurse Specialist*, 2(1), 53–57.

Crawford, J. R., & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, 42, 111–131.

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the impact of event scale revised. *Behaviour Research and Therapy*, *41*(12), 1489-1496.

Crumlish, N., & O'Rourke, K. (2010). A systematic review of treatments for post- traumatic stress disorder among refugees and asylum-seekers. *The Journal of Nervous and Mental Disease, 198*(4), 237–251. https://doi.org/10.1097/nmd.0b013e3181d61258

Cukor, J., Olden, M., Lee, F., & Difede, J. (2010). Evidence-based treatments for PTSD, new directions, and special challenges. *Psychiatric and Neurologic Aspects of War, 1208*, 82–89. https://doi.org/10.1111/j.1749-6632.2010.05793.x

Damasio, A. R., Grabowski, T. J., Bechara, A., Damasio, H., Ponto, L. L., Parvizi, J., & Hichwa, R. D. (2000). Subcortical and cortical brain activity during the feeling of self-generated emotions. *Nature Neuroscience*, *3*(10), 1049–1056. https://doi.org/10.1038/79871

D'Argembeau, A., & Van der Linden, M. (2006). Individual differences in the phenomenology of mental time travel: The effect of vivid visual imagery and emotion regulation strategies. *Consciousness and Cognition*, *15*(2), 342–350. https://doi.org/10.1016/j.concog.2005.09.001

de Bruyne, M., Kors, J., Hoes, A., Klootwijk, P., Dekker, J., Hofman, A., van Bemmel, J. (1999). Both decreased and increased heart rate variability on the standard 10 second electrocardiogram predict cardiac mortality in the elderly: the Rotterdam Study. *American Journal of Epidemiology, 150(12)*, 1282-1288. https://doi.org/10.1093/oxfordjournals.aje.a009959

Dekker, J., Crow, R., Folsom, A., Hannan, P., Liao, D., Sweene, C., & Schouten, E. (2000). Low heart rate variability in a 2-minute rhythm strip predicts risk of coronary heart disease and mortality from several causes: the ARIC study. *Circulation, 102: 1239-1244. https://doi.org/10.1161/01.cir.102.11.1239*

Denzin, N. K., & Lincoln, Y. S. (2011). *The Sage handbook of qualitative research*. Thousand Oaks: Sage.

Desrochers, A. B., Beaulieu-Prévost, D., Desautels, J., Békés, V., Belleville, G., Guay, S., & Marchand, A. (2016). Gender and changes in trauma narrative following CBT for PTSD. Journal of Aggression, *Maltreatment & Trauma*, *25(*9), 974–990. https://doi.org/10.1080/10926771.2016.1231147

Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: A revisit with new data and methods. *Science*, *313*(5789), 979–982. https://doi.org/10.1126/science.1128944

Elbert, T., & Schauer, M. (2002). Psychological trauma: Burnt into memory. *Nature, 419*(6910), 883. https://doi.org/10.1038/419883a

Elbert, T., Schauer, M., & Neuner, F. (2015). Narrative Exposure Therapy (NET): Reorganizing memories of traumatic stress, fear, and violence. *Evidence Based Treatments for Trauma-Related Psychological Disorders*, 229–253. https://doi.org/10.1007/978-3-319-07109-1_12

Elliott, R., Slatick, E., & Urman, M. (2001). Qualitative change process research on psychotherapy: Alternate strategies. *Psycholgishche Beitrage, 43*(3), 69-111.

El Haj, M., Nandrino, J. L., Antoine, P., Boucart, M., & Lenoble, Q. (2017). Eye movement during retrieval of emotional autobiographical memories. Acta Psychologica, 174, 54-58. https://doi.org/10.1016/j.actpsy.2017.02.002

Falligant, J. M., McNulty, M. K., Hausman, N. L., & Rooker, G. W. (2020). Using dual-criteria methods to supplement visual inspection: Replication and extension. *Journal of Applied Behavior Analysis, 53*(3), 1789–1798. https://doi.org/10.1002/jaba.665

Fisher W. W., Kelley M. E., & Lomas J, E. (2003) Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis, 36*(3), 387–406. https://doi.org/10.1901/jaba.2003.36-387

Fletcher, S., Creamer, M., & Forbes, D. (2010). Preventing posttraumatic stress disorder: Are drugs the answer? *Australian and New Zealand Journal of Psychiatry, 44*, 1064–1071. https://doi.org/10.3109/00048674.2010.509858

Fletcher, J, A. (2016). Applying critical realism in qualitative research: methodology meets method. *International Journal of Social Research Methodology (20)*2, 181-194. https://doi.org/10.1080/13645579.2016.1144401

Foa, E. B., Hembree, E., & Rothbaum, B. (2007). *Prolonged exposure therapy for PTSD: therapist guide*. https://doi.org/10.1093/med:psych/9780195308501.001.0001

Foa, E. B., Keane, M. T., & Friedman, M. J. (2000). Guidelines for treatment of PTSD. *Journal of Traumatic Stress, 13*(4), 539–588. https://doi.org/10.1023/a:1007802031411

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*(1), 20–35. https://doi.org/10.1037/0033-2909.99.1.20

Foa, E. B., Molnar, C., Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8*(4),675–690. https://doi.org/10.1002/jts.2490080409

Foa, E. B., Rothbaum, B. O., & Furr, J. M. (2003). Augmenting exposure therapy with other CBT procedures. *Psychiatric Annals*, *33*(1), 47-53. https://doi.org/10.3928/0048-5713-20030101-08

Friedman, B., & Thayer, J. (1998). Autonomic balance revisited: Phobic anxiety and heart rate variability. *Journal of Psychomatic Research, 44(*1), 133 151. https://doi.org/10.1016/s0022-3999(97)00202-x

Frustaci, A., Lanza, G., Fernandez, I., di Giannantonio, M., & Pozzi, G. (2010). Changes in psychological symptoms and heart rate variability during EMDR Treatment: A case series of subthreshold PTSD. *Journal of Emdr Practice and Research, 4*, 3-11. https://doi.org/10.1891/1933-3196413

Gilgen-Ammann, R., Schweizer, T., Wyss, T. (2019). RR interval signal quality of a heart rate monitor and an ECG Holter at rest and during exercise. *European Journal Applied Physiology*,*119*(7), 1525-1532. https://doi.org/10.1007/s00421-019-04142-5

Gray, M. J., & Lombardo, T. W. (2001). Complexity of trauma narratives as an index of fragmented memory in PTSD: A critical analysis. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, *15*(7), S171-S186. https://doi.org/10.1002/acp.840

Gomez, R., Stavropoulos, V., & Griffiths, M. D. (2020). Confirmatory factor analysis and exploratory structural equation modelling of the factor structure of the depression anxiety and stress scales-21. *PloS One, 15(*6), e0233998–e0233998. https://doi.org/10.1371/journal.pone.0233998

Hardt, O., Einarsson, E. Ö., & Nader, K. (2010). A bridge over troubled water: Reconsolidation as a link between cognitive and neuroscientific memory research traditions. *Annual Review of Psychology*, *61*, 141-167. https://doi.org/10.1146/annurev.psych.093008.100455

Harvey, A. G., Bryant, R. A., (1999). Brief report: A qualitative investigation of the organization of traumatic memories. *British Journal of Clinical Psychology, (38),*401–405. https://doi.org/10.1348/014466599162999

Hussey, I., & Hughes, S. (2020). Hidden invalidity among 15 commonly used measures in social and personality psychology. *Advances in Methods and Practices in Psychological Science*, *3*(2),166-184. https://do.org/:10.1177/2515245919882903

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*(1), 12-19. https://doi.org/10.1037/0022-006x.59.1.12

Jaeger, J., Lindblom, K. M., Parker-Guilbert, K., & Zoellner, L. A. (2014). Trauma narratives: It's what you say, not how you say it. *Psychological Trauma: Theory, Research, Practice and Policy*, *6*(5), 473–481. https://doi.org/10.1037/a0035239

Kangaslampi, S. & Peltonen, K. (2019). Changes in traumatic memories and posttraumatic cognitions associate with PTSD symptom improvement in treatment of multiply traumatized children and adolescents. *Journal of Child & Adolescent Trauma, 13,* 103–112. https://doi.org/10.1007/s40653-019-00255-3

Kazdin, A.E. (2010). *Single case research designs: Methods for clinical and applied settings* (2nd ed.). Oxford University Press

Kratochwill, T.R., Hitchcock, J., Horner, R.H., Levin, J.R., Odom, S., Rindskopf, D., M., & Shadish, W.R. (2010). Single case designs technical documentation. *What Works Clearinghouse*. Retrieved from: https://files.eric.ed.gov/fulltext/ED510743.pdf

Kyngaॅs H., & Vanhanen, L. (1999). Content analysis. *Hoitotiede*, 11, 3–12.

Lane, R. D. (2008). Neural substrates of implicit and explicit emotional processes: A unifying framework for psychosomatic medicine. *Psychosomatic Medicine*, *70*(2), 214-231. https://doi.org/10.1097/psy.0b013e3181647e44

Lane, S. (2019). *Using narrative exposure therapy to treat women with a history of Intimate partner violence for post-traumatic stress. A series of single case studies***.** **(**Unpublished doctoral dissertation). University of Nottingham, Nottingham.

Lane, J. D., & Gast, D. L. (2014). Visual analysis in single case experiment design studies: Brief review and guidelines. *Neuropsychological Rehabilitation, 24*(3), 445-463. https://doi.org/10.1080/09602011.2013.815636

Lane, R. D., Ryan, L., Nadel, L., & Greenberg, L. (2015). Memory reconsolidation, emotional arousal, and the process of change in psychotherapy: New insights from brain science. *The Behavioral and Brain Sciences, 38(*1), e1–e1. https://doi.org/10.1017/S0140525X14000041

Lang, P. J. (1979). A bio-informational theory of emotional imagery. *Psychophysiology*, *16*(6), 495-512. https://doi.org/doi: 10.1111/j.1469-8986.1979.tb01511.x

Larsen, S. E., Stirman, S. W., Smith, B. N., & Resick, P. A. (2016). Symptom exacerbations in trauma-focused treatments: Associations with treatment outcome and non-completion. *Behaviour Research and Therapy, 77,* 68-77. https://doi.org/10.1016/j.brat.2015.12.009

Lauri, S. & Kyngaॅs, H. (2005) *Developing Nursing Theories (Finnish: Hoitotieteen Teorian Kehittaॅminen).* Werner Soॅderstroॅm, Dark Oy, Vantaa.

Leahy, F., Ridout, N., Mushtaq, F., & Holland, C. (2018). Improving specific autobiographical memory in older adults: impacts on mood, social problem solving, and functional limitations*. Aging Neuropsychology & Cognition,* 25(5), 695-723. https://doi.org/10.1080/13825585.2017.1365815

Lely, J. C., Smid, G. E., Jongedijk, R. A.,W. Knipscheer, J., & Kleber, R. J. (2019). The effectiveness of narrative exposure therapy: A review, meta-analysis and meta-regression analysis. *European Journal of Psychotraumatology, 10*(1), 1550344. https://doi.org/10.1080/20008198.2018.1550344

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: dissociating episodic from semantic retrieval. *Psychology and Aging*, *17*(4), 677–689. https://doi.org/10.1037/0882-7974.17.4.677

Libby, L. K., & Eibach, R. P. (2002). Looking back in time: Self-concept change affects visual perspective in autobiographical memory. *Journal of Personality and Social Psychology, 82*(2), 167–179. https://doi.org/10.1037/0022-3514.82.2.167

Liberzon, I., & Sripada, C. S. (2007). The functional neuroanatomy of PTSD: A critical review. *Progress in Brain Research*, *167*, 151-169. https://doi.org/10.1016/s0079-6123(07)67011-3

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1–55.

Lobo, M. A., Moeyaert, M., Baraldi Cunha, A., & Babik, I. (2017). Single-case design, analysis, and quality assessment for intervention research. *Journal of Neurologic Physical Therapy: JNPT*, *41*(3), 187–197. https://doi.org/10.1097/npt.0000000000000187

Loevinger, J. (1957). Objective tests as instruments of psychological theory. *Psychological reports*, *3*(3), 635-694. https://journals.sagepub.com/doi/abs/10.2466/pr0.1957.3.3.635

Lovibond, S, H., & Lovibond, P, F. (1995). *Manual for the depression anxiety stress scales*. Sydney Psychology Foundation Australia. https://doi.org/10.1037/t01004-000

Ma, H., H. (2006). An alternative method for quantitative synthesis of single-subject researches: Percentage of data points exceeding the median. *Behaviour Modification, 30*(5), 598-617. https://doi.org/10.1177/0145445504272974

Malins, S., Moghaddam, N., Morriss, R., Schröder, T., Brown, P., Boycott, N., & Atha, C. (2020). Patient activation in psychotherapy interactions: Developing and validating the consultation interactions coding scheme. *Journal of Clinical Psychology*, *76*(4), 646-658. https://doi.org/10.1002/jclp.22910

Makara-Studzińska, M., Tyburski, E., Załuski, M., Adamczyk, K., Mesterhazy, J., & Mesterhazy, A. (2022). Confirmatory factor analysis of three versions of the depression anxiety stress scale (DASS-42, DASS-21, and DASS-12) in polish adults. *Frontiers in Psychiatry, 12*, 770532–770532. https://doi.org/10.3389/fpsyt.2021.770532

McAdams, D. P., & McLean, K. C. (2013). Narrative identity. *Current Directions in Psychological Science: A Journal of the American Psychological Society, 22*(3), 233–238. https://doi.org/10.1177/0963721413475622

McLean, C. P., & Foa, E. B. (2011). Prolonged exposure therapy for post-traumatic stress disorder: A review of evidence and dissemination. *Expert Review of Neurotherapeutics, 11*(8), 1151–1163. https://doi.org/10.1586/ern.11.94

McLeod, J. (2000). The contribution of qualitative research to evidence-based counselling and psychotherapy. In N. Rowland & S. Gross (Eds.) *Evidence based counselling and psychological therapies* (pp.111-126). Routledge.

Morley, S. (2018). *Single-case methods in clinical psychology: A practical guide.* (C. Masterson & C. J. Main, Eds.). Routledge/Taylor & Francis Group. https://doi.org/10.4324/9781315412931

Mørkved, N., Hartmann, K., Aarsheim, L. M., Holen, D., Milde, A.M., Bomyea, J., & Thorp, S.R. (2014). A comparison of narrative exposure therapy and prolonged exposure therapy for PTSD. *Clinical Psychology Review*, 34(6), 453-467. https://doi.org/10.1016/j.cpr.2014.06.005

Motlagh, H. (2010). Impact of Event Scale-Revised. *Journal of Physiotherapy (56),*3 203. https://doi.org/10.1016/s1836-9553(10)70029-1

National Institute for Health and Care Excellence (2018). Post-traumatic stress disorder. Guideline NG116. Retrieved from: https://www.nice.org.uk/guidance/ng116/chapter/Recommendations

Norton, P. J. (2007). Depression Anxiety and Stress Scales (DASS-21): Psychometric analysis across four racial groups. *Anxiety, Stress, and Coping*, *20*(3), 253-265.

Oei, T., Sawang, S., Goh, Y. W., & Mukhtar, F. (2013). Using the depression anxiety stress scale 21 (DASS-21) across cultures. *International Journal of Psychology*, *48*(6), 1018-1029. https://doi.org/10.1080/00207594.2012.755535

Pasupathi, M., Mansour, E., & Brubaker, J. R. (2007). Developing a life story: Constructing relations between self and experience in autobiographical narratives. *Human Development, 50*(2-3), 85–110. https://doi.org/10.1159/000100939

Porges, S. W. (1993). Body perception questionnaire. *Laboratory of Developmental Assessment: University of Maryland.*

Pignotti, M., & Steinberg, M. (2001). Heart rate variability as an outcome measure for thought field therapy in clinical practice. *Journal of Clinical Psychology, 57*(10), 1193–1206. https://doi.org/10.1002/jclp.1086

Poli, A., Angelo Giovanni, I. M., Chiorri, C., Gian-Paolo Mazzoni, Orrù, G., Kolacz, J., Porges, S. W., Conversano, C., Gemignani, A., & Miccoli, M. (2021). Item reduction, psychometric and biometric properties of the italian version of the body perception

questionnaire—short form (BPQ-SF): The BPQ-22. *International Journal of Environmental Research and Public Health, 18*(7), 3835. https://doi.org/10.3390/ijerph18073835

Pratschke, J. (2003). Realistic models? critical realism and statistical models in the Social sciences. *Philosophica, 71*,13-38

Quednow, B. B., Jessen, F., Kuhn, K. U., Maier, W., Daum, I., Wagner, M. (2006). Memory deficits in abstinent MDMA (ecstasy) users: neuropsychological evidence of frontal dysfunction. *Journal of Psychopharmacology. 20(*3), 373-384. https://doi.org/10.1177/0269881106061200

Raghuraman, S., Stuttard, N., & Hunt, N. (2021). Evaluating narrative exposure therapy for post-traumatic stress disorder and depression symptoms: A meta-analysis of the evidence base. *Clinical Psychology & Psychotherapy*, *28*(1), 1-23. https://doi.org/10.1002/cpp.2486

Robjant, K., & Fazel, M. (2010). The emerging evidence for narrative exposure therapy: A review. *Clinical Psychology Review, 30*(8), 1030-1039. https://doi.org/10.1016/j.cpr.2010.07.004

Rubin, D. C., Deffler, S. A., Ogle, C. M., Dowell, N. M., Graesser, A. C., & Beckham, J. C. (2016). Participant, rater, and computer measures of coherence in posttraumatic stress disorder. *Journal of Abnormal Psychology, 125,* 11–25. http://dx.doi.org/10.1037/abn0000126

Sandelowski, M. (1995) Qualitative analysis: what it is and how to begin? *Research in Nursing & Health,* 18, 371–375

Schauer, M., Neuner, F., & Elbert, T. (2011). *Narrative exposure therapy: A short-term treatment for traumatic stress disorders* (2nd rev. and expanded ed.). Hogrefe Publishing

Scruggs, T. E., & Mastropieri, M. A. (1998). Summarizing single-subject research. *Behavior Modification*, *22*, 221-243. https://doi.org/10.1177/01454455980223001

Shaffer, F., & Ginsberg, J. P. (2017). An overview of heart rate variability metrics and norms. *Frontiers in Public Health*, *5*, 258. https://doi.org/10.3389/fpubh.2017.00258

Shalev, A. Y. (2009). Posttraumatic stress disorder and stress-related disorders. *Psychiatric Clinics of North America, 32*(3), 687-704. https://doi.org/10.1016/j.psc.2009.06.001

Siehl, S., Robjant, K., & Crombach, A. (2021a). Systematic review and meta-analyses of the long-term efficacy of narrative exposure therapy for adults, children and perpetrators. *Psychotherapy Research*. *31*, 695–710. https://doi.org/10.1080/10503307.2020.1847345

Siehl, S., Wilhelms, L., & Crombach, A. (2021b). Commentary on Raghuraman et al. (2021). On the long-term efficacy and effectiveness of narrative exposure

therapy. *Frontiers in Psychology*, *12*, 771958–771958. https://doi.org/10.3389/fpsyg.2021.771958

Skivington, K., Matthews, L., Simpson, S. A., Craig, P., Baird, J., & Blazeby, J. M. A. (2021). New framework for developing and evaluating complex interventions: Update of medical research council guidance. *British Medical Journal, 374,* https://doi.org10.1136/bmj.n2061

Speer, K.E., Semple, S., Naumovski, N., & McKune, A.J. (2020) Measuring heart rate variability using commercially available devices in healthy children: A validity and reliability study. *European Journal Investigating Health Psychology Education, 10*, 390-404. https://doi.org/10.3390/ejihpe10010029

Sutin, A. R., & Robins, R. W. (2007). Phenomenology of autobiographical memories: The memory experiences questionnaire. *Memory*, *15*(4), 390-411. https://doi.org/10.1080/09658210701256654

Sumner, J. A., Mineka, S., & McAdams, D. P. (2013). Specificity in autobiographical memory narratives correlates with performance on the Autobiographical Memory Test and prospectively predicts depressive symptoms. *Memory*, *21*(6), 646-656. https://doi.org/10.1080/09658211.2012.746372

Thompson, C. P., Skowronski, J. J., Larsen, S. F., & Betz, A. (1996). *Autobiographical memory: Remembering what and remembering when.* Lawrence Erlbaum Associates, Inc.

Tsuji, H., Larson, M.G., Vanditti, F.J., Manders, E.S., Evans, J.C., Feldman, C.L., & Levey, D. (1996). Impact of reduced heart rate variability on risk for cardiac events: The framingham heart study. *Circulation, 94*, 2850-2855. https://doi.org/10.1161/01.cir.94.11.2850

Vanderveren, E., Bijttebier, P., & Hermans, D. (2019). Autobiographical memory coherence and specificity: Examining their reciprocal relation and their associations with internalizing symptoms and rumination. *Behaviour Research and Therapy*, *116*, 30-35. https://doi.org/10.1016/j.brat.2019.02.003

Vannucci, M., Chiorri, C., & Marchetti, I. (2020). Shaping our personal past: Assessing the phenomenology of autobiographical memory and its association with object and spatial imagery. *Scandinavian Journal of Psychology, 61*(5), 599-606. https://doi.org/10.1111/sjop.12639

Van der Kolk, B. A. (1995) *The body, memory, and the psychobiology of trauma*. In: Sexual abuse recalled: Treating trauma in the era of the recovered memory debate, ed. Alpert, J. L., pp. 29–60. Aronson

Van Minnen, A., Arntz, A., & Keijsers, G. P. (2002). Prolonged exposure in patients with chronic PTSD: Predictors of treatment outcome and dropout. *Behaviour Research and Therapy, 40*(4), 439–457. https://doi.org/10.1016/s0005-7967(01)00024-9

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5) – LEC-5 and Extended Criterion A* [Measurement instrument]. Available from http://www.ptsd.va.gov/

Weiss, D. S., & Marmar, C. R. (1997). The impact of Event Scale-Revised. In J.P Wilson, & T.M Keane (Eds.), *Assessing Psychological Trauma and PTSD: A Practitioner's Handbook* (pp. 399-411). Guilford Press.

Wolpe, J., & Lazarus, A. A. (1966). *The Commonwealth and international library. Mental health and social medicine division. Behavior therapy techniques: A guide to the treatment of neuroses.* Pergamon Press.

World Health Organization. (2019). *International statistical classification of diseases and related health problems* (11th ed.). https://icd.who.int/

Zalta A. K. (2015). Psychological mechanisms of effective cognitive-behavioral treatments for PTSD. *Current Psychiatry Reports*, *17*(4), 560. https://doi.org/10.1007/s11920-015-0560-6

EXTENDED PAPER

Extended Introduction

1.1. Discussion about diagnosing PTSD

There are two widely used diagnostic manuals, one is the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychological Society, APA, 2013) mainly used in the U.S. and the International Classification of Diseases Eleven (ICD-11; World Health Organisation, WHO, 2019) which is used in Europe. The diagnosis of PTSD first appeared in the DSM-III in 1980 (Cloitre, 2020). When both updated versions of the manuals were released, this did lead to the diagnostic criteria for Post-Traumatic Stress Disorder (PTSD) being reconsidered due to the ever-changing criteria (Stein et al., 2014).

Changes made in the DSM-5 (APA, 2013) included the removal of having a high level of subjective fear, and/or hopelessness when an event occurs due to a lack of evidence of it being a precipitating factor of a diagnosis (Stein et al., 2014). Other changes include the diagnosis growing to include 20 symptoms, the number of symptom clusters needed to reach a diagnosis of PTSD was increased from 3 to 4. The original three clusters were intrusion symptoms, avoidance symptoms, and hyperarousal symptoms, the added fourth cluster is negative alterations in cognition and mood, a subtype has also been added for dissociation (Cloitre, 2020; Stein et al., 2014). The clusters, avoiding and numbing, were split into separate categories and expanded adding avoidance and persistent negative changes in mood and cognition. Expanding the clusters meant symptoms such as persistent negative self-evaluation of the self-and/or others, high levels of self-blame, persistent negative emotional states, and reckless or self-destructive behaviour were added (Cloitre 2020; Stein et al., 2014). The ICD-11 (WHO, 2019) has three core symptom clusters which are re-experiencing, avoidance of reminders, and hyperarousal. Changes in the updated version also included removing non-specific symptoms that were found in other conditions (Stein et al., 2014). When comparing the DSM-5 and ICD-11, the ICD-11 has a narrower set of symptoms than the DSM-5 with the aim to better differentiate PTSD from other conditions (Stein et al., 2014). Changes in the ICD-11 come from adopting a public health perspective with an emphasis on simplicity of

diagnostic structures and clinical utility (Cloitre, 2020; Reed, 2010). The ICD-11 also includes more information on age, gender, and cultural differences, which may reflect it having more clinical utility (Brewin et al., 2017). The major difference between the DSM-5 and ICD-11 is that the ICD-11 included a diagnosis of Complex Post-Traumatic Stress Disorder (CPTSD), whereas the DSM-5 does not (to be elaborated further on).

There have been debates about diagnosing PTSD due to inappropriately medicalising a person's normal response and suffering into something as a maladaptive 'disorder' (Nazem et al., 2014; Stein et al., 2007; Yehuda & McFarlane, 1995). There are also critiques of using the DSM-5 and ICD-11 due to their categorical nature of diagnosis. Using a categorical system (i.e., diagnostic status) can help in communicating if a person does/does not have a difficulty and thus justify treatment (Kraemer et al., 2004); however, it can lead to issues with large amounts of heterogeneity and comorbidity for people 'in the category' (Krueger & Bezdjian, 2009). Moving to a dimensional (i.e., symptom severity) approach may be more helpful to conceptualise an individual's distress, due to the nature of people's difficulties fluctuating in severity (Gaebel et al., 2020), capturing the differences between people and how difficulties manifest. Research examining the latent structure of PTSD has demonstrated it is more consistent with a dimensional rather than a categorical model (Forbes et al., 2005; Ruscio et al., 2002; Broman-Fulks et al., 2006). All of which suggests reconceptualising PTSD from a maladaptive response to a stressor, to an understandable response to multiple stressors over the lifespan may allow for a more holistic understanding and approach to treatment (Nazem et al., 2014).

Moving away from debates regarding diagnosis, the DSM-5 does also have its criticisms as there is a lack of empirical support for many of the conditions in the manual, and clinicians often disagree on diagnoses meaning there is low-inter-rater reliability. There are even claims that the DSM-5 has been influenced by the U.S pharmaceutical industry, given many people who participated in its workgroups had ties to pharmaceutical companies (Welch et al., 2013). The claims of the poor validity of the construct of PTSD within the DSM-5 gains support as its diagnostic criteria

have changed with each edition of the manual (Stein et al., 2014), and with the new additions to the diagnosis there are 636,120 possible symptom combinations that would allow for a diagnosis of PTSD with the DSM-5 (Cloitre, 2020).

1.2. Discussion of pre, peri, and post risk factors for PTSD

Experiencing trauma is common, with up to 90% of the general population experiencing one or more traumatic experiences during their lifetime (Kilpatrick et al., 2013). However, being exposed to a trauma does not necessarily mean a person will develop PTSD as around 10-20% of people develop enduring symptoms (Bisson et al, 2015), with estimates of the lifetime prevalence of developing PTSD ranging from 6.1- 9.2% in western samples (Kessler et al., 1995; Sareen et al., 2022). The development of PTSD is largely due to individual vulnerability and protective factors, and pre, peri, and post traumatic processes with the exception of extremely severe stressors (Brewin et al., 2000; Weisæth, 1998). Research from Ozer et al. (2003) found peri-traumatic responses, not prior characteristics, are the strongest predictors of developing PTSD.

Factors which are both a protective and risk factor for developing PTSD pre-trauma are: central nervous system reactivity; development; exposure to previous trauma; coping skills; cultural background; age; gender. Peri-traumatic factors include severity and type of stressor, subjective and behavioural response during the event, and post-traumatic factors include secondary stressors, and social support (Weisæth, 1998). In military populations group cohesion, trust in leadership, and high motivation and training has been shown to be a protective factor against developing PTSD (Weisæth, 1998).

Pre-traumatic. Research has found higher rates of PTSD for women and children (Weisæth, 1998). Experiencing previous trauma and the severity of the event is also associated with PTSD as there is a dose-response relationship between the severity and duration of traumatic events and developing PTSD (Dohrenwend et al., 2006). This can be explained by the building block effect as the effects of repeated traumas can accumulate to a point where a person starts to

experience symptoms (Schauer et al., 2011). Other pre-trauma factors that have been consistently shown to influence the development of PTSD include difficulties with education, childhood adversity, and individual and family psychiatric history (Schauer et al., 2011; Weisæth, 1998).

Peri-traumatic. Factors occurring during the event include the severity of it, as more severe events are more likely to lead to PTSD (Brewin et al., 2000; Schauer et al., 2011; Weisæth, 1998). In terms of types of traumas rape is the most adverse single event that can happen to a person and leads to the development of PTSD in about half of victims, followed by war (two out of five individuals), and then abuse during childhood (more than one in three; Kessler et al., 1995). Dissociative responses particularly derealisation (feeling detached from the environment) during traumatic events is also a predictor of developing PTSD and experiencing worse symptoms (Lebois et al., 2022).

Post-traumatic. Following an event, factors which are associated with developing PTSD include a lack of social support and the hypothesis regarding this is a lack of support means people are not able to speak and emotionally process the event (Schauer et al., 2011; Ozer et al., 2003). Cognitive factors such as rumination have also been found to influence the development and maintenance of PTSD (LoSavio et al., 2017).

1.3. Discussion of CPTSD

CPTSD does not exist as a diagnosis in the DSM-5 (APA, 2013) and first appeared in the ICD-11 (WHO, 2019). Prior to its inclusion in the ICD-11 the condition was observed clinically and was referred to as “disorder of extreme stress” (Roth et al., 1997). Due to the symptom heterogeneity between PTSD and CPTSD they have been organised into two separate conditions in the ICD-11 with a simplified set of symptom clusters to allow for ease of diagnosis. It is important to note that an individual can only be diagnosed with either PTSD or CPTSD (Cloitre, 2020), and there is substantial evidence supporting the discriminative validity of diagnosis between the two conditions (Brewin et al., 2017; Cloitre, 2020). The

prevalence rates of CPTSD vary massively between populations, with the combined range for PTSD and CPTSD being 2-12.7% for the US, UK, Germany, and Israel, whereas in Ghana, Kenya, and Nigeria rates range from 30.6-37% (Cloitre, 2020).

CPTSD is a complex form of PTSD that can develop if a person is subjected to multiple traumatic events. CPTSD occurs when a person is subjected to multiple prolonged traumas of an interpersonal nature, where escape is impossible (Mørkved et al., 2014; WHO, 2019). The ICD-11 conceptualisation of CPTSD came from the repeated observations that people who had experienced chronic, repeated, and prolonged traumas displayed more complex symptoms when compared to those with diagnoses of PTSD (Cloitre, 2020). CPTSD includes the primary symptoms of PTSD, but adds increased difficulties in regulating emotions, dissociation, inter-personal problems, and somatization (Cloitre, 2020; Cloitre et al., 2013). When comparing CPTSD to PTSD, CPTSD is associated with higher levels of impairment in daily functioning (Brewin et al., 2017).

1.4. Information on treatments for PTSD and CPTSD

Cognitive Behavioural Therapy (CBT) is an effective and National Institute for Health and Care Excellence (NICE, 2018) recommended treatment for PTSD. Other NICE (2018) recommended therapies for PTSD include, NET, and eye movement desensitisation reprocessing therapy (EMDR). Selective serotonin reuptake inhibitors (SSRIs) have been used to treat PTSD; however, meta-analysis has shown low effect sizes and that they are inferior when compared to trauma focused CBT (Cloitre, 2020). Systematic reviews comparing trauma focused CBT to psychodynamic approaches found that psychodynamic therapies were effective in treating PTSD, but that CBT was superior (Paintain & Cassidy, 2018). The research suggests CBT is a first line treatment for PTSD. Prolonged Exposure (PE), a specific type of CBT used to treat PTSD, has gained substantial evidence for its effectiveness (Cukor et al., 2010; Foa at al., 2003; Lane et al., 2015). During exposure therapy the person is instructed to repeatedly speak about their traumatic experience, meaning they are exposed to the event and memory (Schauer et al., 2011), with the level of fear initially experienced during the exposure being a

predictor of successful treatment (Jaycox et al., 1998). However, research suggests even after completing a course of PE, up to 45% of people still meet the diagnostic criteria for PTSD (Van Minnen et al., 2002). Additionally, a minority of people do not complete treatment due to the demands of PE (Mørkved et al., 2014), suggesting a more acceptable form of treatment is needed. Evidence shows that CBT and PE are efficacious in reducing symptoms of PTSD for one specific trauma (McLean & Foa, 2011). There has been little research demonstrating the effectiveness of CBT and PE with CPTSD (Mørkved et al., 2014). Moreover, Cloitre (2009; Cloitre et al., 2019) argued that people with CPTSD might not respond well to conventional treatment methods. Reasons CPTSD may not respond well to conventional treatment methods are due to it having a greater number and variety of symptoms, and it being associated with higher levels of impairment, meaning treatment may have to be longer and more intense than existing approaches (Cloitre, 2020). Cloitre's (2020) point regarding longer treatment is echoed by NICE (2018) as they suggested increasing the duration or number of sessions (dependent on need) to help build trust with the patient. All of this suggests a more acceptable therapy that can account for multiple incidents of trauma is needed.

As CPTSD is a newly defined condition no clinical trials evaluating the outcome of interventions have been conducted (Cloitre, 2020). Despite this, evidence-based treatments for PTSD are being applied to CPTSD; however, the recommendation is when working with CPTSD additional interventions targeting difficulties with self-organisation, emotional regulation, cognitive re-appraisal, and self-compassion should be included as necessary (Cloitre, 2020). This results in people receiving more than one therapeutic modality when receiving treatment for CPTSD, for example, CBT maybe used to help process the event and reduce the person's flashbacks/nightmares, and then additional support to teach skills to help affect regulation (Briere & Scott, 2015). There is no consensus of what treatment packages for CPTSD should look like, but Briere and Scott (2015) state they generally include: 1) CBT/EMDR; 2) emotional regulation and coping skills training; 3) relational/psychodynamic approaches; and 4) multi-target intervention models. Phased models initially proposed by Herman (1992) are also suggested for treatment of CPTSD (Cloitre et al., 2012). Herman's (1992) approach would suggest

initially developing safety and stabilisation, then exposure to traumatic memories, and finally moving on. Generally, these adaptions would result in the treatment being prolonged which is suggested to be helpful to build the therapeutic relationship, as one must bear in mind a key aspect of CPTSD is interpersonal difficulties. The phased approach to treatment can help to first introduce skills to improve a person's emotional health and daily functioning, which could support the effectiveness of the trauma focused intervention (Karatzias et al., 2019). Phased approaches would also result in extending treatment for people with CPTSD which should help to build the therapeutic relationship and lower attrition (Herman, 1992); however, they have been criticised due to delaying access to trauma focused interventions (Karatzias et al., 2019), increasing avoidance (DeJongh et al., 2016), and for adversely affecting the outcome of therapy and increasing drop-out (Cloitre et al., 2010). Despite these criticisms what is clear through examining the research is that more intense, longer, and bespoke treatment packages tailored to the individual's needs may need to be offered to people with CPTSD.

Therapies that have received support for treating CPTSD include NET (Schauer et al., 2011) which is also NICE (2018) recommended, dialectical behaviour therapy (DBT) and skill training in affect regulation (STAIR) when they are modified to include exposure and cognitive techniques (Briere & Scott, 2015). Meta-analysis has shown CBT, and EMDR are superior to treatment as usual or waiting list conditions in treating CPTSD (Karatzias et al., 2019). Therefore, there are a variety of therapeutic models that are available to people with CPTSD; however, they need to be further evidenced via clinical trials and the way in which they are delivered (i.e., phased, or stand-alone) needs to be examined further. The role of medication needs to be looked at further, but research suggests SSRIs are less helpful in adults with depression who have experienced childhood abuse, meaning they may be less applicable for people with CPTSD (Cloitre, 2020).

1.5. Further details of NET

NET is a short-term manualised therapy which was designed to work with refugee and asylum seeker populations who have experienced complex and multiple

traumas, where access to therapeutic resources is limited (Schauer et al., 2011). NET is based on the theory of fear networks and blends elements of CBT exposure and testimony therapy (Neuner et al., 2002), with an emphasis on narrating the time and place of the event to re-integrate the contextual information (i.e., cold memory) and the traumatic memory (i.e., hot memory) into an autobiographical lifeline (Elbert et al., 2015; Schauer et al., 2011). NETs mechanisms of change are posited to be exposure and habituation, and autobiographical memory integration (ABMI; Schauer et al., 2011).

NET is built on the principle of fear networks (Schauer et al., 2011). When people recall memories, it often includes accessing visual and sensory information (termed sensory perceptual representations), and for less significant events recollections only last minutes or hours (Conway, 2001). Only memories of salient and/or those developed in highly emotional states are encoded into memory and can be recalled years later (Conway & Pleydell-Pearce, 2000). When people experience traumatic events, the person encodes the sensory and perceptual information (e.g., smells, physical sensations, noises etc), as well as cognitive and emotional elements. Associations between all of these elements are encoded into a connecting system in the brain called a fear network, and this explains why one sensory element can lead to the activation of others, leading to a flashback (Schauer et al., 2011). In NET the ’hot memory’ is the person’s sensory perceptual representation of what happened during the event, and the ‘cold memory’ is the contextual information (time, place, lifetime when event occurred) of the time in the person’s life when the event happened. The theory of fear networks proposes that multiple traumas build stronger sensory perceptual-emotional representations in the network, and as the level of trauma increases it weakens the connections with contextual information, increasing symptoms of trauma (Elbert & Schauer, 2002; Elbert et al., 2015; Foa & Kozack, 1986; Lang, 1979). For trauma symptoms to decrease the sensory perceptual representations of traumatic events need to be contextualised and integrated into autobiographical memory (ABM; Elbert & Schauer, 2002; Elbert et al., 2015). As weaving together, the hot and cold memories allows for information to be integrated into a ‘cool system’ framework reducing symptoms (Schauer et al., 2011). When people experience multiple traumatic events, this strengthens the associations of the

fear network, but it also increases the chances of developing CPTSD through the building block effect. The building block effect suggests that being exposed to trauma has a cumulative effect showing a dose-response relationship as being subjected to more traumatic events makes it more likely a person develops PTSD/CPTSD (Dohrenwend et al., 2006; Schauer et al., 2011). People experiencing mental health conditions other than trauma can also be explained by the building block effect, as people can integrate experiences such as fear and hopelessness into the fear network (Schauer et al., 2011).

NET differs to existing treatments of trauma, as existing exposure methods usually only focus on the worst event a person has experienced with the assumption that treating it will lead to the best treatment outcome (Schauer et al., 2011). However, this is not suitable for people who have experienced multiple events throughout their life; therefore, NET focuses on constructing a lifeline (unique to NET) from birth to the present day and narrating the person's life as a whole (Schauer et al., 2011). During traditional exposure therapy, the patient is asked to repeatedly recall and talk about the traumatic event in as much detail as possible while paying attention to and reexperiencing their emotional, sensory, bodily sensations, and implicit memories (Schauer et al., 2011). NET exposure differs and has a more 'conversational' approach to it (Robjant et al., 2017), with an emphasis on placing the memory in time and place (Schauer et al., 2011). NET's exposure is more directive compared to other therapies as very close attention is paid to the physical, behavioural, and emotional reactions from the patient, while being relayed back to them to guide the patient through the process of retelling the trauma, all while contrasting the past and present physical experiences, cognitions, meanings, emotions, and sensory experiences (Robjant et al., 2017). NET does not have a stabilisation phase like other trauma therapies and instead dissociation and affect regulation are managed in the moment during sessions (Robjant et al., 2017). As mentioned throughout the therapy there is a focus on contextual information and during sessions, autobiographical contextual information is weaved into the narration and integrated into the sensory perceptual recollections or put in NET terms the hot and cold memories are weaved together (Schauer et al., 2011).

NET has three steps: 1) assessment and psychoeducation; 2) creating the lifeline; 3) narration sessions (Schauer et al., 2011). During the assessment and psychoeducation phase, the practitioner completes a clinical interview with the patient and the use of validated psychometrics assessing PTSD is recommended. Elements of psychoeducation should include normalising and legitimising patients' reactions, experiences, and symptoms of trauma, secondly, describing symptoms such as the freeze, flight, fight, fright, flag, faint response, and role of avoidance in maintaining trauma, and finally explaining the therapeutic process (Schauer et al., 2011). Laying the lifeline takes place in the second session, during this session the patient and therapist get a piece of string (representing the patient's life) and the patient is taken through their entire life from birth to present day and mark all of the traumatic events with stones and positive events with flowers in chronological order on the lifeline. More recently candles and sticks have been added to NET with candles representing loss, and sticks, causing harm to others (Robjant et al., 2019). The top of the piece of string is left curled up to represent the future. It is recommended to complete the lifeline in one sitting and exposure is to be avoided, so as not to open the fear network, in this session patients only give the estimated time, place, and age they were during the event, giving it a brief title to not engage with the sensory perceptual representation of the memory (Schauer et al., 2011). Narration sessions must start within three sessions, during the first narration session the therapist asks the patient to start speaking about their life from birth, while the therapist pays attention to the reactions of the patient looking for the activation of hot memories (Schauer et al., 2011). When a hot memory is starting to be activated the patient will show signs of physiological uproar or shut down, the therapist and patient start to narrate the memory in slow motion, close attention is paid to the physical, behavioural, and emotional reactions from the patient, all while contrasting the past and present physical experiences, cognitions, meanings, emotions, and sensory experiences, while asking questions to add contextual information (Robjant et al., 2017; Schauer et al., 2011). Grounding techniques are used as necessary. The principle of NET is by weaving the hot and cold memories together, this helps to consolidate patient's ABM. The therapist takes written accounts of what is said in session and then writes them up as homework and reads it back to the patient in the following session while the patient imagines the narrative allowing for further

exposure. The narrative is amended as necessary and the process of narration in the session continues from where it was left on the lifeline in the previous session. The process of exposure is repeated until habituation is achieved, and narrations end at a safe place for the patient. (Robjant et al., 2017; Schauer et al., 2011). The final session of NET varies dependent on clinical need, one option is to re-read all the session's narratives to the person with a final chance to ensure all amendments are made, that exposure has been reached, and when complete the narrative is signed by the therapist and patient and it is the patients to keep (Schauer et al., 2011). The other option is to relay the lifeline, and this is recommended when people have experienced multiple events of a similar nature, with the rationale being that re-reading the narrations may fuse the memories back together instead of separating them (Schauer et al., 2011).

1.6. Summary of evidence base for NET

NET is a well-tolerated treatment and has consistently low attrition rates compared to other therapies (Schauer et al., 2011). It has gained support from many Randomised Control Trails (RCT) in being a clinically effective treatment in making significant reductions in symptoms of CPTSD with evidence of it being applicable across many cultures (Jongedijk, 2014; Schauer et al., 2011). Evidence of it being appropriate across cultures comes from NET having been used effectively for survivors of natural disasters (Jongedijk, 2014). A RCT that made adaptions to NET to work with former child and adult soldiers, tilted Forensic Offender Rehabilitation Narrative Exposure Therapy (FORNET), and found clinically significant reductions in aggression and PTSD symptoms, and even substance misuse when compared to treatment as usual (Koebach et al., 2021). Previous research has concluded NET is the most evidence-based culturally sensitive treatment besides adapted CBT (Jongedijk, 2014). There is research into its applicability in western samples as Robjant et al. (2017) found NET was effective in reducing the severity of PTSD and general psychological distress for women in the UK who were victims of human trafficking. The effects of treatment were maintained or improved at the 3 month follow up for PTSD. Lely et al. (2019) and Raghuraman et al. (2021) who completed meta-analyses supported NET's effectiveness in treating PTSD and depression, with

Lely et al. (2019) finding advanced age was a predictor of symptom reduction of PTSD and depression.

NET has gained evidence of having long lasting beneficial effects. A meta-analysis was conducted by Siehl et al. (2020) investigating RCTs that examined the long-term impact of NET for PTSD and depression. A total of 56 studies from multiple countries and varying populations were compared and found large effect sizes for the reduction of PTSD symptoms when comparing NET to control populations, with analysis of the RCTs yielding small-medium effect sizes for the short them (< 6 months), and large effect sizes in the long term (≥ 6months). Siehl et al. (2020) concluded NET, KIDNET (child adapted NET) and FORNET were beneficial in reducing trauma and showed sustainable treatment gains. However, the authors heeded caution as these results need to be repeated in countries with highly developed healthcare systems. Suggesting the results may not be generalisable to western populations.

In summary, NET is an effective treatment in reducing symptoms of trauma across many ages, and cultures with a lasting impact. There is emerging evidence of NET's effectiveness in the general population for CPTSD and other conditions such as depression (Jonedijk, 2014; Koebach et al., 2021; Lely et al., 2019; Raghuraman et al., 2021; Robjant et al., 2017; Siehl et al., 2020). However, much of the evidence comes from diverse cultures, and as Siehl et al. (2020) highlighted more research into its applicability with western more developed populations is needed.

1.7. Discussion of trauma theories

The following section discusses some of the main trauma theories relevant to NET and this thesis.

Conditioning Theory. Earlier approaches looked at applying theories of conditioning to PTSD. Mowrer's (1960) two-factor learning theory looked at how fear was acquired through classical conditioning of a neutral stimulus in a fear-provoking situation. When exposed to a traumatic event a wide range of associated stimuli can

gain the ability to elicit fear through the process of stimulus generalisation and conditioning (Keane et al., 1985). The learning and fear conditioning model (Mclean & Foa, 2011), suggests that repeatedly exposing a person to a traumatic memory and limiting avoidance should aid the process of habituation. Habituation is a reduction in anxiety over time when a person stays in a fear-provoking situation. Habituation reduces symptoms of trauma and facilitates cognitive change related to fear, revealing to the person that their anxiety will naturally reduce (Foa et al., 2007; Mørkved et al., 2014). However, repeated exposure to memories is only successful as treatment if people do not distract themselves, or block/avoid the memories (Brewin & Holmes, 2003). Conditioning theories do provide a helpful explanation for why people can experience a wide range of trauma reminders, and the role of avoidance in maintaining PTSD; however, they do not provide reasons for the aetiology of the condition (Brewin & Holmes, 2003).

Information Processing Theories. Other earlier approaches to understanding PTSD includes information processing theories, which refer to cognitive theories that have focused on the traumatic event itself as opposed to its wider personal and social context (Brewin & Holmes, 2003; Foa et al., 1989). These approaches believe that traumatic memory is not represented and processed in memory as it should be, resulting in psychopathology, and to remedy this, information from the events needs to be integrated into the wider memory system (Brewin & Holmes, 2003). Lang (1979) built on the existing behavioural accounts of fear conditioning that proposed fear was the response of creating associations to particular stimuli, to create a cognitive framework. Lang's framework suggested that frightening events were represented in memory due to them being connected in an associative network. The network consisted of three types of information, stimuli about the event (e.g., sights, sounds etc.), the person's emotional and physiological response to the event, and the meaning ascribed to the event. Resulting in cognition and affect being integrated into the associated network, with the network being programmed to escape or avoid danger. Lang proposed that people have stable fear memories that are easily activated by its associated elements, as when a person is triggered by the environment the whole network activates (Brewin & Holmes, 2003; Lang, 1979). Chemtob et al. (1988) suggested for people with PTSD the fear network is constantly

active meaning the person functions in ‘survival mode’ as an adaptive response to trauma.

The theory of fear networks was updated by Foa et al. (1989) who distinguished PTSD from other forms of anxiety. Foa et al. (1989) suggested that when a person experiences a traumatic event it violates previously held concepts of safety, and this revision includes integrating meaning into fear networks as opposed to it relying solely on conditioning (Brewin & Holmes, 2003). This distinction led Foa et al. (1989) to suggest traumatic memories have different representations than those made from everyday experiences, and that PTSD fear networks had multiple levels of representations, meaning a large number of environmental cues can activate them, and that they were characterised by stronger autonoetic responses. Regarding treatment, this means for the fear network to be overcome the strong associations need to be weakened by activating the network via exposure and adding new incompatible information. The success of treatment was deemed to be experiencing habituation either in or in-between sessions, which would weaken associations in the framework (Brewin & Holmes, 2003; Foa et al., 1989).

Emotional Processing Theory. Foa and Rothbaum (1998) built on Foa et al.’s (1989) theory of fear networks, developing the theory’s applicability specifically to PTSD. This led to the development of Emotional Processing Theory (EPT; Foa & Kozark, 1986), which suggested people with rigid pre-trauma views would be more vulnerable to PTSD (e.g., the event shatters the view of the world being safe), and an emphasis on negative appraisals of behaviours and actions during the event leading to greater difficulties post-trauma (Foa & Rothbaum, 1989). EPT hypothesises that during a traumatic event, the memory storage system becomes fragmented, and the contextual information is not integrated into memory (Brewin et al., 2010), and Foa et al.’s (1989) principles outlined in information processing theories were expanded and related to exposure therapy. Foa and Rothbaum (1998) stipulated the following mechanisms were involved in exposure therapy:

1) Reliving should promote habituation which reduces the level of fear of the trauma and its associated elements, it also counters the belief that anxiety is permanent.
2) Exposure prevents the negative reinforcement of avoidance.
3) Rehearsing the memory in a safe therapeutic environment integrates contradictory information.
4) The trauma memory is discriminated into it being a single event as opposed to a global event that perpetuates a negative view of the self and world.
5) Exposure can lead to cognitive change and positives views of self.
6) By reflecting on the event, the patient can challenge previously held negative beliefs.
7) During the event the memory stored is fragmented, disjointed, and hard to explain. The aim of therapy is to create an organised memory that is integrated into memory.

To summarise therapy reduces anxiety, causes changes in memory structures, and can lead to positive appraisal (Brewin & Holmes, 2003; Foa & Rothbaum, 1998). Further research has found that an optimal level of fear needs to be experienced during exposure for treatment to be as successful as possible. EPT has been found to be a comprehensive theory of PTSD and prolonged exposure, the treatment associated with EPT, and is highly effective in treating it (Brewin & Holmes, 2003; Foa et al., 1991; 1999).

Dual Representation Theory. Moving into a recent theory of PTSD, called Dual Representation Theory (DRT; Elbert & Schauer, 2002), is one which NET draws upon. DRT was initially proposed by Brewin et al. in 1996 and has been revised with the developments in cognitive neuroscience. Brewin and Holmes (2003) posit that trauma memories are fundamentally distinct from 'normal' memories due to there being two (or more) memory systems and that trauma information is better represented in one than the other. In Brewin et al.'s (1996) version of the DRT two memory systems work in parallel, but they can take precedence over the other at different times. Verbally Accessible Memories (VAM) are the oral or written narrative memories of the trauma that is integrated with ABM and can be deliberately retrieved

as required, represented with a complete personal context compromising of the past, present, and future (Brewin et al., 1996; Brewin & Holmes, 2003). The VAM includes what the person was doing before, during, and after the event and has been processed into long-term memory allowing it to be recalled at a later date, but only information consciously attended to is processed and stored (Brewin & Holmes, 2003). However, being exposed to a traumatic event leads to high levels of arousal and greatly shifts the person's attention towards the source of threat, meaning conscious evaluations of the trauma, and primary emotions felt at the time of the event (e.g., fear due to threat) and secondary emotions that come from processing and appraising the event (e.g., guilt due to running away from the threat and not helping others) are stored as part of the VAM (Brewin & Holmes, 2003). The other memory system is the Situationally Accessible Memory (SAM) which contains information from lower levels of perceptual processing of the trauma, such as sensory information (e.g., sight, sound, bodily reactions) that were not encoded into the VAM due to receiving little conscious attention (Brewin et al., 1996; Brewin & Holmes, 2003). The SAM is responsible for flashbacks and due to not being verbally accessible, and being activated by internal or external sensory input, they are difficult to communicate to people and do not interact or get updated by ABM (Brewin et al., 1996; Brewin & Holmes, 2003).The DRT was later updated and while it bares the same theoretical concepts it appears the language was changed and VAMs relate to C-reps, and SAM S-reps. DRT gains support as a theory from the cognitive neuroscience field. Further information on the DRT is provided below.

DRT proposes that there are two different types of memory that are encoded during a traumatic event, one includes sensory and emotional information (S-rep), the other spatial and personal context (C-rep; Brewin & Burgess, 2014). When 'normal' memories are recalled both the C and S rep are retrieved together due to them being tightly associated, as the S-rep is retrieved via the associated C-rep (Brewin & Burgess, 2014). According to the theory involuntary recall (e.g., flashbacks/nightmares) of sensory information occurs due to the strength that it was encoded in, due to the high emotional salience of the traumatic event, whereas the C-rep (context) is weakly encoded with little association to the S-rep (Brewin & Burgess, 2014). This occurs because during a traumatic event, the brain prioritises

sensory-perceptual information at the expense of contextual autobiographical memory (Brewin & Burgess, 2014; Schauer et al., 2011), and may be a result of stress down-regulating the hippocampus (Jacobs & Nadel, 1985), and/or dissociation (Brewin & Burgess, 2014). This occurs as during extreme stress the functioning of the hippocampus is impaired, whereas the functioning of the amygdala is enhanced (Brewin, 2001). The impact of stress on these parts of the brain gives a plausible neural basis for the symptoms of PTSD. VAMs are flexible, able to be modified, but often vague, disorganised, and full of gaps, suggesting their representation is dependent on the hippocampus. This is due to the hippocampus' role in memory as VAMs have a temporal representation and are able to be mentally recalled (Brewin & Holmes, 2003). SAMs are perceptual, elicited automatically, and re-experienced as happening in the moment, suggesting an image-based memory that is not related to the hippocampus and is unable to distinguish past from present (Brewin & Holmes, 2003). Therefore, a successful aspect of treatment for DRT is (re)association of the S-rep with its related C-rep, allowing for the sensory information of the event to be integrated with its context and thus into ABM, or integrate contextual information from the VAM into the SAM system (Brewin & Burgess, 2014; Brewin & Holmes, 2003). The principles of the DRT are seen in people with PTSD, as people often have impaired memory of contexts of events but still experience sensory and affective experiences (Brewin, 2014), which would reflect why NET focuses on adding contextual details during therapy. The level of contextual information available to the person during an event does not relate to the amount of information that is encoded, rather it is dependent on how the information is processed which is impacted by factors such as hippocampal efficiency and/or dissociation (Brewin & Burgess, 2014). Brewin & Burgess (2014) recommend that DRT suggests treatments for PTSD should enhance the ventral streaming (which is responsible for a person's representation of objects and object recognition; Sheth & Young, 2016) and of trauma memories by encouraging the visualisation of the memory from different perspectives, or by interfering with the dorsal steam (which is involved in the processing of visual information to allow people to have a sense of special awareness to guide actions; Sheth & Young, 2016) by using transcranial stimulation. Other requirements include reducing negative emotions and cognitions associated with the trauma by integrating new information that challenges pre-existing beliefs

and concepts (Brewin & Holmes, 2003). Another requirement is to stop activation of the trauma by creating new SAMs through habituation or cognitive restructuring that leads to a reduction in arousal and negative affect (Brewin & Holmes, 2003).

Cognitive Model. Ehlers and Clark (2000) proposed a cognitive model in which trauma psychopathology was suggested to be due to individuals processing the event in a way which produces a current sense of threat, an external threat to safety, or an internal threat to the self and future. The mechanisms behind this are negative appraisals of the trauma and/or of the person's own actions, and the trauma itself, with the nature of the person's appraisals influencing the symptoms they experience. Ehlers and Clark (2000) believed the traumatic memory was devoid of context and not integrated into ABM, explaining the difficulties with intentional recall of the event, and why memories were easily triggered and re-experienced as if in the moment. In the cognitive model behavioural strategies such as suppression, distraction, avoidance, misusing substances, and the use of safety behaviours, alongside cognitive styles such as rumination, and dissociation maintain PTSD (Brewin & Holmes, 2003; Ehlers & Clark, 2000).

Summary of Theories. The more recent theories (EPT, DRT, Cognitive Model) do have a significant degree of overlap, but differ on how trauma impacts memory, the processes of change in memory, and how these relate to therapeutic change and recovery (Brewin & Holmes, 2003). All approaches agree that reliving the trauma is beneficial for contextualisation of the memory; however, they all disagree on how psychotherapy works (see Brewin & Holmes, 2003). Brewin & Holmes (2003) highlighted the need to better understand and assess memory organisation as a risk factor for PTSD, and the need to develop better methods of assessment to do so.

1.8. Further information on NET's mechanisms of change

The two posited mechanisms of change of NET are ABMI and exposure and habituation.

Autobiographical Memory Integration (ABMI). The role of memory phenomenology in the maintenance and development of PTSD has been widely researched. As noted in section 1.7 several theoretical accounts of PTSD suggest the problematic nature of trauma memories relate to symptoms (Brewin, 2014; Ehlers & Clark, 2000; Foa & Rothbaum, 1998; Kangaslampi & Peltonen, 2019). As previously noted, when people experience traumatic events, it leads to encoding the emotionally salient and sensory details at the cost of context (Burke et al., 1992; Elbert et al., 2015; Lane et al., 2015). This gains support from DRT which suggests trauma narratives will be incoherent and fragmented due to the splitting of the VAM and SAM systems (Brewin & Holmes, 2003). There is a breadth of research suggesting the structural indices of trauma accounts such as fragmentation and coherency are crucial to the development, maintenance, and recovery from PTSD (Bedard-Gilligan et al., 2017; Foa et al., 1995). With less coherent accounts being associated with PTSD (Brewin, 2014; Rubin et al., 2016). People with PTSD can find it difficult to narrate traumatic events in a coherent and chronological manner (Burke et al., 1992; Lane et al., 2015; Schauer et al., 2011), as when people recall traumatic memories, their accounts are more fragmented and disorganised (Foa et al., 1995; Harvey & Bryant, 1999). Further research into trauma narratives comes from Gray & Lombardo (2001) who found trauma memories tend to become less fragmented, and shorter in word length as treatment progresses, whereas Foa et al. (1995) found they increased. Through reviewing the literature on the structure of trauma narratives, despite the breadth of literature available, the findings are inconsistent and provide mixed results (Bedard-Gilligan et al., 2017; Brewin et al., 2016). Jaeger et al. (2014) suggests focusing on the content of narratives, as opposed to their structure, would be more useful due to finding changes in content not structure related to symptom improvement.

Moving away from memory structure and onto content, factors important to ABMI are time and place details, as it is suggested people with PTSD are unable to place the event appropriately in time and place (Schauer et al., 2011). People's reports are more distanced and less emotionally intense (Libby & Eibach, 2002; Thompson et al., 1996). People can have vivid recollections including many sensory details (Schauer et al., 2011), and vividness is one of the most defining features of intrusive

memories of PTSD (Sutin & Robins, 2007), with emotional ABM found to have more visual imagery than neutral ones (El Haj et al., 2017).

To better understand the concept of ABMI the researcher completed a systematic literature review of how ABM was assessed and the varying measures psychometric properties. Various methods have been used to study ABM; from structured interviews - the Autobiographical Memory Interview (AMI; Kopelman et al., 1989), through cue word tasks - the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), to narrative measures - The Autobiographical Memory Coding Tool (ABMCT; Kovach, 1993). Well-validated interviews such as the Autobiographical Interview (AI; Levine et al., 2002) have been designed to assess the differences in ABM between healthy and in-patient populations; however, interviews are time and labour intensive and impractical to use in larger-scale research designs (Palombo et al., 2013). Structured questionnaires, such as the Assessment of the Phenomenology of Autobiographical Memory (APAM; Vannucci et al., 2020), are less cumbersome; however, these measures are limited to either assessing the memory of a single event or using single-item ratings. In contrast, analysing memory narratives provides a promising alternative method, addressing several limitations of self-report and cue word methodologies. Narratives are less fallible to demand characteristics and may better reflect the recollection process of naturalistic memory (Kangaslampi & Peltonen, 2019; Sumner et al., 2013).
Little attention has been paid to the psychometric properties of the existing ABM measures, leaving several questions about their quality unanswered. As Boyacioglu and Akfirat (2015) and Sutin and Robins (2007) note, most of the existing measures have not been well developed or had their psychometric properties adequately evidenced. Two of the most widely used measures, the Autobiographical Memories Questionnaire (AMQ; Rubin et al., 2003), and the Memory Characteristics Questionnaire (MCQ; Johnson et al., 1988) use single-item ratings resulting in problems regarding reliability and validity. In addition to the lack of evidence of the psychometric properties of the existing measures, there is a concern they do not assess ABM holistically (Sutin & Robins, 2007; Vannucci et al., 2020). ABM can differ across many qualities in its levels of content, vividness, imagery, and sensory details. Most of the extant questionnaires have assessed these concepts with single-

item ratings, either by creating ad hoc items or taking them from existing measures (Boyacioglu & Akfirat, 2015; Sutin & Robins, 2007; Vannucci et al., 2020). While there is consensus on the definition and structure of ABM, there has been little agreement on the dimensions that need to be assessed. When Sutin and Robins (2007) and Boyacioglu and Akfirat, (2015) conducted literature reviews to create their measures they found 10 and 17 dimensions respectively. There has been a growing recognition of the importance of assessing the wide range of phenomenological constructs of ABM; however, these areas have been scarcely studied, suggesting a need for measures to assess ABM holistically.

Overall, the literature reflects that there is a wide range of research and measures into ABM, but there are different views on how to measure ABM and what it consists of. The existing measures have issues with their psychometric properties, but memory narratives provide a promising alternative. Previous literature has highlighted the need to study the link between memory phenomenology and PTSD (Sutin & Robins, 2007), and this gap still needs to be investigated. Many of the existing therapeutic approaches emphasise the need to reorganise and integrate trauma memoires into ABM for therapy to be successful (Schnyder et al., 2015). NET posits creating the lifeline and processing each event in a chronological order while paying attention to the time and place details of the event, allows for ABMI (Schauer et al., 2011; 2020). However, despite NET's claims the role of ABMI as a mechanism of change has not been evidenced empirically (Kangaslampi & Peltonen, 2019). The way the researcher proposes to investigate ABMIA is through analysing how trauma narratives change through therapy, to do this the researcher created a coding tool (see section 2.4).

Exposure and Habituation. NET's other posited mechanism of change is exposure via conversation (Schauer et al., 2011). A person can complete in vivo exposure which is repeatedly being exposed to the traumatic reminders of an event, and/or imaginal exposure which is repeatedly exposing oneself to the traumatic memory. The process of exposure instigates habituation, which is a reduction in anxiety over time when a person stays in a fear-provoking situation. Habituation reduces symptoms of trauma, and facilitates cognitive change related to fear,

revealing to the person that their anxiety will naturally reduce (Foa et al., 2007; Mørkved et al., 2014). Please refer to section 1.7 on emotional processing theory for further information on how exposure and habituation influences change.

Habituation can be measured in many ways, one includes measuring within session habituation (WSH) by looking at the changes between the subjective units of distress (SUDs) at their peak and end of the task, another is to measure between session habituation (BSH) by comparing the difference between peaks of SUDS at the first and subsequent exposure, and finally by looking to see if there are reductions in physiological measures of anxiety within or across tasks (Craske et al., 2008). The evidence regarding the effectiveness of habituation as a mechanism of change is mixed. Baker et al. (2010) found both WSH and BSH related to positive treatment outcome, whereas Cooper et al. (2017) suggested BSH is a stronger predictor of successful treatment than WSH. However, Craske et al. (2008) suggested neither WSH and/or BSH are related to treatment outcome. The reason for these mixed findings may be due to the methodologies used to capture them, as exposure and habituation are usually measured via SUDs which the validity of, have been questioned (Annett, 2002; Schäfer et al., 2018). More objective physiological measures of arousal (and thus exposure) are heart rate monitors which provide an alternative to SUDs (Annett, 2002; Schäfer et al., 2018), and the current study made use of both heart rate monitors and SUDs to provide as much data on exposure and habitation as a change mechanism as possible.

1.9. Information on how PTSD impacts memory

Please refer to section 1.7 and DRT for further information of how memory is impacted during a traumatic event.

To first understand how trauma impacts memories, it is necessary to understand more about memory and how it is stored. ABM is a unique form of human memory, defined as mental representations of events from one's past and semantic information about the self (Fivush, 2011; Griffith et al., 2012). Fivush (2011, p.560) builds on this definition stating ABM "moves beyond the recall of events, to integrate

perspective, interpretation, and evaluation of the self across time, creating personal history". ABM is a higher-order cognitive process, made up of a set of integrated systems, including episodic and semantic memory processes (Fivush 2011; Levine et al., 2002; Squire, 2004; Tulving, 2002). Tulving (1972) differentiated between semantic and episodic memories. Semantic memory is explicit knowledge of the world and is based on the belief of the memory content, for example, knowing the capital of France is Paris. Episodic memories are specific with a time and place, for example, 'the summer I visited Big Ben during a trip to London'. Tulving (1972; 2002) highlighted a crucial distinction between episodic and semantic memory: episodic memory has elements of reliving the event due to autonoetic consciousness; the ability to have an awareness of the self-having experienced the event, and then to time-travel mentally.

Memory can be split into two systems: declarative, and non-declarative. Non-declarative memory is made up of multiple systems including procedural knowledge of skills and actions with little conscious awareness, such as most forms of conditioning and priming (Fivush, 2011; Schacter et al., 2008; Squire, 2004). Declarative memory is conscious and entails the explicit representations of past experiences (Fivush, 2011). In terms of retrieval, there is a consensus that ABM is organised in a hierarchical structure, where memory types are split into extended, summarised, and specific event categories. The events vary in their level of specificity and length in time, with extended events at the top of the hierarchy, and specific at the bottom (Belli, 1998). Retrieval occurs through an integration of multiple pathways in a top-down approach through the hierarchy and is done sequentially within life themes (notable events in a persons' life) that combine extended events, and in parallel across life themes involving sequential and contemporaneous events (Belli, 1998). During recall, the hierarchical structure posits that more general events are recalled first, before more specific and detailed events. Squire (1994) proposed that declarative memoires can be deliberately retrieved, whereas non-declarative cannot. Non-declarative memories influence a person's behaviour, but are activated through environmental, or internal cues such as traumatic memories (Schauer et al., 2011). A memory of a single event can be stored as either declarative (e.g., remembering the day of mastering a new skill) or

non-declarative (e.g., repeated conditioning of the newly acquired skill; Schauer et al., 2011). When memories are retrieved, they have a recollective reliving experience allowing people to access sensory-perceptual information that was present at the time of the original event (Tulving, 2002). Retrieval of sensory perceptual reasoning is the final step in recalling a memory (Conway, 2001). This type of retrieval is not possible for everyday events as not all events are encoded into long term memory, memories of salient events or those created under highly emotional states are integrated into ABM (Conway & Pleydell-Pearce, 2000; Talarico et al., 2004). For more on sensory-perceptual representations please see section 1.7 on information processing theories.

During a traumatic event a person enters a physiological alarm state and goes into the freeze, flight, fight, fright, flag, and faint response which sets of a chain of reactions influencing the brain and body (Schauer et al., 2011). Neuroimaging studies have shown the impact PTSD has in causing neurobiological changes, particularly in the hippocampus, amygdala, medial prefrontal cortex, and anterior cingulate cortex (Kolassa & Elbert, 2007; Schauer et al., 2011). Stressful situations and environments affect the brain, with stress hormones impacting the hippocampus and amygdala (Bremmer, 2002; Schauer et al., 2011). Small levels of stress hormones enhance memory consolidation of emotionally arousing and contextual information (Buchanan & Lovallo, 2001), with the effects of the stress hormones being mediated by the amygdala (McGaugh, 2002). Therefore, the release of small amounts of stress hormones can be adaptive to a person as they are able to encode information about dangerous situations; however, this can become maladaptive when people are subjected to extremely and/or repeated stressful events (Schauer et al., 2011). As the prolonged presence of stress related hormones during an event can inhibit a person's learning and memory due to its impact on the hippocampus, and lead to difficulties with inhibiting the fear response due to effects on the amygdala (Schauer et al., 2011). The medial temporal lobe and hippocampus transform and construct memories containing ABM and are key in building the context of events to aid in episodic memory functioning and emotional regulation (Schauer et al., 2011). The amygdala and cingulate cortex are responsible for sensory-perceptual information. The amygdala assesses threat related stimuli,

regulating the defence cascade, and is involved in the acquisition and expression of conditioned fear responses (Schauer et al., 2011). The medial prefrontal cortex mediates activation of the amygdala and is involved in the process of fear conditioning (Cardinal et al., 2002). The medial prefrontal cortex includes the anterior cingulate cortex which evaluates the emotional importance of a stimulus and how much attention is paid to it (Cardinal et al., 2002).

In PTSD the amygdala is highly responsive to trauma associated stimuli, which impacts the hippocampus and medial frontal cortex, the resulting release of stress hormones impair the brain's functioning, and ability to store memories correctly (Schauer et al., 2011). Small amounts of stress hormones can improve the ability of the hippocampus; however, if its threshold is exceeded, its functioning becomes severely impaired. If a reminder of a traumatic event occurs it can lead to activating the amygdala leading to high levels of stress and arousal resulting in the hippocampus and medial frontal cortex becoming impaired (Nutt & Malizia, 2004). The size of the hippocampus has been found to be smaller in people with PTSD compared to those without it, with repeated exposure to traumatic stimuli at a young age significantly causing a reduction in hippocampal size (Bremner et al., 2003). However, smaller hippocampal volume is not a risk factor for developing PTSD but occurs as a response to being exposed to chronic stressors (Bonne et al., 2001). Other changes in the brain that occur as a result of chronic exposure to traumatic stimuli are the remodelling of the lateral prefrontal, parietal, and posterior midline structures. These regions of the brain are involved in the process of episodic memory, emotional processing, and executive control (Eckart et al., 2010; Schauer et al., 2011).

1.10. Memory reconsolidation and therapeutic change

Multiple therapies have noted the importance of activating emotional arousal as a core aspect of therapeutic change (Foa & Kozack, 1986; Frank, 1974; Missirlian et al., 2005). With more recent approaches wanting to understand how our developmental experiences contribute to our way of understanding the world, and how memory processes interact with emotional processes and thus potentially

therapeutic change (Lane et al., 2015). Lane et al. (2015) proposed memory reconsolidation as a mechanism of change, as a theory it proposes that activating old memories with their associated emotions while introducing new emotional experiences in a therapeutic context enables new elements to be incorporated into the old memory leading to change (Ecker, 2021; Lane et al., 2015). It is argued that the change this creates will then be translated into a wide range of environments and contexts (Lane et al., 2015). An integrated memory model is assumed consisting of three associated components that lead to maladaptive behaviours, the three areas are: 1) ABM; 2) semantic structures; 3) emotional responses. The integrated memory model is similar to that of fear networks (Foa et al., 1989), but Lane et al. (2015) argued this model is predicated on the latest findings from neuroscience. Through activating the old memory and its associated emotional response in therapy allows for reactivation, re-encoding, and re-consolidation. Evidence suggests that memories of events and semantic structures are interactive (Ryan et al., 2008), which means updating previous event memories via new experiences allows the knowledge and rules about the prior event to be updated. Therefore, allowing for new semantic structures/rules/schemas to develop, leading to more adaptive and flexible cognitions and more appropriate emotional responses (Lane et al., 2015). Memory reconsolidation does not mean the original memory is replaced with a new one or new semantic structures, rather, it leads to the original memory with its semantic structures being transformed (Lane et al., 2015).

Memory reconsolidation as a theory believes that emotional responses can be implicit as the bodily response associated with the emotion can occur without awareness of such feeling states (Lane et al., 2015). This is relatable to PTSD due to the nature of external and internal reminders leading to flashbacks/nightmares. Further relating the theory to trauma, the process of therapy in narrating trauma could help the patient add contextual information to their memories that were not available to them at the time (Nadel & Jacobs, 1998). Narration would lead to implicit emotions, and sensations being able to be named, and new information being integrated with the older memory through reconsolidation (Lane et al., 2015). The reconsolidation period is estimated to last for around five hours (Ecker et al., 2012). Moving onto the nature of memory after experiencing an event, the memory created

undergoes a process of stabilisation referred to as consolidation (Lane et al., 2015). This means the memory is less likely to be interfered with by memories of other similar experiences, and it is more likely to be successfully recalled later (McGaugh, 2000). As memories age and are recalled they undergo revision and are re-shaped, with repeated recollections typically leading to shortened recalls with events being discarded, transformed, or added (Bartlett, 1932; Lane et al., 2015). However, ABM memories that are important or highly emotional for a person appear 'scripted' when repeatedly recalled becoming more consistent over time (Nadel et al., 2007). Once stabilised, memories are more likely to be successfully recalled, with Multiple Trace Theory (MTT) offering a suggestion for how memories are consolidated (Moscovitch & Nadel, 1999).

MTT posits as long-term episodic memory recall always involves the hippocampus which leads to strengthening of the mental representation of the event, and this has support from neuroimaging studies (Lane et al., 2015; Moscovitch et al., 2006). Other theories of memory consolidation propose after an event the memory is fragile, labile, and during this time it is able to be interrupted to stop it forming, but after time has passed the memory is permanent and maybe modified, but not eliminated (Lane et al., 2015). MTT suggests that every time the memory is retrieved it becomes fragile and labile, needing another consolidation period (i.e., reconsolidation), but during this new information can be added (Nadel et al., 2000). Every time an episodic memory is recalled a new opportunity to encode it occurs, expanding its memory trace, making it more accessible and likely to be retrieved in the future, as adding new information as part of the recollective experience means the memory is strengthened and altered (Lane et al., 2015; Nadel et al., 2007). Relating this to PTSD, every time a memory is triggered the memory undergoes reconsolidation, and this means the memory can be disrupted and eliminate the previously conditioned fear response. This is because reconsolidation changes components of the retrieved memory; however, it does not lead to extinction, because the original memory trace can be reinstated if exposed to a relevant cue in a new context (Lane et al., 2015). As emotional memories are more likely to be remembered, in the instance of a traumatic memory being triggered this would lead to activation of the amygdala, and according to the MTT the recollected event and its

emotional response will be reconsolidated, meaning the original memory is strengthened and more likely to be recalled in the future. However, the MTT also explains how this process can be interrupted, as if the traumatic memory is activated in a safe therapeutic context where new information is integrated into the original memory transforming it, leading to re-evaluating the memory and lowering emotional arousal, it can lead to therapeutic change. As therapy changes our understanding of past experiences and manipulates the original memory meaning it will no longer be retrievable in its original form (Lane et al., 2015).

As memory reconsolidation proposes an integrated memory system linking ABM, semantic structures (e.g., rules/knowledge gained from past experiences), and emotional responses it means memories can be activated in many ways. The memory system can be activated by emotional responses, behaviours, perceptual details, and the rules/principles used to interpret the situation. As any of these areas can activate the memory structure, they can also update other areas via reconsolidation (Lane et al., 2015). Therefore, Lane et al. (2015) argued the integrated memory model can provide a common language and mechanism of change regardless of the therapeutic modality, due to therapies commonly affecting emotional responses, semantic structures, and/or episodic/ABM memory.

The theory of memory reconsolidation as a mechanism has been criticised. Brewin (2015) in response to Lane et al.'s (2015) paper stated that other more plausible theories evidenced by neuroscience provide a stronger alternative approach such as retrieval competition. Instead of old memories being reorganised with new information, Brewin argued memory reconsolidation had not been well evidenced in humans and that the alternative possibility suggests therapies created new memories that competed against old ones, with the most accessible memory having the greatest influence on behaviour (Brewin 2006; 2015). The suggestion of memory reconsolidation being a unifying model of therapeutic change was also criticised, due to Brewin (2015) believing therapeutic change cannot be explained by one process. However, Brewin did agree that investigating the role of memory and changes in memory as a mechanism of change is one of the most promising methods of enquiry available at this time. While memory reconsolidation has been

criticised as a theory and there are other plausible explanations, what is clear is the need to further research the role of memory phenomenology and psychopathology.

1.11. Jaeger et al.'s (2014) coding framework

Jaeger et al. (2014) examined the structural indices and content of trauma narratives of 35 female assault survivors. The narratives were examined to see the association between the structure and content of trauma narratives and PTSD, but also included difficulties such as depression, anxiety, anger, dissociation, and guilt. Structural factors of narratives include fragmentation and disorganisation, including confusion of order, difficulties remembering important details, repetition of words and speech fillers, it is hypothesised the presence of these factors indicate difficulties with encoding the memory (Brewin et al., 1996; Ehlers & Clark, 2000; van Der Kolk et al., 1995). Content of narratives has also been suggested to explain who may go on to develop PTSD or not (Jaeger et al., 2014). Jaeger et al. (2014) highlighted the existing gap in the literature examining trauma narratives. To code the narratives disorganisation was operationalised by reviewing the literature from Harvey and Bryant (1999) to include disjointedness, confusion, and repetition of an utterance, see Table 7 for examples. Fragmentation was operationalised by consulting the work from Foa et al. (1995) to include repetition of word, unfinished thoughts, or speech fillers (see Table 7). Total word count was also analysed as part of the study. Participants were asked to describe a daily event and then a trauma event to a researcher for five minutes each and followed the procedure laid out by Foa et al. (1995). The coding ranged from having good to very high inter-rater reliability dependent on the area measured. When recounting style and levels of distress were accounted for, Jaeger et al. (2014) found that the structure of the narrative was not associated with PTSD, or any other difficulties examined. However, the use of more emotional language, higher cognitive processing, and less self-focus (i.e., pronoun use) were associated with lower levels of symptomology, Therefore, it is what people say (content) not how they say it (structure) that is related to symptomology, and the emotional processing of the event.

Jaeger et al. (2014) provided much needed research into trauma narratives, and although their findings contradicted a vast amount of existing literature (Brewin et al., 1996; Ehlers & Clark, 2000; van Der Kolk et al., 1995), they added further support for Brewin's (2016) claims suggesting the evidence on traumatic memories becoming less fragmented and more coherent is mixed. The researcher of the current study took the tool as operationalised in Table 14 and adapted it to include areas of ABM.

Table 14

Narrative Analysis Coding Framework (Jaeger et al., 2014)

Disorganisation	Examples	Fragmentation	Examples
Repetition of Phrases (Following each other in narrative)	"I couldn't get away... I couldn't get away"	Unfinished Thoughts	"So then..."
Confusion	"I don't know how I got up"	Repetition of Words (Within the same phrase)	"My my my head my head was spinning"
Disjointedness	"He I was go brought with over"	Speech Filler (Counted individual)	"Um….er"

1.12. The use of heart data in psychological research

The use of heart rate monitors to collect heart rate data, more particularly heart rate variability (HRV) and heart rate (HR) to assess therapeutic outcomes has become increasingly popular (Cohen et al., 1999; Pignotti & Steinberg, 2001). Part of the reason for this is due to HRV being a non-invasive, highly sensitive, reliable, and objective tool. HRV is highly stable as it does not change without intervention and does not respond to placebo effect (Kleiger et al., 1991; Pignotti & Steinberg, 2001; Stein et al., 1994). HRV measures the variation of intervals between heartbeats (fluctuation in time between adjacent heartbeats), and the balance between the

sympathetic and parasympathetic systems of the Autonomic Nervous System (ANS; McCraty & Shaffer, 2015; Pignotti & Steinberg, 2001), whereas HR is the number of beats per minute (McCraty & Shaffer, 2015). HRV reflects the autonomic balance of many aspects of physical health such as blood pressure, gas exchange, gut, heart, and vascular tone which regulates blood pressure (Gevirtz et al., 2016). A healthy heart's fluctuations are described as "mathematical chaos", as its oscillations are complex and non-linear (Golderberger, 1991). The variability in the heart can be adaptive as it provides the flexibility needed to cope with and understand rapidly changing environments (Beckers et al., 2006). Optimal levels of HRV are associated with better health, self-regulation, resilience, and higher levels of resting HRV help the performance of executive functioning (McCraty & Shaffer, 2015). HRV is relevant to psychology as research by Damasio et al. (2000) showed that emotions, such as fear, were associated with certain regions of the brain and the ANS; therefore, measuring heart data and HRV gives an objective measure of a person's emotional state (Pignotti & Steinberg, 2001). Low HRV is associated with psychological and physical health difficulties, as research has shown low HRV is a predictor of mortality, an indicator of poor health (Bigger et al., 1992; Dekker et al., 2000; Tsuji et al., 1996), and is associated with anxiety (Friedman & Thayer, 1998a); people with PTSD have lower HRV even when not exposed to traumatic stimuli compared to those without PTSD (Cohen et al., 1998). Too high HRV also poses a risk to health (deBruyne et al., 1999; Dekker et al., 2000), as some conditions that are pathological can produce higher HRV (Stein et al., 2005). Increased cardiac vagal tone is associated with elevated HRV (Frustaci et al., 2010; Stein et al., 1994). Vagal control is more efficient in modulating changes in HR than sympathetic control, and the degree of vagal control determines the responsivity and sensitivity of HR in certain environmental conditions (Goldberger, 1991; Saul, 1990). High vagal tone represents a person's 'flexibility' in varying physiological and psychological conditions, whereas reductions in vagal functioning are associated with a lack of adaptive functioning, and poor health (Friedman & Thayer, 1998b).

When a person experiences a trauma, it leads to psychological and physiological changes, with the person experiencing hyperarousal, greater sensitivity to triggers, and heightened startle response (Frustaci et al., 2010). Previous research has

measured people's physiological responses via self-report, whereas more objective cardiac measures are available (Keane et al., 1998). Typical features of PTSD include having heightened psychophysiological baseline scores and greater physiological activity to trauma reminders, with research showing these occur after the event and are not pre-existing risk factors (Buckley & Kaloupek, 2001; Frustaci et al., 2010). Therefore, gaining more objective physiological measures helps to better understand the process and efficacy of therapy and are recommended as opposed to relying on self-reported symptoms (Orr et al., 2003). Measuring HRV provides a quantitative assessment of cardiovascular autonomic response. The root mean square of successive RR interval differences (rMSSD) is often used as a measure of HRV in psychophysiology (Owen & Steptoe, 2003) as well as in physical health issues as it is considered the most useful marker of parasympathetic neural activation (Shaffer & Ginsberg, 2017; Zygmunt & Stanczyk, 2010), and is considered a primary measure of change in HRV with it estimating vagally mediated changes in HRV (Shaffer & Ginsberg, 2017; Shaffer et al., 2014).

Extended Method

2.1. Study epistemology

A critical realist stance was taken for this study; this stance was born out of the frustrations with positivist and constructivist approaches (Denzin & Lincoln, 2011).

Positivism is aligned with the hypothetico-deductive model of science, which starts with building a testable hypothesis, designing an experiment through operationalising variables, conducting the experiment, and using the findings to inform theory/literature (Park et al., 2020). Positivism favours quantitative methods and one of its main goals is to generate explanations or causal relationships that lead to prediction and control of the area being explored (Gergen, 2001; Park et al., 2020; Sciarra, 1999), which is a problem, as it implies such tests can give an objective access to reality. Constructivist approaches are also labelled as interpretivist. These paradigms are associated with qualitative approaches that emphasise the world is

socially constructed through language and explore people's experiences, as opposed to finding 'truths' (Alharahsheh & Pius, 2020), which is a problem as if 'all' is socially constructed how is one's truth tested against another's? Critical realism takes aspects of both approaches and combines them to make a philosophy of science which gives a robust account of ontology and epistemology (Brown et al., 2002). One of critical realism's defining tenants is that ontology (what is real), is not reducible to epistemology (our knowledge of reality), as human knowledge only captures a limited part of reality (Fletcher, 2016).

Critical realism argues that research methods should be informed by the area being researched, and that by using qualitative and quantitative methods allows for areas to be examined in depth from different angles (Pratschke, 2003). Using both approaches would mean that quantitative methods could test the causal mechanisms of a theory, whereas qualitative methods could explore areas missed by quantitative approaches (McLeod, 2000). It has been argued that case studies are the best methodology design for critical realism, due to case studies often seeking to develop casual relationships of complex events (Easton, 2010; Wynn & Williams, 2012). Therefore, critical realism was deemed the most appropriate stance to take for the study, as the study was mixed methods, meaning the quantitative approaches can be used to test causal mechanisms put forward by NET, and can be combined with qualitative approaches to investigate complex concepts such as patient's experiences and own explanations for change that quantitative methods could not answer alone.

2.2 Overview of study design including rationale and critique

Single Case Designs. As time has advanced so have the methodologies employed in psychological sciences, with a move away from studying individuals, to looking at groups of people. Prior to the development of group designs single case designs (SCDs) were used (Morgan & Morgan, 2008). One of the most common methodologies currently employed in the scientific field are RCTs, which look at groups of people, they do have the benefit of controlling biases and confounding variables of the observed effect, but also have limitations (Westen et al., 2004).

Limitations of RCTs include sampling biases, as they often exclude a large number of participants, and have a 'selected' sample (Morley, 2017; Schulz et al., 2010), and double-blind studies often fail to implement the blinding of conditions in a meaningful manner (Morley, 2017). Despite this RCTs and other group designs provide valuable research; however, SCDs can be used to generate robust practice-based evidence (Barkham et al., 2010; McMillan & Morley, 2010). As SCDs can answer the question of if an intervention will be helpful for an individual, whereas RCTs/group designs cannot answer if an intervention will be helpful for an individual or explore the processes occurring in a therapy (Morley, 2017).

Single case research comes in several forms, there are case studies, single case quantitative analyses, and single-case experiments (Hillard, 1993). Case studies generally provide qualitative observations of what has happened in therapy, with no formal attempt to manipulate treatment (Hillard, 1993). Single case quantitative analyses describe designs where quantitative data was captured, but with little attempt to manipulate variables (Hillard, 1993). Single case experiments or SCDs are an experimental design that gains quantitative data through the manipulation of the intervention, allowing for valid conclusions about the impact of treatment on the area of interest (Hillard, 1993). SCDs offer a clinically practical, valid, and credible alternative to more mainstream methods, and provide a systematic methodology, design of data collection, and analysis, allowing for efficacy and effectiveness to be examined where group designs cannot be implemented (Morley, 2017). SCDs consist of three phases: 1) period of assessment allowing for baseline observations; 2) a period where the intervention is applied; and 3) a follow-up period to assess the impact of treatment (Elliot, 2002; Morley, 2017). This is often referred to as an A-B design with phase A being the baseline, and B the intervention. SCDs take repeated measurements and compare the variability and trends in data across phases to make inferences about individual differences that may explain the results which are often missed in group designs (Morgan & Morgan, 2008; Morley, 2017). In SCDs the individual acts as their own control condition and the level of change is measured against themselves. As the individual is their own barometer of measurement, and because SCDs use target and process measures that are specific to the individual or area of interest, this offers a way of addressing complex questions about the

variability of conditions for individuals that is not possible in groups designs (Morley, 2017). This level of rigorous measurement and exploration at the individual level allows for the development and evaluation of novel treatments (Schork, 2015). The use of SCDs and testing mechanisms at the individual level allows for replication of treatments across several patients and clinical settings (Heyvaert et al., 2012). This is an important aspect of SCDs as it provides evidence that a treatment is potentially effective and generalisable across settings demonstrating external validity (Morgan & Morgan, 2008; Morley, 2017).

Rationale of Study Design. This study adopted a mixed-method, naturalistic, sequential measurement, SCD A-B and follow-up (FU) design (Barlow et al., 2009). A non-treatment baseline phase (A) was followed by up to a twelve-week NET treatment phase (B) and then a FU phase. A SCD was chosen due to being able to use target and process measures that are specific to the individual and area of interest which cannot be done in large group designs (Morley, 2017). This was pertinent to the study as the research question was to explore the purported change mechanisms of NET, and the researcher created a measure of ABMI, applying it as a process measure. Using a SCD, allows for relationships between variables to be investigated rigorously, and if designed well can have good levels of generalisability (Lobo et al., 2017). As the research site was an NHS clinic, the naturalistic setting allowed for generalisability. An AB design was used in the study. In an AB design, measurements are repeatedly taken through the baseline phase (A), giving a comparison for the intervention phase (B; Morley, 2017). Using an AB design allows for the process and outcome variables to be examined in depth (Kazdin, 2010); therefore, meeting the study's aim by allowing the mechanisms of change to be examined in detail. However, AB designs have been critiqued due to the changes in the outcome variable potentially being explained by extraneous factors, therefore, not establishing causality.

To demonstrate effectiveness with SCDs it is argued that the interventions findings need to be replicated across three studies, and that a minimum three baseline data points are needed before introducing the intervention (Kratochwill et al., 2010; Lobo et al., 2017; Morgan & Morgan, 2008; Morley, 2017). Having an

extended baseline has advantages in demonstrating validity (Barlow et al., 2009); however, it does come with risks as Kractochwill et al. (2010) does not recommend delaying treatment for people with risk variables (i.e., self-harm). As such an AB design with three baseline data points was used in this study due to it being the most appropriate design scientifically and ethically. There were multiple case series designs that could have been used for the study. Other than AB designs, an ABA (reversal design), or multiple baseline approach could have been used (Lobo et al, 2017; Morley, 2017). In multiple baseline approaches the treatment phase is staggered and introduced later for some individuals, as it allows the researcher to make more valid inferences of the impact of treatment (Kratochwill et al., 2010). However, the issue with this is an ethical one as it withholds treatment from people who are potentially in distress (Morgan & Morgan, 2008). As the study recruited people from an NHS clinic who had experienced trauma withholding treatment and/or making people wait longer to strengthen the study's claims of validity was not acceptable. ABA designs look at introducing treatment, taking it away, and then re-introducing it as it allows for stronger claims of the effect of treatment to be made (Morgan & Morgan, 2008). However, again this raises ethical issues of withdrawing a potentially beneficial treatment from a person, also given the intervention involved therapy it is not possible to 'de-skill' someone and take the effect of the intervention from them (Lobo et al., 2017).

Rationale for Sample Size. Research into the minimum sample size needed to demonstrate a good level of external validity and power within a SCD, varies from 3-4 people, with the effect of the intervention needing to be demonstrated across three sets of people (Kratochwill et al., 2010; Lobo et al., 2017; Morgan & Morgan, 2008; Morley, 2017). For these reasons, four people were recruited, with three completing the study. The original intention was to recruit six people to account for attrition; however, there were difficulties with recruitment and the minimum of three participants were met and deemed satisfactory by the research team.

2.3. Justification of inclusion and exclusion criteria

Participants were invited to take part in the study if they met the following inclusion criteria:

1. Between the ages of 18-65.
2. Could give fully informed consent.
3. Experiencing traumatic stress resulting from multiple trauma (no diagnosis of PTSD/CPTSD needed).
4. Could communicate verbally and were fluent in English.
5. Had no ongoing trauma focused therapy.
6. Referred to secondary care mental health services and assessed as appropriate for NET by the service.

The study wanted to work with adults and not older adults (see rationale below) therefore, anybody between the ages of 18-65 were deemed eligible, and only adults accessed the recruitment sites. Fully informed consent was gained to ensure each participant had capacity and was able to decide to take part in the study if they wanted to do so. The person needed to be experiencing symptoms of trauma due to NET being designed to work with trauma populations, no diagnosis was required as the services were psychology led, meaning diagnosis was not provided, and the researcher did not want to exclude people based on a psychiatric label as long as they were showing symptoms of trauma (section 1.1 also calls into question the validity of diagnosis). Working with people who were fluent in English was to make sure the person would be able to engage and benefit from therapy that would be delivered in English. The person having no further ongoing therapy was crucial to not add any additional confounding variables to the study. Finally, being referred to a secondary care mental health service was related to the standard service provision and having access to the population the study wanted to work with.

Participants were not eligible to take part in the study if they met any of the following exclusion criteria:

1. Under the age of 18.
2. Above the age of 65.
3. Currently experiencing an episode of psychosis.
4. Had an intellectual disability.
5. Were actively suicidal.
6. Were non-fluent in English.
7. Were currently abusing substances.

The exclusion criteria reflect trying to ensure that any variables that can impact one's ABM had been considered. These variables were assessed by the person completing the assessment and then by the researcher at the initial appointment. A person was deemed non-fluent in English if they needed an interpreter to be able to engage in the session. If the assessment highlighted that a person was misusing substances and unwilling to abstain while taking part, they were deemed not eligible. Substance misuse was defined in the study by taking a definition provided by the NHS as "continued misuse of any mind-altering substance that severely affects a person's physical and mental health, social situation and responsibilities". Substance abuse has been shown to impair the formation and retrieval of ABM (Quednow et al., 2006). As people get older it can have an impact on ABM as the accurate recall of events becomes more difficult, therefore, older adults were not eligible to take part in the study (Leahy et al., 2018). Zhang et al. (2019) provided evidence showing that people experiencing psychosis were less able to recall ABM events; therefore, people experiencing psychosis were unable to take part in the study. As a person who was actively suicidal would require a different treatment than NET, participant safety was considered due to the potential iatrogenic effects of treatment; therefore, a person who was actively suicidal was not able to take part in the study. As one of the study's research aims was to investigate posited change mechanisms, and not the use of NET within certain populations, people under the age of 18, those who

were not fluent in English, and people with an intellectual disability were not eligible to take part in the study.

2.4. Additional information and rationale for study measures.

An overview of the measures including critique and rationale for the use of them in the study is provided in the following section. Table 15 provides information for how often the measures were collected.

Impact of Events Scale Revised (IES-R). The IES-R (Weiss & Marmar, 1997) measures symptoms of post-traumatic stress disorder. It is a 22 item self-report questionnaire, and is divided into three subscales that assesses intrusion, avoidance, and hyperarousal in PTSD over the last seven days, with higher scores representing more severe symptoms. As the name suggests the IES-R is a revised version of the IES which is one of the most widely used self-report measures of trauma (Beck et al., 2008; Creamer et al., 2003). As the diagnosis of PTSD changed in the DSM-III (APA, 1980) so did the measures used to assess it, and the IES-R was created to reflect the three symptom clusters identified in the DSM-III (Beck et al., 2008). The psychometric properties of the IES-R have been tested and it has been found to have high levels of reliability, with test-retest reliability (Motlagh, 2010): r = 0.89 to 0.94 and Cronbach's alpha (Creamer et al., 2003): Intrusion = 0.87 to 0.94, avoidance = 0.84 to 0.97, hyperarousal = 0.79 to 0.91. It has high levels of validity- concurrent validity when compared to IES, (Beck et al., 2008): Intrusion (r = 0.86) and avoidance (r = 0.66) subscales. The tool also has good discriminative validity (Creamer et al., 2003). This has led some to conclude that the IES-R is a gold standard measure (Christianson & Marren, 2012).

Given the IES-R's good psychometric properties, and it being a shorter self-report measure with patient burden in mind, it was used. The measure was amended to make participants aware that it was assessing all of their traumatic events as opposed to assessing singular events which is what the measure is made for, and this could impact the tool's reliability and validity. However, to the researcher's knowledge there are no existing measures assessing trauma symptomology for

multiple events that could be used to assess the effectiveness of therapy. Therefore, the IES-R had to be used.

Depression Anxiety and Stress Scale 21 (DASS-21). There was a wide range of potential measures available to the researcher to assess psychological difficulties, such as the Patient Health Questionnaire-9 (PHQ-9; Spitzer et al., 1999) for depression, the General Anxiety Disorder Assessment (GAD-7; Spitzer et al., 2006) for anxiety, or the Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM; Evans et al., 2002) which is a 34-item self-report questionnaire covering well-being, functioning, problems/symptoms, and risk. The researcher wanted a measure that covered a range of psychological difficulties relevant to the population, and one that would see if adapting the NET protocol had an impact on people's overall psychological health. The PHQ-9 and GAD-7 were not used to reduce patient burden as the researcher felt having participants complete one questionnaire would be less cumbersome. The CORE-OM did not seem relevant to the trauma population due to the areas assessed as the population who accessed the recruitment sites often have comorbid conditions such as anxiety and/or depression. Therefore, the DASS was considered. The original DASS is a 42-item self-report questionnaire measuring depression, anxiety, and stress and was created due to previous measures failing to discriminate well between depression and anxiety conditions (Lovibond & Lovibond, 1995; Oei et al., 2013). However, the researcher felt asking participants to complete a 42-item measure would be too long given this was not the only questionnaire being used. The DASS-21 (Lovibond & Lovibond, 1995) was created to reduce administration time and is measure of general psychological distress with three subscales measuring depression, anxiety, and stress, it is a self-report questionnaire ranging over the last seven days. To score the DASS-21 the scores from the measure are multiplied to give original DASS scores, with higher scores reflecting greater difficulties. The measure is widely used across many cultures, clinical populations, and has high levels of reliability and internal consistency (Crawford, & Henry, 2003; Norton, 2007; Oei et al., 2013): depression: range α=.829 to .947, anxiety: range α=.778 to .947, stress: range α=.871 to .933; total α=.966. It also has good levels of validity: convergent validity of the DASS depression scale compared with the personal disturbance scale (sAD; Bedford &

Foulds, 1977) measure: r=0.78 (Crawford & Henry, 2003), convergent validity of the DASS anxiety scale compared with sAD measure: r=0.72 (Crawford & Henry, 2003), and convergent validity of the DASS stress scale compared with the positive and negative affect schedule (PANNAS; Watson et al., 1988) measure: r=0.67 (Crawford & Henry, 2003). The DASS-21 was chosen due to the measure's good psychometric properties, it being a shorter measure (with participant fatigue in mind) of general psychological distress, depression, anxiety, and stress. This was because the study investigated if NET had an impact on secondary outcomes, and to see if the adaptions to the protocol impacted the intervention received by the participants.

Life Events Checklist (LEC-5). The Life Events Checklist (LEC-5; Weathers et al., 2013) which is part of the PCL-5 (Weathers et al., 2013) was used to assess the number and type of traumatic events a person has experienced which was collected as demographic information. The LEC-5 is split into two parts, the first is a 17 item questionnaire asking if a person has been exposed to a type of traumatic event (e.g. fire or explosion), to which the person can respond with: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it doesn't apply to you. The second part of the LEC-5 then asks if a person has experienced more than one event, to describe the worst event, how long ago it happened, how the person experienced it, if someone's life was in danger, if someone was seriously injured or killed, if it involved sexual violence, If the event involved the death of a close family member or close friend, and if it was due to some kind of accident or violence, or was it due to natural causes, and how many times altogether has the person experienced a similar event as stressful or nearly as stressful as the worst event. Using the checklist allowed the researcher to see how many traumatic events a participant had been exposed to and in which manner, which was important to collect as it helped inform the intervention (by knowing what events should be included in NET sessions/lifeline) and approach by the therapist. No psychometric data was needed for the LEC-5 as it was used to collect demographic data.

Physiological Measures of Arousal- Heart Rate (HR) and Heart Rate Variability (HRV). The Polar H10 chest strap was used to collect heart rate data (HR and HRV). The Polar H10 has been shown to be a reliable and valid measure of HR and HRV; even when compared to an ECG as gold standard (Gilgen-Ammann et al., 2019; Speer et al., 2020). Using gold standard equipment usually presents with an error reading of the values collected close to 1% (Karlsson et al., 2012). Despite the potential discomfort wearing a heart monitor could have caused a participant they were chosen over wrist monitors due to the accuracy of measurement provided, as wrist monitors often have artefacts induced by external factors which increases the error ratings of their readings to up to 10% (Morelli et al., 2019). Gathering heart data will give an objective physiological measure of arousal to assess the process of exposure and habituation. The app Elite HRV was used to collect heart data after consultation with colleagues well versed in the field. Elite HRV has gained support from the scientific community and is regarded as a valid and reliable tool (Moya-Ramon et al., 2022). HR is an objective measure of physiological arousal and is measured by the number of beats per minute (McCraty & Shaffer, 2015; Pignotti, & Steinberg, 2001), with higher beats per minute reflecting a higher level of arousal. The Root Mean Square of Successive Difference (rMSSD) was visually analysed as the rMSSD reflects the beat-to-beat variance in heart rate and is a primary measure of change in HRV (Schaffer & Ginsberg, 2017).

rMSSD is measured in milliseconds and is a time domain measure of HRV which quantifies the amount of variability of the interbeat interval (IBI) which is the time period between successive heartbeats (Shaffer & Ginsberg, 2017), or put simply time domain values measure the amount of HRV during the specified period. To calculate the rMSSD each successive time difference between heartbeats in milliseconds needs to be calculated, each value is then squared, and the result is averaged before the square root of the total is gained. The recommended minimum recording time is 5 minutes; however, ultra-short-time periods (under 5 minutes) are often used, due to ease of collection and efficiency in clinical and research settings (Shaffer & Ginsberg, 2017). Despite ultra-short-time readings being collected their use has been called into question due to an absence of research into them (Shaffer & Ginsberg, 2017).

Research has demonstrated that 10-30 seconds is the minimum time needed to get a reliable measure of rMSSD and thus HRV (Castaldo et al., 2019; Munoz et al., 2015; Pecchia et al., 2018). rMSSD was collected as the measure of choice as it is sensitive to vagal cardiac control and has been suggested to be superior to other methods of measurement as it is less sensitive to changes in respiration (Penttila¨et al., 2001). rMSSD is less affected by respiration than respiratory sinus arrhythmia (RSA) which is the regulatory mechanism of HR (Hill & Siebenbrock, 2009), and the standard deviation of the average normal-to-normal intervals (SDNN) another measure of HRV (Shaffer & Ginsberg, 2017). rMSSD being less influenced by changes in respiration is important when used for shorter time measurements, as changes in respiration stimulates the cardiovascular system which can lower the power of short-term measurements (Shaffer & Ginsberg, 2017). It is important contextually, as when a participant narrated a trauma during sessions it was expected that there would be physiological changes resulting in changes in respiration. However, there are concerns over the statistical properties of rMSSD as they have not been fully examined (Bernston et al., 2005). Bernston et al. (2005) raised concerns of rMSSD being used as a measure of vagal cardiac control for comparing varying heart rate metrics in between subjects' designs, but concluded rMSSD may be a useful time domain measure of vagal control for within group designs. Rossi et al. (2020) compared the use of SDNN and rMSSD for ultra-short-time periods and found that as ultra-short-time periods do not assess very low frequencies which the SDNN is highly affected by meant the bias for estimating SDNN increased as the time window decreased. The authors concluded that SDNN needed longer than two minutes to provide reliable results. However, only small errors in rMSSD were detected up to the 30 second point, due to it being impacted by high frequencies which are possible to be evaluated even when the time window is small, meaning only 30 second readings were needed to produce reliable rMSSD results. Therefore, on weighing up the evidence the researcher chose to complete ultra-short 2-minute readings to gather HR and HRV data and analysed rMSSD. The 2-minute readings were chosen to not burden participants and to not take too much time out of the session.

Subjective Units of Distress (SUDs). The process of exposure and habituation are typically measured through SUDS (Foa & Kozack, 1986; Wolpe & Lazarus, 1966), which is a person's subjective account of distress on a set scale. The SUD scale was developed by Joseph Wolpe (1969) and has been used widely as it is quick and simple to do (Penny & Teatero, 2015). SUDs are helpful to establish the level of distress a person is experiencing in the moment, as well as patterns of current and previous distress, and to evaluate the progress of treatment; however, there is little empirical research into them (Kiyimba et al., 2020; Penny & Teatero, 2015). SUDs were collected alongside heart data to gather as much data as possible of the exposure and habituation process. Participants were asked to rate their level of distress on a scale from 0 (no distress) to 10 (maximum distress), at the start and end of their trauma narrations and when the therapist re-read their narrative from the previous session throughout the intervention phase. However, the use of SUDs has been criticised due to their fallibility and subjective nature and more objective measures are recommended to be used which is why heart rate monitors were used in the study (Annett., 2002; Frustaci et al., 2010; Schäfer et al., 2018). Despite this collecting SUDs was useful as it allowed to test pre-and post-narration levels of distress, it allowed the therapist to gauge the participant's level of anxiety in session and to tailor the session accordingly, it also provided a backup data source in case there were any issues with the heart rate monitors.

The Body Perception Questionnaire Short Form (BPQ-SF). The BPQ-SF (Cabrera et al., 2018; Porges, 1993) was collected in case there was a resurgence in COVID-19 that meant the study had to be moved online, and heart data was no longer able to be collected. Fortunately, this was not the case, but BPQ-SF data had already been collected during the baseline phase, therefore, it was collected at the end of the intervention and was analysed. The BPQ-SF is a self-report measure that assesses a person's perception of body awareness and autonomic reactivity. The measure's items are based on the autonomic nervous system, and a set of neural pathways that connect the brain and body. It assesses a person's experiences of reactivity in their organs and tissues that are regulated by the autonomic nervous system. The measure has two domains both with separate subscales. The first domain and subscale is body awareness, that measures the sensitivity of internal

bodily functions (e.g. muscle tension), with high scores reflecting hypersensitivity, whereas low scores reflect hyposensitivity. The second domain, autonomic reactivity has two subscales, supradiaphragmatic reactivity which measures the responses of autonomically-innervated organs above the diaphragm and reflects the calm resting state and sympathetic “fight or flight” responses. The second subscale, subdiaphragmatic reactivity, measures the response of autonomically-innervated gastrointestinal organs below the diaphragm, that reflects the reactivity of unmyelinated vagus nerve, the sympathetic nervous system, and the enteric nervous system. The BPQ-SF has good psychometric properties, it has good levels of convergent validity with similar measures and been found to have a consistent factor structure across samples (Cabrera et al., 2018).

As the BPQ-SF measures a person’s perception of their body awareness and reactivity of their autonomic nervous system it was felt this would be the best proxy measure of physiological changes due to therapy if heart rate data could not be collected. The reason for this is because the BPQ-SF is associated with polyvagal theory which posits the human threat response is routed in phylogenetics (Porges, 2007). As people evolved the ANS was integrated into a system with the polyvagal nerve which is part of the parasympathetic nervous system which helps dampen defence responses (Kolacz et al., 2020). Dampened parasympathetic activity (which can be measured by HRV) is associated with PTSD (Chalmers et al., 2014), with traumatic experiences potentially sensitising a person’s ANS threat response which could also increase the risk of developing PTSD (Kolacz et al., 2020). The measure has been widely used across many mental health conditions and research has showed people who complete the measure who have PTSD report more autonomic symptoms (Kolacz et al., 2020). Therefore, given the measures good psychometric properties, its use in the field, and theoretical links to physiological responses related to trauma it was appropriate to use in case there were any issues with collecting heart data.

The Autobiographical Memory Integration Coding Tool (ABMICT). To the researcher’s knowledge there are no existing studies that have looked at ABMI as a process measure of trauma therapy. This means there is no consensus on how to

measure ABMI. Existing research by Foa et al. (1995) explored structural and content changes to trauma narratives pre and post prolonged exposure; however, the measure did not include any areas of ABM. Also, the context of treatment for prolonged exposure and NET differs massively, as during prolonged exposure the person repeatedly recalls the same event, meaning narratives may become more rehearsed and coherent, and not necessarily reflect the process of ABMI. During NET the person recalls their event once and it is then re-read to them in the following session, therefore, measuring ABMI in NET may give a more naturalistic insight into the processes of memory as opposed to getting people to recall well versed narratives. There has been more research into structural changes of narratives (i.e., Jaeger et al., 2014), and this gives an existing body of literature and theory to develop a measure from.

An existing coding measure (Jaeger et al., 2014; Lane, 2019) was adapted and a new measure the autobiographical memory integration coding tool (AMBICT; Appendix A) created for this study. Various methods have been used to study ABM. An issue with self-reports of trauma via quantitative measures, is that self-reports can be influenced by demand characteristics, and the memory could be seen more as a person's perception of their memory quality, and rather represent the frequency of their symptoms (Kangaslampi & Peltonen, 2019; McKinnon et al., 2017; Pasupathi, 2007). Analysing trauma narratives with an observer-rated index allows for a more nuanced understanding of the trauma memory based on its content (Kangaslampi & Peltonen, 2019); ultimately allowing a researcher to see the effects of treatment to narratives over time, and to see if it is integrated into the autobiographical lifeline. Therefore, memory narratives provide a promising option as they can address several limitations of self-report and cue word methodologies (Kangaslampi & Peltonen, 2019; Sumner et al., 2013).

The AMBICT assesses vividness, emotional distancing, sensory details, narrative coherence, time and place details, fragmentation, disorganisation, and total word count. The areas included from Jaeger et al.'s (2014) measure were fragmentation informed by Foa et al. (1995), disorganisation informed by Harvey and Bryant (1999), and total word count. The ABMICT was used in the intervention phase to

code transcripts on a session-by-session basis allowing for changes in the structure, content, and ABMI areas to be examined as a process measure. No information on the validity or reliability of this measure is available; however, this could be investigated as future research. An external clinician reviewed the ABMICT and its scoring and deemed it internally coherent and applicable in its current format.

Table 15
Frequency of Measures

	Post-Assessment/ Baseline 1	Initial Appointment/ Baseline 2	Psychoeducation /S1 Baseline 3	S2 Lifeline	S3	S4	S5	S6	S7	S8	S9	S10	S11 Relay Lifeline	S12 Final	Post Therapy
Trauma: IES-R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General: DASS-21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPQ-SF			X												X
Exposure HRV: Start session					For T1	For T2	For T3	For T4	For T5	For T6	For T7	For T8	For T9		
Exposure HRV: End Session					For T1	For T2	For T3	For T4	For T5	For T6	For T7	For T8	For T9		
Exposure SUDS: Pre narration and re-narration					X	X	X	X	X	X	X	X	X		
Exposure SUDS:					X	X	X	X	X	X	X	X	X		

Post narration and re-narration													
ABMICT (coding)			X	X	X	X	X	X	X	X			
Qualitative Change Interview												X	

2.5. Development of the ABMI measure

The initial step in developing the autobiographical memory integration coding tool (AMBICT; Appendix A) was for the researcher to conduct a systematic literature review of how ABM is assessed while critiquing the psychometrics and methodological issues. Through reviewing the literature, the researcher noted that various methods have been used to study ABM; structured interviews - the Autobiographical Memory Interview (AMI; Kopelman et al., 1989), cue word tasks - the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), to narrative measures - The Autobiographical Memory Coding Tool (ABMCT; Kovach, 1993). Memory narratives, however, provide a promising alternative method as they can address several limitations of self-report and cue word methodologies. Narratives are less fallible to demand characteristics and may better reflect the recollection process of naturalistic memory (Kangaslampi & Peltonen, 2019; Sumner et al., 2013).

As part of the literature review the researcher was able to identify the constructs that were assessed the most often in the existing measures. Any construct that was assessed four or more times was deemed a core factor. Therefore, vividness, emotional intensity, sensory details, coherence, and belief in accuracy were deemed as core factors when assessing ABM. As vividness, emotional distancing, sensory details, and narrative coherence were all deemed to be core factors and were relevant when assessing trauma narratives, they were included in the ABMICT. Time and place details were assessed three times in the existing measures; however, given a key aspect of NET is adding contextual information (cold memories) as part of treatment it was included in the AMBICT. Fragmentation, disorganisation, and total word count were also included due to being part of Jaeger et al.'s (2014) measure.

After reviewing the literature and deciding on the factors that were to be included in the measure the researcher reviewed the existing definitions to operationalise the constructs for the coding tool. To help develop the coding tool the Consultation Interactions Coding Scheme (CICS; Mallins et al., 2020) and The Autobiographical

Interview (AI; Levine et al., 2002) were reviewed which helped outline the scoring and segmenting processes in the tool.

Extended Procedure

2.6. Overview of study ethical approval and registration, confidentiality, anonymity, and data storage

Ethical Approval and Study Registration. Prior to applying for ethical approval potential issues were discussed with the research team. Ethical approval was gained from the East Midlands - Derby Research Ethics Committee, the Health Research Authority and Health and Care Research Wales (HRA), and the University of Nottingham (Appendices B-D). The study gained a favourable REC and HRA opinion on 1st September 2021. The study was supported by the research department of Nottinghamshire Healthcare NHS Foundation Trust (Appendix E). The study was registered on a public database (clinicalTrials.gov identifier: NCT05383846; Appendix F).

Confidentiality and Anonymity. All data collected was treated confidentiality in line with Nottinghamshire Healthcare Trusts' confidentiality and information governance policies. The limits of confidentiality of both the study and therapy were explained to the participant (i.e., disclosure of risk to self or others). Participants were told that the main researcher would discuss their case with their supervisors and research team. To protect the participant's identity, they were assigned a letter and pseudonym in place of their name on any study materials. Identification codes were used for participants on all the study's materials (audio/video recordings, transcripts etc). The transcripts from therapy and progress notes were uploaded to RiO as part of the participant's medical and electronic records. The NET+ sessions and change interviews were either audio or video recorded, erased from the recording device, and transferred onto secure servers.

A separate confidential document was developed with the use of identification codes coupled with participant's information (name and date of birth); this allowed for the datasets to be matched to the individual if they chose to withdraw. This document was password protected and stored on an NHS server which only the lead researcher and chief investigator had access to. When completing physical or online copies of the questionnaires participants were asked to use their pseudonym, with anonymous copies created by the researcher and uploaded to their medical records. The tablet used to record heart data was encrypted, and password protected, the Elite HRV account was created by the lead researcher and did not have any personal identifiable information of any participant on it as it only collected numerical data. Documents containing identifiable information such as session interview transcripts and session narratives were anonymised prior to being stored with the rest of the study data (see below). Non-anonymised versions of the narratives and session data were uploaded to participant's clinical records. Any other identifiable information such as consent forms were kept separate from the research data they were linked to and stored on electronic databases before being destroyed. Participants were told their identities would remain anonymised in any dissemination of the research.

Data Storage and Security. All audio/video recordings were transferred and stored on a protected drive on trust computer, and then deleted from the device. All the recordings were deleted after transcription/study purposes, and fidelity checking. The interview transcripts and study materials were kept on the trust computer in a secure drive, before being anonymised and stored on the secure University OneDrive system. To contact participants Rio was used to access their contact details, and following every session, notes were uploaded onto Rio. Electronic questionnaires were downloaded from Jisc Online Surveys and deleted from its database at the end of the study. Heart data was deleted from the Elite HRV app at the end of the study and no identifiable information of any participant was collected when using the app. All study/research data was anonymised prior to being stored on the University of Nottingham's servers, and it will be destroyed after seven years. Participants' contact details were kept for six months to allow for contact after follow-up if needed and destroyed afterwards.

2.7. Information on recruitment, and consent and withdrawal process, debrief, participant safety and payment

Recruitment and Challenges. The primary recruitment site for the study was one of the Step 4 Psychological Services within Nottinghamshire. Other contingency sites which provided support for the study included the Centre for Trauma Resilience and Growth. The other Step 4 Psychological Service within Nottinghamshire was approached; however, never responded to the researcher. A naturalistic sampling strategy was used and there were no issues in recruiting four people for the study. The initial intention was to recruit six participants with four in treatment and two on a reserve list to account for attrition. However, recruiting six proved difficult with people either deemed not suitable or not responding to invites from the field supervisor. Therefore, only four were recruited into the study and one withdrew late into the study and was not able to be replaced. The contingency site was not able to be used late in the study due to time constraints faced by the researcher to complete the study.

Consent Procedure. Prior to discussing the study, potential participants were told that taking part was completely voluntary and would not impact the care they received. If suitable, potential participants were informed of the study immediately after their assessment by the assessing clinician. The field supervisor reviewed the services waiting list and contacted potential participants they deemed suitable. If the person expressed an interest in the study, they were informed of the nature of the study and given the information and consent pages and completed a consent to contact form (allowing the researcher to contact them; Appendices G-I). Potential participants were then given a minimum twenty-four-hour period to consider their participation, before being contacted by the main researcher. If verbal consent was gained, the researcher booked an initial appointment to discuss the study and gain written consent. In the following appointment if written consent was gained the participant and researcher booked their first session. If no consent was gained it was reiterated to the person that it would not impact their care.

Withdrawal Procedure. It was made clear to participants that taking part in the study was completely voluntary, and they could withdraw at any time without giving a reason and it would not impact their care or treatment. However, participants were told that data collected up to the point of withdrawal may still be used to not impact the final analysis. It was explained to participants if they wanted to withdraw from the study, but not their treatment they were able to do so, and they would be reviewed by the service and allocated to another practitioner.

If a participant did not attend sessions at any point without giving a reason it was explained that multiple attempts to contact them would be made (initially via telephone and then letter), and they would have two weeks to respond. It was explained to participants if the researcher became concerned about their safety and wellbeing they may be removed from the study and referred to the relevant level of support (See Appendix G for information of withdrawal on information sheet).

Debrief Procedure. Participants were debriefed and provided with a debrief sheet at the end of the study, this included: the contact details of the research team; details of other organisations that may be of use to the participant (Appendix J). The participant was invited to ask any questions and offered the opportunity to have a summary of the results sent to them.

Participant Safety. Participants' wellbeing was monitored every session. To ensure participant wellbeing the researcher had weekly supervision to review each participant. Other professionals involved in the participant's care continued their involvement (e.g., general practitioners). The researcher who acted as the therapist used their clinical judgment to provide the most appropriate care for the participant. Any further deviations from the NET protocol were based on clinical judgement and subsequently documented in the sessions' notes and analysed by fidelity checks. All participants received a review appointment following the completion of the study and received treatment as usual for any comorbid condition.

NET like most trauma-based therapies requires the detailed narration of the person's traumatic events, which can be distressing for participants. When starting a

trauma-based intervention during the exposure element of treatment it can lead to an increase in symptoms such as nightmares, flashbacks, and dissociation. Prior to starting the therapy participants received a psycho-education session to inform them of the potential risks of treatment and had an opportunity to ask any questions they had. As part of treatment participant's symptoms, wellbeing, and level of risk (to self- and/or others) were reviewed every session. As part of ensuring the participant gave fully informed consent the risks and expectations of treatment were discussed during the psychoeducation session. All participants were provided with the contact details of their local crisis team and were debriefed at the end of treatment. If a participant still showed a significant level of distress or needed further support at the end of treatment the researcher told the team responsible for their care to ensure they had access to further treatment or the relevant level of support. The occurrence of any adverse and/or serious adverse events as defined in the protocol was monitored throughout the study, with no serious adverse events occurring.

Researcher Safety. The researcher who conducted the therapy was at risk of vicarious trauma, due to being exposed to highly traumatic material. To manage this the researcher had weekly supervision in which they were able to discuss any concerns regarding their own wellbeing.

Participant Payment. Participants were not offered any financial incentive to take part in the study, and they were not reimbursed travel expenses.

2.8. Quality checks

Refer to Appendix K to see the template quality check forms. The quality checks followed the approach based in published examples of treatment fidelity literature (Goodyer et al., 2017). Sessions were randomly selected ensuring one psychoeducation, one lifeline, and one narration session per participant were reviewed, with the fidelity checks being conducted by the chief investigator (TS). The types of sessions had different forms and criteria that needed to be met, with some items being scored yes/no if they were present, and others on a 5-point scale (0= never-4=always). The pre-established criteria to meet the required standards of fidelity varied, dependent on the session type (please refer to the separate forms);

however, generally to be considered an acceptable session no more than one question could be marked as a no (absent), and no more than two answers could fall below a 2 on the 5-point scale.

2.9. Change interview schedule

The change interviews (CI) took place online via MS Teams. They lasted between 30-60 minutes and were conducted by a third party up to two weeks after finishing therapy. The CIs took place as soon as physically possible after participants ended the intervention phase to allow them to have access to review sessions by the study service in a timely manner. Follow-up data were collected prior to the CI beginning. The interview was informed by Elliott et al. (2001) and explored participant's overall views and experiences of NET/NET+, the specific factors they found helpful/unhelpful, and any changes the participant had identified due to NET/NET+ or other factors. Please refer to Appendix L for the CI schedule.

Extended Analysis

3.1. Further information on the analyses conducted

Visual Analysis. Visual analysis of SCD has been the main method of quantitative analysis for SCDs for many years and is attributable to the tradition of applied behavioural analysis (Morley, 2017). However, visual analysis is not without its criticisms as some have argued since the introduction of statistical methods that using statistical methods over visual analysis removes observer bias (Jones et al., 1978), and is able to detect smaller effects often missed (Kazdin, 1982). Despite these criticisms, visual analysis is still a valuable tool and combining both visual and statistical methods of analysis can be complimentary (Morley, 2017). Visual analysis allows for the systematic evaluation of the trend, level, and stability of the data, both within and across phases of the study (Lane & Gast, 2014; Morgan & Morgan, 2008; Morley, 2017), allowing the researcher to examine the relationship between variables. To examine the trend, linear regression lines were plotted across the

baseline and intervention phases, but as the FU only had one data point this was not possible. To examine the level, the most common summary statistic used is the mean, and therefore, mean lines across phases were plotted onto the graphs (Morley, 2017). To examine the stability across phases, Lobo et al. (2017) provided guidance stating the criterion was satisfied if about 80%– 90% of the data in a phase fell within a 15% range of the median (average) of all data points for that phase.

Given the criticisms of visual analysis, there is a need for more robust statistical ways to examine SCDs. However, using certain statistical analysis is not appropriate with SCDs due to parametric assumptions of independence being violated, as time series data is often auto-correlated (Morley, 2017). While autocorrelation is not present in all SCDs the presence of it would threaten the validity of any parametric analysis (Shadish et al., 2013), and therefore, parametric tests are not used in SCDs. For this reason, there has been research into developing ways to analyse and measure effect sizes in SCD (see Morley, 2017 for an overview). Calculating the effect size gives a more objective measure of the effectiveness of treatment, allowing for comparisons between phases and across cases to be made (Morley, 2017; Parker et al., 2007). There are multiple methods available to a researcher to calculate effect sizes; however, there is no one agreed approach.

Tests that have been used to analyse the level and effect sizes between trends include the percentage of non-overlapping data (PND; Scruggs et al., 1987). The PND is a simple statistic to calculate, as all one has to do is calculate the percentage of points in the treatment phase that do not overlap with any values in the baseline phase (Morley, 2017). Problems with the PND include increasing the risk of making a type 2 error (Lenz, 2013; Ma, 2006). As only a singular data point in the baseline is used and if there are high variability in scores this impacts the PND value. Another issue is the statistical distribution of the PND is unknown and there is no statistical test associated with it. These criticisms lead Morley (2017) to conclude the PNS has limited use and is purely descriptive. An alternative approach which overcomes one of the criticisms of the PND as it uses more data in its analysis (Morley, 2017) is the percentage of data points exceeding the median (PEM; Ma, 2006). To calculate the PEM, a horizontal middle line is drawn across the baseline data and extended into

the treatment phase. If the number of data points in the baseline phase is odd the line that is drawn will hit the median. if the number of data points in the baseline phase is even the line that is drawn will go between the two middle points of the baseline data (Ma, 2006). If the change in the area of interest is expected to decrease then the number of points that are below the line in the treatment phase are counted and expressed as a percentage (Ma, 2006). If the change in the area of interest is expected to increase then the areas above the line are calculated and expressed as a percentage (Ma, 2006). The PEM score has the same meaning as an effect size, and therefore, the percentage gained represents the effect size (Ma, 2006). The PEM is less likely to make a type 2 error than the PND (Lenz et al., 2013; Ma, 2006), but it has been criticised for inflating effect sizes and increasing the risk of type 1 errors (Wolery et al., 2010). Due to the criticisms of the PND, the PEM was chosen.

To strengthen the visual analysis with the criticisms of the PEM in mind the researcher applied dual criterion (DC; Fisher et al., 2003) to their analysis. The DC applies statistical methods alongside visual analysis, giving a conservative method of analysis with low observed rates of type 1 and 2 errors (Fisher et al., 2003; Morley, 2017). To apply the DC a mean and trend line from the baseline phase are plotted over the treatment phase, and this aids the reliability of the judgments made about the change (Morley, 2017). Fisher et al. (2003) created a rule for how many points should go in the predicted direction to conclude there has been a treatment effect (Table 16). Points can fall above/below the lines dependent on the expected direction of change, if a decrease is expected points below are counted, if an increase is expected points above are counted (Fisher et al., 2003; Morley, 2017). The Conservative DC (CDC) is an even more conservative method of analysis which improves reliability and validity, in the CDC the mean and baseline trend lines are shifted down by a quarter of the standard deviation of the baseline if there is an expected decrease in the targeted area and shifted up if there is an expected increase (Fisher et al., 2003; Morley, 2017). There is little literature available critiquing the DC and CDC. While the CDC mitigates the risk of making a type 1 error (concluding there has been an effect when there was not), the researcher chose the

DC as the method of analysis as the CDC seemed too conservative potentially hiding small treatment effects.

Table 16

The Number of Data Points in the Treatment Phase and the Corresponding Number of Data Points That Must Be Above/Below Both Criterion Lines to Conclude That There is a Treatment Effect (Fisher et al., 2003).

Treatment phase	Needed above both criterion lines
5	5
6	6
7	6
8	7
9	8
10	8
11	9
12	9
13	10
14	11
15	12
16	12
17	12
18	13
19	13
20	14
21	14
22	15
23	15

Simulation Modelling Analysis (SMA). SMA is a way to analyse correlations and temporal relations between two variables with small amounts of autocorrelated data (Borckardt et al., 2008; Borckardt & Nash, 2014). SMA should only be used with small sets of data (under 29 per phase) and is a bootstrapping method that is based on the assumption “that the simulation data streams generated by the program are representative of the “population” of data streams from which one’s actual data is drawn” (Borckardt, 2006, p.3). SMA provides adequate power to detect effects in small data sets and protects against type 1 errors (Borckardt et al., 2008).

SMA was used to assess potential temporal and correlational relationships between the IES-R and DASS-21, all of the variable's data across all phases were examined. SMA gives the lag effect and temporal sequences of the measures if a correlation is found. (I.e., If the IES-R score reduces, does that precede a reduction in general psychological distress). SMA analysis produces a correlation coefficient (*r*) and a *p* value, with a positive lag indicating a change in the first variable precedes a change in the second, whereas a negative lag indicates a change in the second variable precedes a change in the first. A lag of 0 indicates a change occurring at the same time, a lag of +/- 1 and 2 indicated changes occurring one or two weeks earlier (+) or later (-; Brockardt, 2006). Refer to Table 17 to see the temporal relationships of variables that were examined.

Table 17

Variables Examined via SMA

Variable 1	**Variable 2**
IES-R Total	DASS-21 Depression
IES-R Total	DASS-21 Anxiety
IES-R Total	DASS-21 Stress
IES-R Intrusion	IES-R Avoidance
IES-R Intrusion	IES-R Hyperarousal
IES-R Hyperarousal	IES-R Avoidance
DASS-21 Depression	DASS-21 Anxiety
DASS-21 Depression	DASS-21 Stress
DASS-21 Anxiety	DASS-21 Stress

Reliable Change Index (RC) and Clinically Significant Change (CSC). RC and CSC of the IES-R and DASS-21 were calculated for the study at the final treatment session and FU, please see Table 18 for an overview of the clinical and non-clinical norms used. The rationale for using Lovibond and Lovibond's (1995) non-clinical sample was due to not being able to find a sample of a UK non-clinical population. A

non-clinical UK sample that made use of the original DASS was found; however, due to differences in the measure, the researcher felt it was best to use a sample that used the same version of the measure. Ronk et al.'s (2013) clinical sample was used as the researcher was unable to find any published norms of a clinical sample with the DASS-21 from the UK. Ronk et al. (2013) provided norms of in and outpatient samples, both samples had similar demographics to the sample used in the study; however, the inpatient samples scores were closer to two of the three participants in the study. Despite this, the outpatient sample was used due to the study making use of outpatient participants, and to limit researcher bias. Rash et al. (2008) provided clinical and non-clinical samples and norms of the IES-R. The majority of existing literature on the use of the IES-R with norms available comes from either veterans or validation studies of the psychometric proprieties of the measure within different cultures. The researcher felt neither of these populations represented their sample well and did not feel they were appropriate to use. Therefore, Rash et al.'s (2008) data was used. Rash et al.'s (2008) clinical sample was misusing substances which was not the case for any participant in this study; however, the sample was the closest match found to the study participants in terms of age, gender, race, and type of traumas experienced.

Table 18

Clinical and Non-Clinical Norms used in Reliable Change and Clinically Significant Change Calculations

Measure	Sample	Population	n	Subscale	M (SD)	α	Clinical cut-off scores
DASS-21	Nonclinical (Lovibond & Lovibond, 1995)	US students and blue-white collar workers, adolescents and adults (ages 17-69; 64.2% Female). Taking part in a general health screen programme.	2914	Depression	6.34 (6.97)	.96	9
				Anxiety	4.70 (4.91)	.92	7
				Stress	10.11 (7.91)	.95	14
	Clinical (Ronk. Korman, Hooke & Page, 2013)	US adults (mean age 42.9; 63.2% Female). Attending outpatient therapy services.	1000	Depression	13.32 (11.10)		9.22
				Anxiety	9.09 (8.82)		6.31
				Stress	15.01 (10.00)		12.42

Measure	Sample	Population	n	Subscale	M (SD)	α	Clinical cut-off scores
IES-R	Clinical (Rash, Coffey, Baschnagel, Drobes & Saladin, 2008)	US adults (mean age 34.6; 63.4% Female; 66.2% White). Diagnosed PTSD and accessing substance misuse services.	71	Total	45.4 (17.8)	.95	32
	Nonclinical (Rash, Coffey, Baschnagel, Drobes & Saladin, 2008)	US adults (mean age 36.7; 75.5% Male; 45.3% White). No diagnosis of PTSD but accessing substance misuse services.	54	Total	21.5 (19.2)		

Jacobson and Truax (1991) proposed a method to evaluate the changes made by an individual or group pre- to post-treatment. Jacobson and Truax suggest calculating the RC and CSC to evaluate changes, these analyses are commonly used to assess psychotherapy outcomes, and although there are alternatives, Jacobson and Traux's approach is considered the most useful (Atkins et al., 2005; Lambert & Ogles, 2009). RC scores are standardised measures of change that account for measurement error and are equivalent to z-scores. To calculate RC first the standard error of measurement of the instrument (SeM) is calculated: $SeM = SD \times \sqrt{(1 - r)}$, with SD representing the standard deviation of a representative sample, and r the internal consistency of the measure. Then the standard error of difference (SeDiff) is calculated: $SeDiff = \sqrt{2} \times SeM^2$. Finally, the RC can be calculated by taking the pre-treatment score away from the post-treatment score and dividing it by the SeDiff: RC= (Pre-treatment score-Post treatment score)/SeDiff. If the value gained is greater than +/-1.96 the change would be considered reliable with 95% certainty that it was not due to measurement error.

To determine if a reliable change is clinically meaningful Jacobson and Truax (1991) argue that the CSC method should be applied. To do so Jacobson and Truax propose three alternative criteria:

(a) Participant's post-treatment score falls more than two standard deviations from the clinical population mean, in the direction of the non-clinical population.

(b) Participant's post-treatment score falls within two standard deviations of the non-clinical population mean.

(C) Participant's post-treatment score falls closer to the non-clinical population mean, than the clinical population.

To decide between which criterion is best Jacobson and Truax (1991) suggested when norms are available, either b or c is preferred. To choose between b and c, when clinical and non-clinical populations overlap, c is preferred. However, when the distributions are nonoverlapping, b is preferred. When there are no norms available,

choose a. Therefore, in this study as there was an overlap between clinical and non-clinical population data for both the IES-R and DASS-21 (Table 18), criterion C was used.

Content Analysis. As the change interviews only included three participants, content analysis (CA) or thematic analysis (TA) seemed appropriate, as either approach was suitable for a lower level of interpretation when compared to grounded theory for example (Vasimoradi et al., 2013). Both CA and TA can be used to explore people's experiences and reasonings of an event. However, CA can be more useful when exploring a phenomenon where little is known about it, as it can be used to report frequent issues mentioned in the data (Green & Thorogood, 2004). Whereas, TA can be helpful when exploring a phenomenon and wanting to give a rich, detailed, and complex account of the data (Braun & Clarke, 2006). One of the biggest differences between CA and TA is that CA can provide a quantitative interpretation of the data as the frequency of the codes, categories, and themes can be analysed (Gbrich, 2007; Vaismoradi et al., 2013). Whereas TA is purely qualitative in providing a nuanced account of the data (Braun & Clarke, 2006; Vaismoradi et al., 2013).

CA is a method of analysing large amounts of written messages (Cole, 1988), to systematically code and categorise text to find trends and patterns of the words used including the frequency, relationship, and structures of communication (Mayring, 2000; Pope et al., 2006; Powers & Knapp, 2006; Gbrich, 2007; Vaismoradi et al., 2013). Meaning CA is a systematic and objective way to describe and quantify a phenomenon (Sandelowski, 1999). It allows the researcher to test theoretical issues and gain an understanding and new insights from data by creating categories of words, phrases, and meanings from it (Cavanagh, 1997). The aim of CA is to give a description of a phenomenon, and the outcome of analysis is to gain concepts or categories that build a model of the phenomena (Kyngä¨s & Vanhanen 1999).

NET has an existing theoretical base; it has evidence for its effectiveness in treating trauma within refugee and asylum seeker populations. The current study aimed to gain an understanding of the posited change mechanisms of NET and build

upon theory as the mechanisms of change have not been evidenced robustly. As a modified protocol of NET was used, and the CI explored the participant's views and acceptability of NET/NET+, inductive and semantic CA was used.

CA with an inductive approach was used due to it being recommended when existing research is limited, or knowledge is fragmented (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Leung & Chung, 2017). As NET's proposed mechanisms of change have not been robustly demonstrated, and the study used a modified protocol; an inductive approach seemed the best fit, due to the lack of research and knowledge into a modified version of NET (NET+) and the effectiveness and acceptability of a modified protocol of NET (NET+). CA seemed appropriate due to the researcher's reflexivity, to limit their bias, and let the categories come from the data to avoid predefining categories (Kondracki & Wellman, 2002; Hsieh & Shannon, 2005). A critical realist (CR) approach was used as the study adopted a mixed method approach, and CR allows for qualitative and quantitative approaches to be blended giving flexibility to posit how and why the phenomenon exists (Leung & Chung 2017; Maxwell & Mittapalli 2010). Phases followed to conduct CA are outlined in Table 19.

Table 19

Phases of CA (Elo & Kyngäs, 2008; Erlingsson & Brysiewicz et al., 2017)

Step	Description
1) Familiarise	Read and re-read the data while noting down initial impressions.
2) Condense Text into Meaning Units	With the research question in mind divide text into meaning units. Ensure condensed text still conveys the essential message.
3) Create Codes	Codes are descriptive labels for condensed meaning units and help researchers reflect on the data. At this stage there is limited interpretation; however, codes identify connections between meaning units and can have some initial reactions to the text.
4) Develop Categories and Themes	Sort codes into categories that answer the questions who, what, when, or where? Compare codes to see which belong together and therefore form a category. Themes are the highest level of abstraction and express the underlying (latent) content and come from grouping two or more categories. Analysis does not always need to include themes as they come from data that is rich with latent meaning. Themes answer questions such as why, how, in what way or by what means.
5) Report	Report analysis and results via models, conceptual systems/map, and/or categories, and/or a story line, and/or narratively.

3.2. Scoring of the ABMICT

Scoring aims to provide a summary and overall picture of the spread of autobiographical memory integration areas (ABMIAs) across a segment or session transcript, providing an analytic and visual understanding of the level of detail and frequency of the ABMIAs assessed in the transcript.

As total word count of the transcripts were recorded, this allowed for the coder to assess the percentage and average score of the ABMIAs covered in the transcript and to gain the percentage of the transcript that is coded to a specific ABMIA. To do this the researcher counted every word used when an ABMIA was discussed and

combined every instance of when an ABMIA was discussed and then divided this number by the total word count. Recording the word count of each ABMIA assessed provided the researcher with the proportion of the transcript coded for certain ABMIAs, therefore, the researcher was able to see what percentage of one ABMIA of the transcript was coded for by dividing it from the total word count. This allowed the researcher to score the segment of the transcript. For example, if there were three instances of the ABMIA time and place details being discussed and each time they were discussed, 20 words were spoken, the researcher would add these words together to get 60. If the total word count of the transcript was 600, this would then be divided by 60 and turned into a percentage to get 10%, meaning AMBIA time and place details would account for 10% of the transcript. If 10% of the transcript was coded as time and place details with a score of +2, the researcher would multiply these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each ABMIA, the average score for each ABMIA should be calculated.

The average scores and percentages should be calculated to two decimal places. See Appendix M for scoring templates, and Appendix N for example transcript with coding applied.

Extended Results

4.1. Descriptive statistics of measures

Table 20 outlines the mean, standard deviation, and range for each participant for the IES-R and DASS-21 across phases apart from FU as only one data point was collected.

Table 20

Participant Measures Descriptive Statistics

	Fox			Raven			Wolverine		
Measure	Baseline M, (SD), Range	Intervention M, (SD), Range	Follow-up Total	Baseline M, (SD), Range	Intervention M, (SD), Range	Follow-up Total	Baseline M, (SD), Range	Intervention M, (SD), Range	Follow-up Total
IES-R									
Intrusion	23.25, (2.59), 20-27	19.33, (2.36), 14-21	20	12.8, (2.04), 10-15	10.72, (4.39), 4-17	3	22.67, (4.78), 16-27	21.08, (3.62), 14-25	23
Avoidance	20.25, (0.43), 20-21	19.11, (1.52), 16-21	17	8.4, (3), 6-14	6.27, (4.07), 3-16	4	17.67, (1,25), 16-19	14.83, (1.32), 13-17	19
Hyperarousal	20, (1), 19-21	19, (1.41), 17-21	19	5.4, (1.5), 4-8	5.09, (1.16), 4-7	5	21, (.82), 16-19	16, (2.04), 14-17	17
Total	63.5, (2.87), 60-68	57.44, (3.56), 52-63	56	26.6, (5.95), 20-37	21.91, (7.87), 14-37	12	60.67, (4.71), 54-64	51.64, (5.84), 42-58	59
DASS-21									
Depression	30.5, (2.95), 2 6-34	26.88, (6.87), 16-38	30	14.4, (3.88), 8-20	12.55, (6.66), 4-30	9	29.33, (3.4), 26-34	25.27, (6.04), 16-32	22
Anxiety	31, (4.36), 24-36	31.55, (2.26), 28-34	30	7.6, (2.33), 4-10	9.64, (5.71), 2-24	2	29.33, (.04), 28-30	26.72, (4.69), 20-36	26
Stress	36, (2.45), 32-38	31.77, (1.75), 30-34	30	19.8, (2.86), 16-24	15.82, (4.22), 8-24	12	33.33, (2.49), 30-36	30.91, (3.55), 26-36	28
Total	48.75, (3.35), 45-54	44.22, (4.21), 37-50	45	20.6, (3.2), 17-26	19, (4.59), 12-31	11	47.67, (1.24), 46-49	41.45, (4.72), 35-50	38

Notes. M=Mean; SD= Standard Deviation; IES-R= Impact of Events Scale Revised- Total Range Score=0-88 higher scores indicate greater levels of post-traumatic stress; DASS-21= Depression Anxiety And Stress Subscale 21- Total Range Score=0-63 higher scores indicate greater levels of general psychological distress, depression, anxiety, and stress.

4.2. Information on the quality checks

Recordings of 5 sessions were selected randomly and reviewed in full by the chief investigator (TS) using the pre-established quality check forms. All sessions met the established criteria. Please refer to Appendices O to see the completed fidelity check forms.

4.3. Dual criterion analysis of the IES-R

Figure 3 shows visual displays of participants' IES-R total scores with DC (Fisher et al., 2003) applied. DC was used to strengthen claims about the treatment's potential effectiveness in treating symptoms of PTSD. Only total scores were visually analysed due to the research aim of assessing the potential effectiveness of the intervention on post-traumatic stress symptoms as a whole. For a treatment effect to be evident via DC analysis a certain number of points have to fall below the lines (Table 16). All intervention and FU data were included in the DC analysis, zero out of a needed eight points fell below the lines for Fox, zero out of a needed nine for Raven, but twelve out of a needed nine for Wolverine fell below both lines identifying a systematic treatment effect.

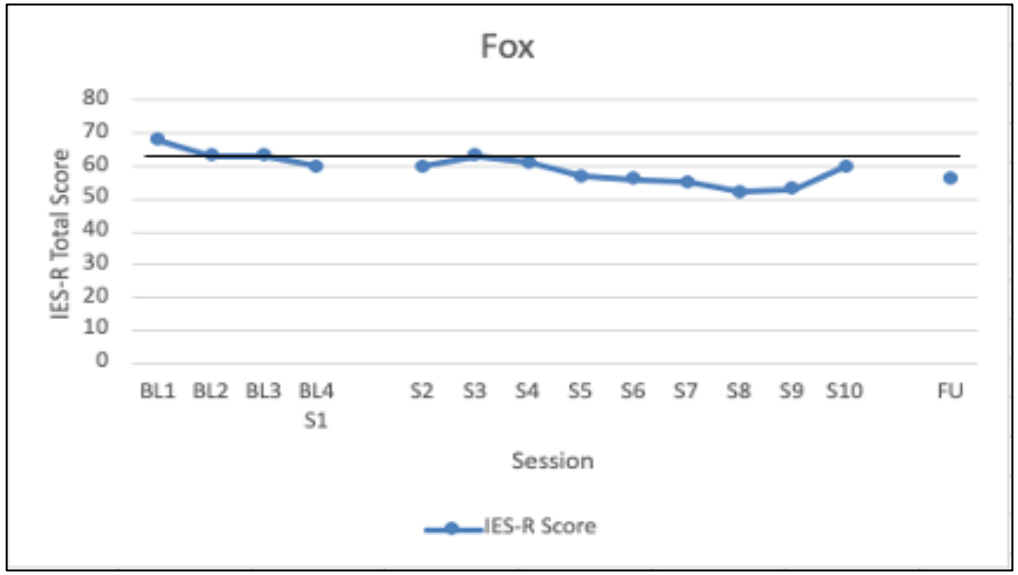
4.4. PEM effect size calculations.

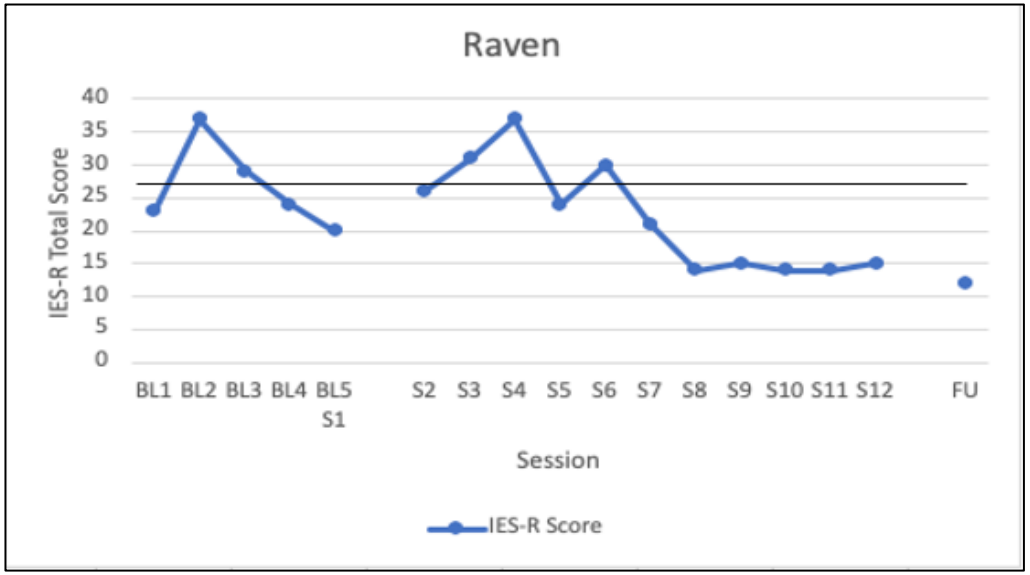
Calculating the PEM (Ma, 2006) score allowed the researcher to gain an effect size. Calculating the effect size allows for a more objective measure of the effectiveness of treatment, allowing for comparisons between phases and across cases to be made (Morley, 2017; Parker et al., 2007). Only the PEM was calculated for the IES-R, as the study used an intervention that is designed to work with symptoms of PTSD. Therefore, gauging the effectiveness of the intervention for the difficulty it is designed to work for, as opposed to other difficulties (i.e., general psychological distress) was warranted. To calculate the PEM, a horizontal line is drawn across the median value of the baseline data, and if the change in the area of interest is expected to decrease then the number of points that are below the line in the treatment phase are counted and expressed as a percentage (Ma, 2006). The number of points is calculated and turned into a percentage, with the percentage

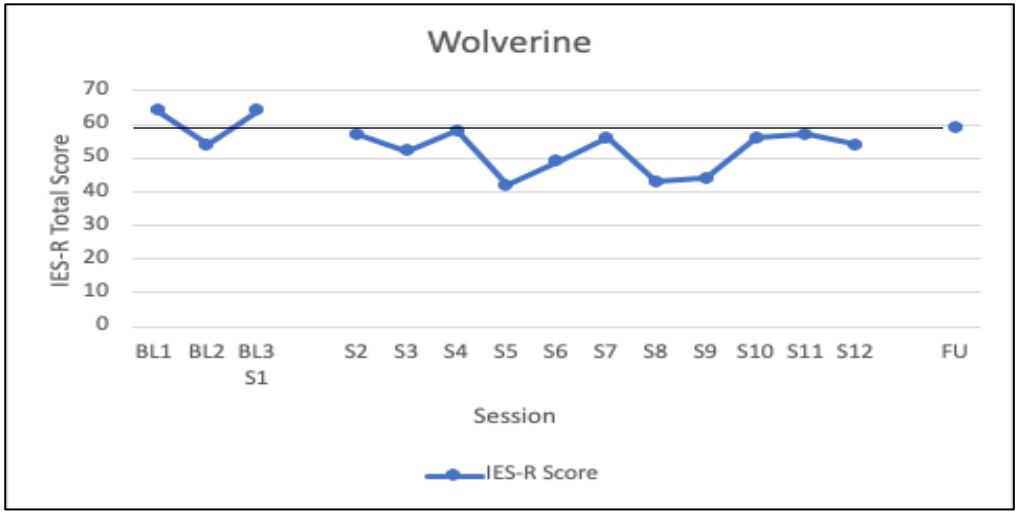
equalling the effect size (Ma, 2006). The treatment phase included the intervention and FU data. Figure 20 shows the graphs used to calculate the PEM. Results of the PEM analysis suggested an effective treatment effect for Fox as nine out a possible ten points were below the line which gives a result of 90%. A moderately effective treatment was identified for Raven with nine out of a possible twelve points below the line giving a result of 75%. A debatably effective treatment for Wolverine was identified with eight out of a possible twelve points below the line giving a result of 67%.

Figure 20

Participant's IES-R Graphs with PEM Line







Notes. BL=Baseline; S=Session; FU= Follow up; IES-R= Impact of Events Scale- Revised; Solid line= PEM Line

4.5. Dual criterion analysis for DASS-21

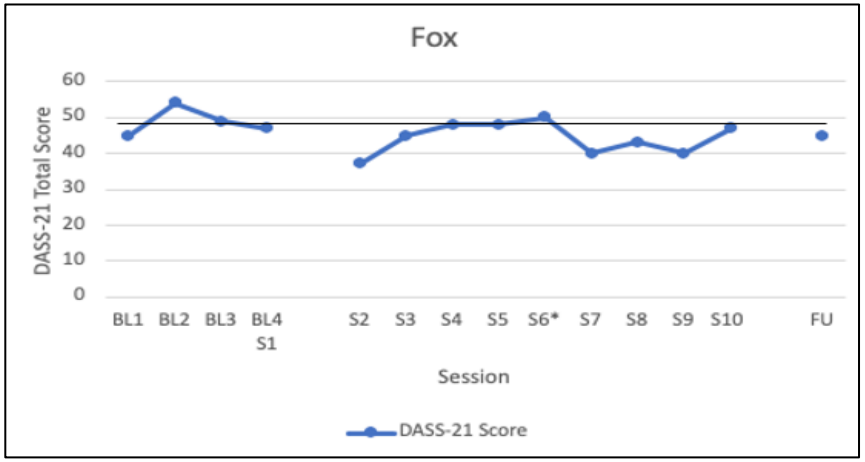
DC was used to strengthen claims about the treatment's potential effectiveness in treating symptoms of general psychological distress. DC analysis provided insight into general psychological distress, whereas the subscales which the measure was created to assess were able to be evaluated with published norms and therefore RC and CSC were able to be used. For a treatment effect to be evident via DC analysis a certain number of points have to fall below the lines (Table 16). All intervention and FU data were included in the DC analysis. Seven out of a needed eight points fell below the lines for Fox meaning there was no treatment effect. However, nine out of a needed nine points fell below the lines for Raven, and eleven out of a needed nine for Wolverine fell below both lines. Meaning a systematic treatment effect occurred for Raven and Wolverine.

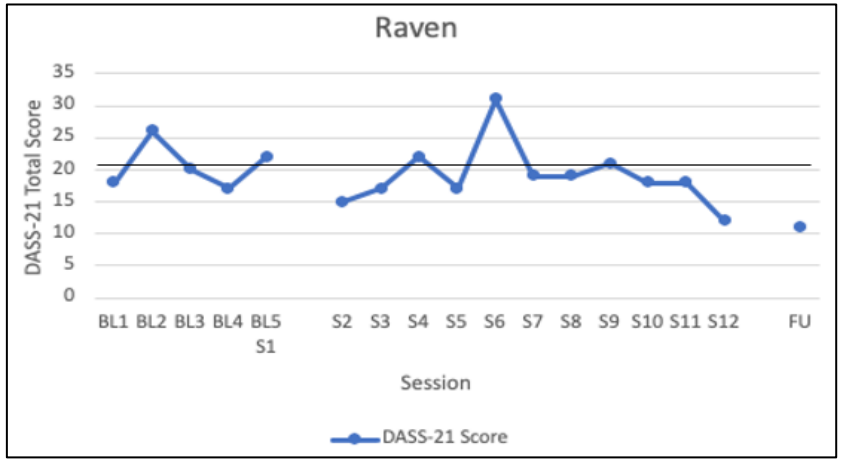
4.6. PEM effect size calculations.

The DASS-21 total scores were analysed with the PEM approach (Ma, 2006) as this allowed the researcher to gain an effect size, giving a more objective measure of the effectiveness of treatment as a whole for general psychological distress, allowing for comparisons between phases and across cases to be made (Morley, 2017; Parker et al., 2007). Figure 21 shows the graphs used to calculate the PEM. Results of the PEM analysis for general psychological distress suggested a debatably effective treatment effect for Fox, as six out a possible ten points were below the line which gives a result of 60%. One point was on the line for Fox but was not included to manage bias. A moderately effective treatment was identified for Raven with nine out of a possible twelve points below the line giving a result of 75%. A moderately effective treatment for Wolverine was identified with ten out of a possible twelve points below the line giving a result of 83%. One data point was on the line for Wolverine and not included.

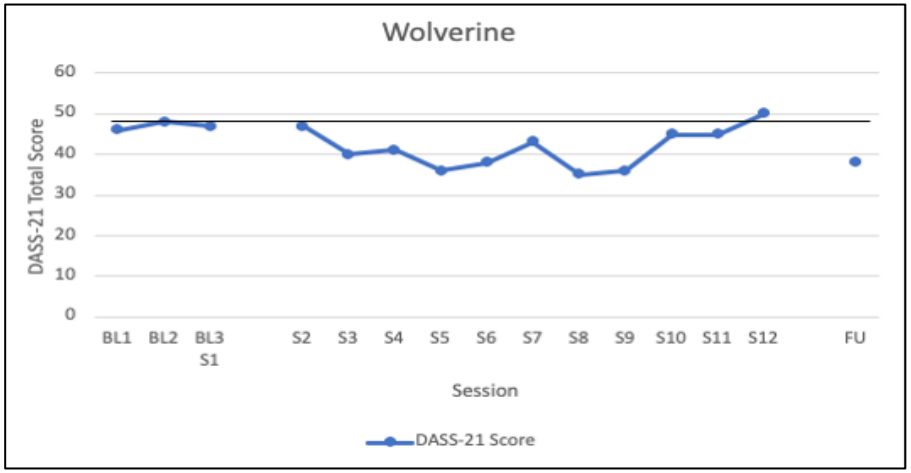
Figure 21

Visual Displays of General Psychological Distress with PEM Line





N.B S6* for Fox indicates 4-week gap



Notes. BL= Baseline; S=Session; FU=Follow Up; DASS21= Depression Anxiety and Stress Scale 21 Items; measures completed before session; Solid line=PEM Line

4.7. Information on DASS-21 Scoring

This section provides details for how the DASS-21 is scored and its severity of conditions is rated (Table 21). Before interpreting the scores, the summed numbers in each sub-scale need to be multiplied by 2, this gives DASS Scores as the DASS 21 is the shorter version of the measure. Participants' subscale scores and severity are provided in Table 22.

Table 21
DASS Severity Ratings

Severity	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Table 22
Participants DASS-21 Subscale Totals and Severity

Participant	Time	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress
Fox	Pre (B1)	26 (Severe)	32 (Ext. Sev)	32 (Severe)
	Post (S10)	30 (Ext. Sev.)	32 (Ext. Sev)	30 (Severe)
	One Week Follow Up	30 (Ext. Sev.)	30 (Ext. Sev)	30 (Severe)
Raven	Pre (B1)	8 (Normal)	10 (Moderate)	18 (Mild)
	Post (S12)	8 (Normal)	6 (Normal)	10 (Normal)
	Two Week Follow Up	8 (Normal)	2 (Normal)	12 (Normal)
Wolverine	Pre (B1)	26 (Severe)	30 (Ext. Sev)	36 (Ext. Sev)
	Post (S12)	32 (Ext. Sev.)	36 (Ext. Sev)	32 (Severe)
	One Week Follow Up	22 (Severe)	26 (Ext. Sev)	28 (Severe)

Notes. (Ext. Sev) = Extremely Severe

4.8. Information on SMA

SMA was conducted to analyse the temporal and correlational relationships between the IES-R and DASS-21 subscales (Depression, Anxiety, and Stress). All of the participants' data were included in the analysis. SMA was ran with the Bonferroni correction to protect against type 1 errors (Armstrong, 2014). Although some *p* values are below 0.05 this does not always indicate a significant lag (temporal relationship), and only significant lags are marked on Table 23. The analysis showed significant correlations between the IES-R and stress (Table 23) for: Fox Lag +1 (r = .68, p=.004) suggesting a sequential change as decreases in the IES-R are followed by decreases in stress a week later, and Wolverine Lag 0 (r = .79, p=.000) suggesting changes occurring concurrently.

Table 23

SMA Lag Correlations between IES-R and DASS-21 Subscales

Participant	Lag	IES-R Total & DAAS-21 Depression Subscale	ρ (with Bonferroni correction)	Lag	IES-R Total & DAAS-21 Anxiety Subscale	ρ (with Bonferroni correction)	Lag	IES-R Total & DAAS-21 Stress Subscale	ρ (with Bonferroni correction)
Fox	-2	r= -0.01	0.473	-2	r= +0.04	0.434	-2	r= +0.24	0.205
	-1	r= +0.19	0.282	-1	r= +0.05	0.414	-1	r= +0.16	0.307
	0	r= +0.45	0.083	0	r= -0.03	0.464	0	r= +0.30	0.167
	+1	r= +0.59	0.019	+1	r= -0.11	0.351	+1	r= +0.68	0.004**
	+2	r= +0.39	0.085	+2	r= -0.30	0.127	+2	r= +0.52	0.024
Raven	-2	r= -0.33	0.077	-2	r= +0.23	0.212	-2	r= -0.25	0.139
	-1	r= -0.16	0.266	-1	r= +0.28	0.171	-1	r= -0.01	0.478
	0	r= +0.20	0.215	0	r= +0.67	0.005	0	r= +0.12	0.317
	+1	r= -0.07	0.380	+1	r= +0.46	0.044	+1	r= +0.13	0.286
	+2	r= +0.27	0.124	+2	r= +0.40	0.060	+2	r= +0.18	0.206
Wolverine	-2	r= +0.27	0.158	-2	r= +0.11	0.349	-2	r= -0.09	0.356
	-1	r= +0.19	0.259	-1	r= +0.50	0.025	-1	r= -0.08	0.391
	0	r= +0.54	0.023	0	r= +0.29	0.164	0	r= +0.79	0.000**
	+1	r= +0.10	0.362	+1	r= +0.36	0.096	+1	r= +0.14	0.315
	+2	r= -0.31	0.123	+2	r= +0.32	0.119	+2	r= +0.09	0.357

Notes. r= Pearson's r co-efficient, +/- shows direction of the correlation; *Significant lag at p<0.05; **Significant lag at p<0.01

4.9. Reliable Change Index (RC) and Clinically Significant Change (CSC)

As mentioned in the extended analysis the RC and CSC of the IES-R and DASS-21 were calculated for the study at the final treatment session and FU, (please see Table 18 for an overview of the clinical and non-clinical norms used with the rationale provided in section 3.1). Table 24 provided the values obtained from the RC analysis; symptom change was considered reliable with 95% confidence if the RC was greater than +/- 1.96.

Regarding the IES-R a RC was found for Fox at FU, and although one was not found for Raven, they were very close, but a CSC was found. Not finding a RC in the IES-R for Raven was due to RC being calculated with the first data point of the baseline phase which was the second lowest score in the phase. Therefore, sensitivity analysis was conducted with the baseline mean (score of 27). When the baseline mean was used in calculations this gave a RC score of 2.66 which is greater than 1.96 indicating a RC. Regarding Raven's DASS-21 subscales, RC and CSC were noted in stress at the end of the intervention, but this did not maintain into FU. The change for Raven was a loss of RC and it only remained CSC for stress at FU, meaning it was not deemed reliable with 95% confidence like it was at the end of treatment. However, there was a RC and CSC in anxiety for Raven at FU.

Table 24

Reliable Change Indices

Participant	Time	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress	IES-R
Fox	Post (S10)	-1.27	0.00	0.63	1.42
	One Week Follow Up	-1.27	0.57	0.63	2.13^{R}
Raven	Post (S12)	0.00	1.13	2.53^{RCSC}	1.42
	Two Week Follow Up	0.00	2.27^{RCSC}	1.90^{CSC}	1.95^{CSC}
Wolverine	Post (S12)	-1.91	-1.70	1.26	1.78
	One Week Follow Up	1.27	1.13	1.53	0.89

Notes. Calculation completed using non-clinical and clinical norms in published literature. Decreases in IES-R and DASS-21 indicates improvements. DASS-21 scores are doubled when scoring. Post = final NET session. R= Reliable Change. RCSC= Reliable and Clinically Significant Change.

4.10. Information on ABMIA

Please refer to the journal paper for discussion on the autobiographical memory integration mechanism of change. Table 25 provides the frequencies of the amounts of increases and decreases pre-and-post therapy in autobiographical memory coded in narratives through the ABMICT. Please note for sensory details for Fox one narrative stayed the same and did not change.

Table 25

Participants' Changes in Autobiographical Memory Across Therapy

	Fox		Raven		Wolverine	
ABMIA	Increase	Decrease	Increase	Decrease	Increase	Decrease
Vividness	**5**	1	**7**	1	**7**	1
Time and Place Details	1	**5**	3	**5**	**6**	2
Emotional Distancing (RS)	2	**4**	2	**6**	**5**	3
Sensory Details	**5**	0	**7**	1	**7**	1
Fragmentation (RS)	**4**	2	4	4	3	**5**
Disorganisation (RS)	1	**5**	1	**7**	2	**6**
Narrative Coherence (Increase in Time and Place Details, and decreases in Fragmentation and Disorganisation)	0	**6**	1	**7**	4	4
Total Word Count	3	3	1	**7**	4	4

Notes. ABMIA= Autobiographical Memory Integration Area; RS= Reverse Scored; Bold numbers represent areas with greater number of changes

4.11. Change interview data

All three participants attended the CI which were conducted by an external researcher (a trainee clinical psychologist) over MS Teams. Fox and Raven's sessions lasted around 30 minutes, and Wolverine's an hour. Interviews were conducted one week after the final intervention session for Fox and Wolverine, and two weeks after for Raven. This was to allow for all of the participants to be reviewed by the service in a timely manner. Fox and Wolverine continued their NET with another practitioner as the recommended twelve sessions were reached and they

had not finished processing their lifelines. Table 26 provides an overview of the qualitative data gained from the participants, please note only condensed meaning units are displayed and not every instance of the data coded is displayed in the table. The reason for this is to give a concise overview of coding and flavour of the categories. Table 27 provides an overview of the categories with a description and the codes that make up the categories.

Table 26

Summary of Change Interview Data with Codes, Meaning Units, Frequencies of Codes, and Categories

Code	Condensed Meaning Unit	Frequency	Category
	Question: How have you been feeling generally?		
Positive Affect	F- I've been good.	F- 2 R- 1 W-0	Positives of Therapy
Negative Impact	R- It was so difficult…it was just affecting everything it wouldn't go away.	F- 1 R- 4 W- 1	Negatives of Therapy
Difficult Post Intervention	R-It was very much like so these feelings haven't gone away and I felt like well, I've not been I've not made progress and I just felt very negative about the whole thing. And didn't really know how to deal with it all, so I just gave it a bit of time and I did settle.	F-0 R- 1 W- 1	Therapy As a Process
	Question: Looking back, what was therapy like for you as a whole?		
Hard Therapy	F- it was hard a little harder than I thought it would be. R- Difficult I think yeah. W-I've had a difficult experience.	F- 2 R- 6 W- 3	Therapy As a Process
Detailed Therapy	F- the only therapy I've had before was just talking about it and then that would be it but this time it was talking about it but going through all the small details, feelings, and then having to have it read back to me and go though it again.	F- 1 R-0 W-0	Memory-Vividness
Effective Therapy	F- it worked a lot better than any other therapy I've had. W- it's working. It's hard, but it's working.	F- 1 R-0 W-1	Therapy As a Process

Mixed Habituation	F- all though some of them didn't get easier to hear a few of the memories we went through did get a lot easier to hear and I didn't get the same feelings I had the first time I went through it. W- hearing it back the second time. And again, I saw the difference, I was still in and out from my perspective, I was still in and out of being present, but it not as. Frequently and not as severely.	F- 1 R- 0 W- 2	Therapy As a Process
Emotional Rollercoaster	R- I had a few weeks of being fine and then a few weeks being really low. So it was a bit of a roller coaster.	F-0 R- 1 W-0	Negatives of Therapy
Therapy was Positive	W- it was positive.	F- 1 R- 0 W- 3	Positives of Therapy
Question: You were specifically asked to freely narrate a trauma before then re-narrating it with the help of the therapist in session, how was this for you?			
Hard to Talk About Memories	F- I wouldn't say it was very easy because talking about the memories is a hard thing to do but once I started talking about it just sort of spilling out it wasn't too bad. F- there was one memory. That's. Was difficult to continue and then at the end. But that was because it was a really sort of difficult memory for me. W- not with the therapy in general, but one particular narration. I didn't want to do and and I tried to skip over.	F- 3 R- 0 W- 1	Speaking About Trauma
Fragmented Recall/Order	R- The free narration. I'm not really sure like to start with it's just sort of saying what you remember and what you think and that was. Sort of difficult to get going, I guess finding a start point and trying to	F- 1 R- 5 W- 0	Memory- Time and Place Details

	remember things that you don't some of it happen. When I was very young and you don't necessarily remember. R- yeah trying to order and then you'd be saying something I'd go no that's not right. Because this had happened and dates and things were very much like Topsy Turvy. R- Yes, especially the earliest stuff when trying to figure out well did that happen first or did this happen first and then……there's other things that must have happened but you can't always remember. F- a little bit confused sometimes.		
Speaking About Trauma is Brutal	W- Yeah. That nearly killed me. I mean it was brutal. It's absolutely brutal. And it was really. Really, really frightening.	F- 0 R- 0 W- 1	Speaking About Trauma
Talking About Trauma is Scary	W- and then the the fear.	F- 0 R- 0 W- 1	Speaking About Trauma
Trauma Loses Power	W- To see that difference, it’s still horrific, it's still traumatizing, it was still horrible and vicious, but not as severe. It felt like narrating it again, kind of tucked away a little bit of the power behind it. I think that's the main point out of it for me is that, It felt like this still is a hugely damaging aspect of my life, but it's not as in charge as I thought it was. You know, we're still a long road to go, but I saw the potential. F- erm but when he read it back it wasn’t like either of those it was just like hearing a story that didn’t hurt as much as the first time we did it it was definitely an improvement.	F- 3 R- 0 W- 2	Therapy As a Process

	W- It felt like. It goes back to the power weakening. But yeah, the power of the situation weakening. So yeah. So for me, I would say that with that you duration was less and and I think the frequency.		
Question: How was it to hear someone re-read your previous session's narrative to you each session?			
Listening to Trauma is Difficult	F- sometimes when he was reading out some of the memories it was really hard to stay and listen especially the last session erm I just wanted to walk out. R- I found some of it really emotional. W- it's horrible and it's. sometimes not horrible all the time. You know, sometimes there's nice things that are read back to you F- I wanted to cover my ears or just not listen generally. I just didn't wanna hear what he was going. I knew what he was gonna say and I didn't wanna hear it.	F- 6 R- 1 W- 3	Hearing About Trauma
Avoiding Listening to Trauma	F- but there were some memories when he read it back when I was first talking to him about them I was sort of either trying to make myself numb to it or the feelings would be too much.	F- 3 R- 0 W- 0	Hearing About Trauma
Hearing the Narrative is Validating	R- It like gives you that validation that it did happen and I think that's useful as part of healing.	F- 0 R- 1 W- 0	Hearing About Trauma
Hearing the Narrative can be Dismissing	R- some of it, you think ohh well. You've just read it as if. It's just an everyday thing … And I got that validation and sometimes I felt very much like we've just read that just like it's a page on a book and that that's my life that's happened to me.	F- 0 R- 1 W- 0	Hearing About Trauma

Last Session is Hard	R-the last session is going through absolutely everything and that really affected me when I came out …..down until about Tuesday, Wednesday. F- I think, the hardest part, cause I've already heard all the all this stuff before, and then we got to that final memory and I had to hear that all again and I just wanted to sort of tune out a little bit.	F- 1 R- 2 W- 0	NET Specifics
Positives of Hearing the Narrative	W- sometimes not horrible all the time. You know, sometimes there's nice things that are read back to you and you go. Ohh yeah. You know, I've got this, like this nice memory or that was positive. F- the sense of accomplishment when I left that day was really, really good, so it was still definitely worth it.	F- 1 R- 0 W- 1	Hearing About Trauma
Question: NET has a psychoeducation session, this is where Jackson will have explained to you what happens in our minds and body when we experience traumatic stress and how therapy is meant to help with that, did it make sense to you? Can you recall any of it? And if so, what was the most important aspect of it?			
Learning About Freeze, Fight, Flight, Fawn, Faint Helpful	F- For me it was the way, he explained. Fight or flight. R- we talked a lot about the fight and flight responses.	F- 1 R- 1 W- 0	NET Specifics
Psychoeducation was Normalising	F- It was nice to feel like it was just normal.	F- 2 R- 0 W- 0	NET Specifics
Psychoeducation Helped Develop Insight into Body and Emotions	W- I would say recognizing you know my body's response, you know to how I'm feeling.	F- 0 R- 0 W- 1	NET Specifics

Psychoeducation Helped Develop Insight into Symptoms	W- I started to recognize symptoms more.	F- 0 R- 0 W- 1	NET Specifics
Psychoeducation Helped Develop Insight into Dissociation	W- if I felt an episode coming on and, you know, in the home environment or out and about, then I would be able to recognize that and try and step in because I'd been taught, you know, this is what your body could do. And this is how you might respond.	F- 0 R- 0 W- 1	NET Specifics
Question: What was it like to talk about the contextual details (e.g., specific details of each event such as the room/time) of each traumatic event?			
Fragmented Recall of Context	F- So I remember all the details of my memory really well. But it caught me off guard about how I might remember the memory really, well in all the details, but I don't remember the times and dates or the seasons very well.	F- 2 R- 0 W- 0	Memory- Time and Place Details
Good Memory of Trauma	F- So I remember all the details of my memory really well. R- I could remember more than I thought like remembering what different rooms look like, at somebody's house.	F- 1 R- 1 W- 0	Memory- Vividness
Questioning Certainty of Memory	R- some of it. I thought I wasn't sure about it all, and I thought I might making it up …and some of it was a little bit confusing how almost like a visual sort of snapshot in my head.	F- 0 R- 1 W- 0	Memory-Time and Place Details
Differences in Recall of Senses in Memory	R- Yeah, some things were more vivid for me than others, but I'm not very good with smells or physical what could you actually feel rather than emotional but the visual memory for me was the big one.	F- 0 R- 1 W- 0	Memory- Sensory Details

Talking About Memories Helped Remember Details	W- the more we talked about the details, the more I unpicked things that I hadn't. Remembered previously. I was able to see the layout of everything. I was able to see you know, things I haven't thought about, you know, like ornaments on the shelves, you know, like old family photographs, you know, things like that and that we're able to help me kind of put things into time and space. F- with the memory when Jackson was helping me through it he was like going through the sounds and smells and the tastes and what I could see and feel and because of that it unlocked a lot more and I was talking to my partner about it and the more I was talking about it the more I was remembering …so in a strange way I guess the positive is that erm going through the session with Jackson and him taking the time to go into as much detail as possible I was unlocking memoires I didn't know I had and it helped me sort of see the past a lot clearer than I used to.	F- 1 R- 0 W- 2	Memory-Vividness
Talking About Memories Helped be More Open	W- I think it helped to open up things that I hadn't. Been able to delve into before.	F- 0 R- 0 W- 1	Speaking About Trauma
	Question: Given the time limited and structured nature of NET, how was that for you?		
Positive Experience of the Time Limited Structure & Structure of NET	R- liked the structure and the routine. F- it was well structured. W- I would say that the sessions were. The right length and for me, I think it was helpful to, you know, do a set chunk and narrate and then and then have it read back to me. And then narrate and then try and work through these set chunks because. I think if it had been longer, I	F- 2 R- 2 W- 2	NET Specifics

	think it would have been too intense and I think if it had been shorter, I wouldn't have had enough time. So I think that was absolutely fine.		
Positive Experience of Hearing Previous Session's Script	R- I like reviewing it like the following session like how you go back over it, it's just that double exposure isn't it but. It reminds you, which point you got to….Yeah. It's not a shock is it, you know what's coming.	F- 0 R- 1 W- 0	Hearing About Trauma
Negative Experience of the Time Limited Structure of NET	W- In terms of having a set amount of weeks that was a bit scary for me to be honest, because with the set amount of weeks It is very, very hard for me to trust people.	F- 0 R- 0 W- 1	NET Specifics
Negative Impact	F- So when we was talking about some of the more difficult memories, and there was obviously that first day and probably a couple of days after. There was a hidden negative or affected my moods really, bad, so I'd find it difficult to work at the initiative to get out of bed and everything seemed kind of pointless. Sometimes it's even questioning…if therapy was for me because it just seemed so. Felt like I was going backwards. R- I was quite unstable. Impaired thinking throughout the process just settling down now, but I thought I was going mad because I just couldn't remember things.	F- 1 R- 1 W- 1	Negatives of Therapy
Question: Have you noticed any positive or negative change(s) during and after therapy?			
Positive Impact of Therapy	F- there was positives after some sessions I would come out and it was like some of the sessions where he read it back to me and I didn't feel as like hung onto it as I did before.	F- 1 R- 2 W- 2	Positives of Therapy

	F- I guess I felt more motivated to do things so those weeks would be the weeks I would start trying to go outside a bit more or doing things around the house or…..looking after myself a little bit more. R- for the last two weeks. I've not had any real nightmares about things, which is nice.		
Therapy Improved Insight	R- I think it's important, I can realize why I'm doing things makes me feel a little bit more in control of what I'm experiencing.	F- 0 R- 2 W- 0	Positives of Therapy
Negative- Restarting Self-Harm	R- I've started with the self-harming again. W- after those particularly horrible sessions, I would have, days of (details of self-harm redacted for anonymity) and one of the things that seems to have developed out of that. And so when I was first put on the list, the things I was doing to harm myself were (details of self-harm redacted for anonymity)…... And so for me, that's negative.	F- 0 R- 1 W- 1	Negatives of Therapy
Negative Impact After Session	F- there was one memory that we worked through that was really negative and that did impact me for a little longer than normal in fact I think I spent the whole week going into the next session feeling negative. W- Doing a session that is. That's all trauma is very difficult and I'm sure it's for anyone, but like it's very difficult trying to go back into the real world once you leave the room.	F- 1 R-0 W- 1	Negatives of Therapy
Question: Was there any specific point in therapy (e.g., session number, or introduction of intervention) where you noticed a change(s)?			
Unlocked New Memories	F- talking about the memories unlocked other memoires for me.	F- 2 R- 1	Therapy As a Process

		W- 0	
Relieves Guilt	F- it helped relieve me of a lot of my guilt so I was holding onto…for what had happened.	F- 1 R- 0 W- 0	Positives of Therapy
Narrating Gives Order and Makes Clearer	F- It adds a timeline my memories are scattered when I first started therapy my memories were really strong and all over the place and I couldn't remember the in-betweens and I didn't think that was important but after the sessions the positive that has come out was remembering the in-betweens and give a timeline so it was erm helping me see it in the most truthful way for the first time.	F- 2 R- 0 W- 0	Memory-Time and Place Details
Therapy is Painful	R- there's no standout moment, it was all equally painful.	F- 0 R- 1 W- 0	Negatives of Therapy
Question: If you have noticed a change, what aspect of therapy do you feel was the most important to cause the change?			
Flowers are Positive	F- I think that my most helpful technique is looking for a flower straight after having a negative thought.	F- 2 R- 0 W- 0	NET Specifics
Therapy Makes People Think More About Trauma	R- it makes me think more about it well.	F- 0 R- 1 W- 0	Memory- Vividness
Process of Therapy was Validating	R- That's real and that did happen and that shouldn't have happened, which gives me a bit of validation.	F- 0 R- 1 W- 0	Therapy As a Process
Therapy Helped with Work	W- So I started my job in (redacted), about a month into the into the therapy. And if I'd not had this therapy. I don't think I would have been anywhere near as effective.	F- 0 R- 0 W- 2	Positives of Therapy
Corrective Experience of Men	W- having a guy you can trust, you know that I'm not married to.	F- 0 R- 0	Positives of Therapy

		W- 1	
Therapy Provided Tools	W- Being equipped with tools to keep me calm and in a situation where I might have previously been heightened. F- He was he was giving me. Techniques to handle things in the future. W- I've been given tools.	F- 2 R- 0 W- 2	Positives of Therapy
Approaching Things Previously Avoided	W- Whereas before you know I would have just. I would have just run but now I'm like, OK, well, I can try this. I can try that. And if that's not OK, then I can do this.	F- 0 R- 0 W- 2	Positives of Therapy
Question: Do you feel the change was due to the techniques used in the therapy, or other significant factors in your life? (e.g., relationship with therapist, changes in factors outside of therapy)			
Change due to Therapy	F- it has to be therapy I haven't really changed anything in the other aspects of my life. R- therapy and I've had no other changes. W- the tools that he equipped me with Have been very substantial, And very important.	F- 1 R- 1 W- 1	Changes
Change due to Therapist	W- I would say that he himself is very personable and very easy to talk to, very relational you know. Relational in a very professional sense, I really appreciated the fact that you know that he was easy to get on with.	F- 0 R- 0 W- 2	Changes
Question: What personal strengths/aspects of your life do you feel has helped you make use of therapy?			
Family Support Helped in Therapy	F- personally I don't think I had a strength of my own but I think it was my partner and my kids that gave me strength.	F- 1 R- 0	Changes

		W- 1	
Friend Support Helped in Therapy	R- Probably my friends and being able to have people to talk to.	F- 0 R- 1 W- 0	Changes
Hobbies Helped in Therapy	R- I keep myself very busy, which is a good and a bad thing. So I don't give myself time to think which is a blessing and a curse. I use exercise a lot to help deal with things.	F- 0 R- 1 W- 0	Changes
Relinquishing Control Helped in Therapy	W- do you know what's the big one I've learned to relinquish control in some situations. I like control….. So this is a massive thing for me.	F- 0 R- 0 W- 1	Changes
Therapy Built Trust in Others	W- trusting my husband and again this goes back to trusting people around me and the trust thing in general.	F- 0 R- 0 W- 1	Positives of Therapy
Helpful-Risk Assessments	R- the helpful things like doing the risk assessment.	F- 0 R- 1 W- 0	Therapy As a Process
Helpful- Weekly Check In	R- seeing how I was doing between sessions was useful.	F- 0 R- 1 W- 0	Therapy As a Process
Question: Was there any aspect of the therapy which you feel could be added to make it more helpful?			
No Changes to Therapy	W- No I don't think so. Although I've had a difficult experience, I would say it's been positive, I've been given tools, I've learned new skills and. And I don't think there's anything that can be added, to be honest with you. F- None, no I wouldn’t change it for me.	F- 2 R- 0 W- 1	NET Specifics
Therapist Factors	F- He keep it really friendly and relaxed.	F- 3 R- 1	Therapy As a Process

	R- No, he was very calming. W- I think I've had the right person to help me through it.	W- 1	
Research- Change Questionnaires	R- I think maybe questions on the surveys could be different just because I don't feel it paints a really thorough picture.	F- 0 R- 1 W- 0	Research
Adaption- More Sessions	W- given it's for research purposes I don't think there is because the only thing I would say is a longer time span, you know of the block of sessions.	F- 0 R- 0 W- 1	Research
Question: Compared to other trauma-based therapies, what made this therapy more helpful?			
NET is more Specific and Scaffolded Compared to Counselling for Abuse	R- I think this was more scaffolded and more specific other was just talking through things that had happened and how it was affecting me now and I think had something like. 25 sessions 25 hours just talking through it.	F- 0 R- 1 W- 0	NET V Other Trauma Therapies
NET Takes Away Avoidance	R- self-led by me, you know what do you want to talk about today? I think it gave room to not dwell on some things and dwell on certain things, too much whereas being somebody else lead. It takes the control away from me but takes me where I need to go rather than where I want to go.	F- 0 R- 1 W- 0	NET V Other Trauma Therapies
NET is more Detailed than Counselling for Abuse	R- I had talked about things before, but not in the detail that that we spoke about.	F- 0 R- 1 W- 0	NET V Other Trauma Therapies

NET is Better Than Other Therapies but it's due to the Therapist	W- I think it's been better.. but I don't know if that's because I've had a handful of really bad counsellors in the past and … only one or two that were really good.	F- 0 R- 0 W- 1	NET V Other Trauma Therapies
Structure of Sessions made NET Better Than Other Therapies	W- Just let it all out at the start of the session and which is always needed and then I've had plenty of time to do this more structured way of doing things and which I think has been very positive cause other types of counselling that I've had …. but it's not. It's not great. It's not very personable. It doesn't give you the chance to connect with your therapist.	F- 0 R- 0 W- 1	NET V Other Trauma Therapies
Individual Readiness Making Therapy More Successful Compared to Previous Therapies	W- don't know if that's because. I'm more ready, you know, to expose my trauma and face it and deal with it. Because, you know I signed up for this because I want to be well.	F- 0 R- 0 W- 1	Changes

Question: What were the unhelpful aspects of therapy?

No Unhelpful Aspects of Therapy	F- I don't think there was anything unhelpful, even if I might have felt like it in the moment. It turned out that later it was really helpful.	F- 2 R- 0 W- 0	NET Specifics
Not Relevant to Discuss All Stones	R- Some of the things, I didn't feel was relevant in terms of the trauma. You know, some of the stones. I felt weren't relevant.	F- 0 R- 1 W- 0	NET Specifics

Question: Was there either an aspect or time in therapy that you feel you could not carry on? And why/what this? If so, what helped you complete therapy?

Trying to Skip Stones	W- not with the therapy in general, but one particular narration. I didn't want to do and I tried to skip over because I was so embarrassed about this particular narration I was like I can't talk about this…. I was mortified and I was like, it's fine. Want to do the next one is? We don't need to do this one. It's fine. and I got rained in. No, the fact that you're avoiding it shows that we need to talk about.	F- 0 R- 0 W- 1	Speaking About Trauma
Question: Was there anything during the therapy that took you by surprise or was unexpected?			
Initially Confused at Start of Therapy	F-. So the second week it caught me off guard that we was rereading that memory we did last week. I still went and think it would starting a new one. So I was just like it was so strange that we had to go through the last memory.	F- 1 R- 0 W- 0	Research
Surprised Unlocked New Memories	R- earlier on I unlocked the memory that I didn't know I had that was unexpected.	F- 0 R- 1 W- 0	Surprises
Surprised Grounding Worked	W- I didn't expect the grounding tools to work.	F- 0 R- 0 W- 1	Surprises
Question: If you could make any changes to the therapy what would they be?			
Therapy is Hard but Good	F- It's been really good, positive, difficult but positive.	F- 1 R- 0 W- 0	Therapy As a Process
The Right Therapy for the Person	W- I think I've had the right approach taken with me and when it was floated to me initially by a psychologist called (redacted), it was floated past me about doing things like rapid eye movement and I was like, no, that sounds awful but I think something like narrative therapy, I think is the right path for someone like me.	F- 0 R- 0 W- 1	Changes

Notes. F=Fox; R=Raven; W=Wolverine; Jackson= Researcher/therapist's name

Table 27
Overview of Categories and Codes

Category	Category Description	Code(s)
Memory	Overarching Category containing Vividness, Time and Place Details, and Sensory Detail categories that help explain quantitative data.	
Vividness	Participant's experiences of the therapy that helps explain the findings regarding changes in the vividness of memories.	Detailed Therapy Good Memory of Trauma Talking About Memory Helped Remember Details Therapy Helped me to Think More About Trauma
Time and Place Details	Participant's experiences of the therapy that helps explain the findings regarding changes in the amount of time and place details of memories.	Fragmented Recall/Order Fragmented Recall of Context Questioning Certainty of Memory Narrative Gives Order & Makes Clearer
Sensory Details	Participant's experiences of the therapy that helps explain the findings regarding changes in the amount of sensory details of memories.	Differences in Recall of Senses
Hearing About Trauma	Participant's experiences of hearing their trauma being spoken back to them through therapy.	Listening to Trauma is Difficult Avoiding Listening to Trauma Hearing Narrative is Validating Hearing Narrative is Dismissing Positives of Hearing Narrative

		Positives of Hearing Narrative from Previous Session
Speaking About Trauma	Participant's experiences of having to speak about their trauma in therapy.	Hard to Talk About Memories Speaking About Trauma is Brutal Talking About Trauma is Scary Trying to Skip Stones Talking About Memory Helped be More Open
Positives of Therapy	Participant's positive general experiences and the areas identified as a positive because of going through therapy.	Positive Affect Therapy was Positive Positive Impact of Therapy Therapy Improved Insight Relieves Guilt Therapy Helped with Work Therapy Provided Tools Therapy Built Trust in Others Corrective Experience of Men Approaching Things Previously Avoided
Negatives of Therapy	Participant's negative general experiences and the areas identified as a negative because of going through therapy.	Negative Impact Negative Restart of Self-Harm Negative Impact After Session Therapy Painful Emotional Rollercoaster
Therapy As a Process	Participant's experiences of their journey of going through therapy as a whole.	Difficult Post Intervention Hard Therapy Effective Therapy Mixed Habituation

		Trauma Loses Power Unlocked New Memories Process is Validating Therapy is Hard but Good Helpful Risk Assessments Helpful Checking in Therapist Factors
NET Specifics	Participant's experiences of having gone through NET and the specific techniques, and structure of NET.	Last Session is Hard Learning about the Freeze, Fight, Flight, Fawn, Faint Psychoeducation was Normalising Psychoeducation Built Insight into Body & Emotions Psychoeducation Built Insight into Symptoms Psychoeducation Built Insight into Dissociation Positive Experience of Time & Structure Negative Experience of Time Limited Structure No Unhelpful Aspects Not Relevant to Discuss All Stones No Changes Flowers are Positive
NET V Other Trauma Therapies	Participant's experiences of having NET compared to other trauma-based approaches.	NET Specific & Scaffolded NET Takes Away Avoidance NET More Detailed Than Trauma Based Counselling NET Better but due to Therapist

		Structure of Sessions made NET Better Than Other Therapies
Research	Participant's comments on the research design and taking part in research.	Change Questionnaires Adaptions to have more Sessions Confused at the Start
Changes	The things that participants noticed helped influence change throughout the therapy.	Change due to Therapy Change due to Therapist Family Support Helped Friend Support Helped Hobbies Helped Relinquishing Control Helped The Right Therapy for the Right Person Individual Readiness
Surprises	Things that took participants by surprise.	Surprised Unlocked New Memories Surprised Grounding Worked

4.12. Summary results for each participant

The following section explores participants' quantitative and qualitative results in more detail. This section includes observational details from sessions, supervision, and the therapist's reflective notes.

Fox

Context. Fox has had therapy in the past, but the researcher was not sure when and what this entailed. However, they commented NET "*worked a lot better than any other therapy I've had".* Session length varied between 120-180 minutes. Fox spoke positively of NET and explained the psychoeducation session was normalising "*It was nice to feel like it was just normal*".

Visual Analysis of IES-R. Visual analysis revealed an improving trend in the intervention phase for Fox in the IES-R. There were no issues with variability across either phase. There was a reduction in overall pre-post (baseline to FU) scores on the IES-R, but Fox remained in the higher category. DC analysis did not identify a treatment effect. However, contrary to the DC analysis a RC in the IES-R was found at FU, and PEM analysis suggested an effective treatment. The RC in the IES-R score maybe explained due to Fox not finishing therapy, and therefore due to the high IES-R score one would not expect to see a CSC within ten sessions. Qualitatively Fox reported the intervention was helpful as after sessions they "*didn't feel as hung onto it as before*" (memory), and they were more motivated in their mood and were doing things they previously avoided. However, they did comment at times when hearing their narrations re-read to them that they made themselves "*numb*" and "*didn't want to listen*". Fox repeatedly commented one of their favourite aspects of NET was looking for a flower after a "*negative thought*". Fox attributed their changes to therapy and the external support of their partner and children.

Secondary Outcomes. For secondary outcomes there were no changes noted in general psychological distress (as measured by DASS-21 total scores), DC analysis did not identify a treatment effect, and there were no issues with stability across any

phases. Visual analysis of the intervention phase and DASS-21 subscales showed there was an improving trend for Fox and depression, deteriorations in anxiety, and no changes for stress. There were issues in stability in the intervention phase for depression, and anxiety across both phases. There were no RC or CSC noted in any subscales. Through calculating the baseline means Fox was categorised as extremely severe in all subscales, at the end of the intervention and FU the only change was a reduction in stress to severe. For the analysis of temporal relationships between the IES-R and DASS-21 there was a significant correlation between the IES-R and stress at lag +1 (r = .68, p=.004) suggesting a sequential change as decreases in the IES-R were followed by decreases in stress a week later. This may suggest that symptoms of PTSD were associated with levels of stress as reductions in PTSD led to reductions in stress.

Exposure and Habituation. There was little evidence of in-session habituation when looking at HR, and HRV. Fox's SUDs suggested they only experienced habituation twice which does not support the role of between-session habituation. This may match Fox's qualitative report of "*some memories not getting easier*" (to listen to); however, they did comment on experiencing habituation. Observationally it appeared the participant experienced habituation, apart from in the very first narration session, where it was difficult to identify a flower/appropriate place to end the memory. Interestingly, when looking at HRV (rMSSD) data there is a gradual increasing trend at the start of every session, and there were increases in rMSSD and decreases in HR at the start and end of treatment. This may give more insight into the process of habituation, as Fox also experienced consistent decreases in rMSSD in session. This would not support the role of in-session habituation. However, the gradual trend of rMSSD increasing, and the changes from the start to end of treatment would suggest that the process of therapy increased vagal tone (as it is associated with elevated HRV), which may support the role of between-session habituation. There were no changes in the BPQ-SF.

ABMI Narratives. Fox completed six sets of narrations showing increases in vividness and SD five times and fragmentation four times. Increases in vividness and SD maybe explained by Fox saying,

"*going through the session with Jackson (therapist) and him taking the time to go into as much detail as possible I was unlocking memories I didn't know I had and it helped me sort of see the past a lot clearer than I used to*".

It is interesting that Fox commented on seeing the past clearer than they used to and they repeated that therapy,

"*adds a timeline my memories are scattered when I first started therapy my memories were really strong and all over the place and I couldn't remember the in-betweens and I didn't think that was important but after the sessions the positive that has come out was remembering the in-betweens and give a timeline so it was erm helping me see it in the most truthful way for the first time".*

Despite Fox saying therapy helped them see the past clearer and gave a timeline there were decreases in time and place details (TPD) and they also said,

"So I remember all the details of my memory really well. But it caught me off guard about how I might remember the memory really, well in all the details, but I don't remember the times and dates or the seasons very well".

This may suggest despite therapy giving a timeline, it was still difficult for Fox to speak with certainty about specific events. There were decreases in disorganisation five times, and emotional distancing (ED) four times. The criteria for narrative coherence (NC) were not met on any narration, and total word count (TWC) increased and decreased the same amount.

Raven

Context. Raven had previously received counselling for their trauma, and this ended shortly before taking part in the study. Sessions generally lasted for 120 minutes. When Raven was comparing counselling to NET, they explained that NET "*was more scaffolded and more specific (the) other was just talking through things*

that had happened and how it was affecting me now and I think had something like. 25 sessions 25 hours just talking through it". It appears the contextual differences between NET and counselling were helpful, as due to the directive nature of NET it limited Raven's avoidance as "*It takes the control away from me but takes me where I need to go rather than where I want to go".* NET was described as more detailed which again maybe due to the nature of the intervention as Raven explained "*I had talked about things before, but not in the detail that that we spoke about*.". These comments from Raven seem to suggest that they had a more positive experience of NET compared to counselling.

Visual Analysis of IES-R. Visual analysis revealed improving trends in the IES-R intervention phase for Raven. However, there were issues with stability across the intervention as only 64% of data points instead of the 80% fell within the stipulated 15% range of the median of data points for that phase (Lobo et al., 2017). Raven's baseline IES-R scores fluctuated from 23-37 with PTSD ranging from being a clinical concern (scores of 24+) and above the clinical cut-off score (33+) to 12 at FU which is below PTSD being a clinical concern, suggesting treatment was helpful in reducing PTSD. Raven's IES-R scores steadily increased early on in treatment and dropped before increasing once more. These changes in scores coincided with the build-up to sessions where pertinent traumas were due to be processed and continued after narrating them. This 'hangover' effect of narrations was particularly true for the last session "*the last session is going through absolutely everything and that really affected me when I came out ….down until about Tuesday, Wednesday"* (sessions took place on a Friday). Following sessions Raven often commented on feeling bad and noted symptoms such as "*Impaired thinking throughout the process just settling down now, but I thought I was going mad because I just couldn't remember things."*. Raven's IES-R scores started to consistently decrease following narrating the most salient traumas. DC analysis suggested treatment did not have a systematic effect for Raven. However, the results of the PEM analysis suggested a moderately effective treatment, treatment gains were maintained throughout the intervention and at FU, and although there was no RC for Raven, they were very close (-0.01). Not finding a RC in the IES-R was due to RC being calculated with the first data point of the baseline phase which was the second lowest score in the phase. Therefore,

sensitivity analysis was conducted with the baseline mean (score of 27). When the baseline mean was used in calculations this gave an RC score of 2.66 which is greater than 1.96 indicating a RC, and Ravens post-treatment score is closer to the normative mean indicating a CSC as well. Qualitatively Raven found the intervention helpful as their nightmares reduced, but they also started self-harming again. Raven believed the changes made were due to therapy, but highlighted their friends, and hobbies as helpful external factors.

Secondary Outcomes. Visual analysis of general psychological distress revealed an improvement for Raven which was maintained into FU. There were no issues with stability across any phases. DC analysis suggested a treatment effect in general psychological distress. Visual analysis of the subscale scores across the intervention phase, found a deteriorating trend in depression, and stress, but improvements in anxiety. Depression improved at session three and stayed at the same level for session four; however, there was an increase in depression between session five and six. Depression scores started to decrease again in line with lowering IES-R scores and reduction in depression also coincided with discussing the most salient traumas. At FU improvements in anxiety and stress, and depression were noted, with stress and anxiety being below baseline and intervention means. There were issues in stability across all subscales and phases apart from the baseline phase for depression. Through calculating the baseline means, Raven was categorised as moderate for depression and stress, and mild for anxiety, at the end of the intervention they were non-clinical in all subscales, and this was maintained at FU. RC and CSC were noted in stress at the end of the intervention, but only the CSC maintained into FU, meaning this change would no longer be reliable with 95% confidence. Clinically this change between post-intervention to FU may suggest a potential for a relapse in stress. However, there was a RC and CSC in anxiety at FU, and although this was not flagged as a significant lag by SMA analysis, the variables were found to have a moderate correlation (r =+0.67) at lag 0 which was significant (p= 0.005), suggesting the variables were related to each other, and change in anxiety and trauma occurred concurrently.

Exposure and Habituation. For Raven 50% of their sessions ended in increases and decreases in HR, but when looking at the HRV data 70% of their sessions ended with increases, suggesting evidence of in-session habituation more times than not. Raven's rMSSD scores generally increased session by session as therapy progressed. However, Raven's SUDS only suggested between-session habituation in four sessions. There were increases in rMSSD and decreases in HR at the start and end of treatment and looking at Raven's heart data may suggest in session habituation led to more changes. There was a very small and non-significant decrease in BPQ-SF.

ABMI Narratives. Raven completed eight sets of narrations showing increases in vividness and SD seven times. Raven spoke about having a good memory of events "*I could remember more than I thought like remembering what different rooms look like, at somebody's house.",* and it could be that vividness increased due to the "*detail that that we spoke about." (events).* It was interesting that SD increased as Raven explained "*I'm not very good with smells or physical what could you actually feel rather than emotional but the visual memory for me was the big one"* these individual differences noted by Raven may explain the increases in vividness and decreases in ED which occurred six times. Raven often commented on the difficulty with placing memories in time and place stating dates were "*topsy turvy*" and that events that happened when "*very young and you don't necessarily remember",* which even after processing the memory may explain why TPD decreased five times. Early on in therapy Raven did comment multiple times on "*I thought I wasn't sure about it all, and I thought I might (be) making it up*", and this was managed by the therapist recommending that they go with what they thought was true and to still engage with the memory as much as possible, regardless of if it was true or not. There were decreases in disorganisation and TWC seven times. Fragmentation increased and decreased the same amount, and the criteria for NC was met once.

Wolverine

Context. Prior to starting the study, Wolverine received a trauma focused psychoeducation package from the service which included teaching grounding skills

and a guided self-help information pack. Wolverine had received trauma focused interventions and therapy in the past. Wolverine also had health conditions which could have impacted the heart data and BPQ-SF. Wolverine was curious and showed an interest into NET and its theory which did result in the therapist and them having multiple conversations about weaving hot and cold memories together. Sessions often lasted between 150-180 minutes, with grounding techniques being used frequently to manage dissociation. Wolverine spoke positively of NET in comparison to their previous therapies "*I think it's been better and but I don't know if that's because I've had a handful of really bad counsellors in the past and and only one or two that were really good*", but this positive experience could have been due to therapist factors. NET helped Wolverine *"recognise symptoms more"* which included signs of dissociation too. The only adaption suggested was to increase the number of sessions "*I would say is a longer time span, you know of the block of sessions*".

Visual Analysis of IES-R. Visual analysis revealed no changes in trend of the IES-R for Wolverine across the intervention phase. There were no issues with stability across either phase. Wolverine was above the clinical cut-off and remained there at the end of intervention. Scores did fluctuate through treatment, no RC or CSC was found, and there was an increase at FU; however, Wolverine explained this was due to an external event that happened in the week leading up to the CI. Despite visual analysis showing no changes, and a debatable effect size being found from the PEM calculation, DC analysis identified a systematic treatment effect for Wolverine. Qualitatively Wolverine spoke positively about the intervention and was doing things previously avoided, but also commented on it being "*difficult*", experiencing negative affect following sessions *"for a few days afterwards when I'm trying to come down and it's made the self-loathing, you know, much worse",* which may explain why they re-started to self-harm. Changes were attributed to being more ready for therapy *"I'm more ready, you know, to expose my trauma and face it and deal with it. Because…..I want to be well",* the therapy itself, the relationship with the therapist *"I would say that he himself is very personable and very easy to talk to, very relational you know*", and support from their partner.

Secondary Outcomes. Visual analysis of the total scores of the DASS-21 revealed, a deterioration across the baseline and intervention phase; however, at FU improvements were noticed. These scores may be explained due to interpersonal factors outside of therapy that were impacting Wolverine whilst in the intervention. There were no issues with stability across any phases. Despite there being a deterioration, DC analysis found a treatment effect. Visual analysis of the subscale scores across the intervention phase, revealed deteriorating trends in depression and anxiety, with improvements in stress. At FU improvements were noticed for Wolverine across all areas. No RC and CSC changes were found. At baseline Wolverine was categorised as extremely severe for depression and anxiety, and severe for stress, at the end of the intervention, the only change noted was a reduction in depression to severe at FU. The analysis of temporal relationships between the IES-R and DASS-21 found a significant correlation between the IES-R and stress at Lag 0 (r = .79, p=.000) suggesting changes occurring concurrently. This may suggest that symptoms of PTSD were associated with levels of stress as reductions in PTSD led to reductions in stress.

Exposure and Habituation. Focusing on HR only one session ended with an increase in HR, but there were increases in HRV in 56% of sessions suggesting mixed amounts of in-session habituation. However, Wolverine did have health conditions which may have impacted these results, and session 7 did have poor signal quality which may explain the massive increase in HRV for that session. Through looking at Wolverine's SUDS their distress increased in all bar one session following narration, suggesting little between-session habituation, and reflecting how distressing it was for them to speak about their trauma which was commented on "*I mean it was brutal. It's absolutely brutal and it was really, really, really frightening*". Despite this Wolverine often spoke about experiencing habituation and trauma losing power,

> "*To see that difference, it's still horrific, it's still traumatizing, it was still horrible and vicious, but not as severe. It felt like narrating it again, kind of tucked away a little bit of the power behind it. I think that's the main point out of it for me is that It felt*

like this still is a hugely damaging aspect of my life, but it's not as in charge as I thought it was".

However, they also spoke about experiencing dissociation,

"*hearing it back the second time. And again, I saw the difference, I was still in and out from my perspective, I was still in and out of being present, but it not as frequently and not as severely"*

Which when coupled with how distressing it was to speak about trauma may explain the varying levels of habituation. Despite this, there were increases in rMSSD and decreases in HR at the start and end of treatment, with rMSSD generally increasing throughout therapy. There was a slight increase in the BPQ-SF which may be explained by therapy improving insight into their bodily reactions *"I would say recognizing you know my body's response you know to how I'm feeling".*

ABMI Narratives. Wolverine completed eight sets of narrations showing increases in vividness and SD seven times, TPD six, and ED five. Increases in vividness may be explained by the process of narration as Wolverine said,

"*the more we talked about the details, the more I unpicked things that I hadn't remembered previously. I was able to see the layout of everything. I was able to see you know, things I haven't thought about, you know, like ornaments on the shelves, you know, like old family photographs, you know, things like that and that were able to help me kind of put things into time and space*"

Which would result in higher vividness scores. There were decreases in disorganisation six times, and fragmentation five. NC was met in half of the sessions, and TWC increased and decreased the same amount. Wolverine was the only participant to experience increases in TPD, which may be due to them having an interest in the theory of NET and being aware that adding contextual information is seen to be key.

Extended Discussion

Mechanisms of Change. The primary aims of the study were to develop an existing measure to assess ABMI, which would allow for the process of ABMI specific to NET to be investigated, and to investigate the exposure change process of NET.

5.1. ABMI. For all participants throughout therapy, there were increases in vividness and SD. The finding that vividness increased after narration suggests participants were able to describe clearer, more detailed, and specific visual images to the therapist. D'Argembeau and van der Linden (2006) found vividness predicts the level of SD and Vannucci et al. (2020) found higher levels of visual object imagery (which would be scored as vividness in the ABMICT) were associated with higher levels of SD. The existing literature suggests there is a relationship between vividness and SD, and the literature would explain why both vividness and SD increased in this study. This study provides support for the previous literature, and demonstrates the relationship between vividness and SD is shown qualitatively (as previous methods used self-report measures). It is not surprising as accounts became more vivid, they included more SD. Vividness has also been found to be related to stronger experiences of emotional reliving (Vannucci et al., 2020), with two participants seeing decreases in ED reflecting their second narrations being less distanced, including more emotion. Therefore, second narrations with more emotion that were potentially explaining the SDs associated with the emotion such as shaking, sweating, and/or noises etc., would create a stronger visual image for the scorer and thus a higher vividness score. A potential critique of vividness is the way it is operationalised in the field of ABM and as a construct in the ABMICT it could conflate multiple areas. Therefore, although the ABMICT gives a qualitative and quantitative analysis of transcripts, the definition and convergent and discriminant validity of vividness could be explored, as in its current format it appears to be an overarching/global theme, as opposed to a unitary construct.

Two participants who improved the most regarding trauma symptomology had consistent decreases in TPD, ED, and NC. The one participant who did not show an

improvement in trauma symptomatology had increases in TPDs and ED, meaning their accounts had more contextual details, but became more distanced, including less emotion. In NET one would expect increases in TPDs. For Wolverine, they showed an interest in the theory which may have resulted in practice effects being shown as they were aware of the importance of adding contextual information to memories. However, the focus on adding context may also explain the increases in ED, as by focusing on adding TPD it may have limited the emotional engagement with the memory, potentially explaining the little reduction in trauma symptoms. For the two participants who saw reductions in trauma symptomology and had decreases in TPD, this may suggest NET works on different principles than it proposes, and there are multiple potential explanations for why this occurred. Qualitatively both participants commented on finding it difficult to place memories in time and place. It could be during the second narrations the two participants did not see the value in repeatedly naming TPD, especially if they were not certain about the event. The findings reflect they engaged more with sensory and emotional details which may appear more pertinent to people undergoing NET. The reductions in TPD may also be explained with how ABM is organised in a hierarchical structure, positing that more general events are recalled first, before more specific and detailed events (Belli, 1998). It could be that therapy helped to build a more general understanding of life events, but this did not lead to a better understanding of specific and detailed life events, or it could be the opposite that participants recalled fewer general events and one more specific event. This finding could be explained by the scoring of the measure, as if a person was to name more TPDs more frequently (e.g., rooms, places, people, dates, times), as opposed to one very specific TPD it could mean they score higher on the measure. This did not seem to be the case when the researcher scored transcripts and the scoring of the area was set out to account for this occurring. These points may reflect a difficulty in trying to measure TPDs with the current tool as the scoring reflects the level of expressed TPDs by participants rather than their internal TPD which the researcher would not be privy to. However, if the ABMICT was used with a larger sample the scoring criteria could be reviewed and refined.

All participants had decreases in disorganisation, with the two who experienced reductions in trauma having decreases in TPD, ED, and NC. There is mixed support for the role of structural indices of trauma narratives being related to the outcome of therapy (Bedard-Gilligan et al. 2017; Brewin, 2016; Desrochers et al. 2016; Jaeger et al., 2014). The only consistent structural finding in the current study was disorganisation decreasing for all participants; however, this occurred regardless of if people improved or not. Decreases in disorganisation meant second narrations were less confused, phrases were repeated less, and sentences were more coherent. This could be explained by the process of somebody repeatedly rehearsing a narrative, as the person freely narrated it in session and then went over it again with the therapist which could have led to structural changes. As research has found that through repetition narratives become shortened, more stereotyped, and scripted making them more structured and consistent (Bartlet, 1932; Neisser & Harsch, 1992). Regarding the findings for NC decreasing this could be due to it being scored categorically which was not the original intention of the researcher. Originally NC was supposed to be scored on a Likert scale, both reverse and normal scoring were tried. When normal/positively scored fragmentation was named coherence and disorganisation named organisation. However, regardless of the method of scoring some participant transcripts were not accurately reflecting if they were more or less fragmented/disorganised. For example, when positively scored an area with a +2 score and 16.03% area percentage was resulting in an overall score of 8.20: (16.03x2)/4=8.20. Then when scoring a transcript that was more organised/coherent as it gained a +4 score but had a lower percentage area resulting in an overall score of 5.59: (5.19x4)/4=5.59. Therefore, due to the issues with numerical scoring, a categorical dimension (yes/no) was used. This study would support Jaeger et al.'s (2014) claims that content is more important than structure and suggest trauma therapies focus on ABMI areas such as vividness, sensory and emotional details to facilitate change. The claims that focusing on emotional and sensory information to process trauma may be supported by the evidence of intensive short-term dynamic psychotherapy (ISTDP) successfully treating PTSD/CPTSD (Roggenkamp et al., 2021; Safarnia et al., 2020).

5.2. Exposure and Habituation. For Fox, there was little evidence of within session habituation (WSH) and even a decrease in HRV in the majority of their sessions, which would support Fox's SUDs which suggested they only experienced habituation twice. However, a RC was found in the IES-R for Fox. For Raven the majority of their sessions ended with increases in HRV, suggesting evidence of WSH more times than not. However, Raven's SUDS only suggested habituation in four sessions. Despite this a RC and CSC (via sensitivity analysis) was found for Raven in the IES-R. For Wolverine only one session ended with an increase in HR, but there were increases in HRV in just over half of sessions suggesting mixed WSH. However, Wolverine's SUDS increased on all bar one occasion. There was little change in Wolverine's IES-R. NET suggests that a successful treatment is dependent on WSH (Schauer et al., 2011); however, this study provides mixed support of the role of WSH as a condition of successful treatment. Through looking at physiological data the participant who experienced the most WSH did see the greatest reduction in symptoms of trauma. The next participant who experienced WSH more than half of the time saw little change in trauma symptoms. Finally, the participant who had consistent decreases in HRV suggesting little WSH saw a RC in their IES-R score. This is despite literature suggesting a reduction in trauma should not occur if there was no habituation. However, this may be explained by BSH, or Craske et al. (2008) who suggested the learning associated with processing and tolerating distress regardless of habituation can explain therapeutic change. There was little agreement between participants' SUDs and objective physiological measures, and it was not uncommon to see increases in SUDs after narration which theoretically would suggest habituation did not occur (Craske et al., 2008). In the current study session by session heart data sought to provide information on WSH, with the before and after heart data and SUDs reflecting BSH. Comparing WSH and BSH in the current study is not the fairest of comparisons as they did not contain the same stones/traumas, as WSH looked at two separate stones, whereas BSH SUDs covered the initial narration and re-narration of the same stone. Despite this, the current study would support the use of objective physiological measures over SUDs due to the discrepancies between them and the heart data calling into question their reliability and validity (Annett., 2002; Frustaci et al., 2010; Schäfer et al., 2018). There were technological issues that limited the heart data recordings to the

beginning and end of sessions, and despite the criticisms of using wrist straps to measure heart data, future research could use wrist straps to measure heart data during and between sessions to further explore the role of WSH and BSH.

The research on WSH and BSH relating to therapeutic outcome is mixed, Baker et al. (2010) found both WSH and BSH were related to positive treatment outcomes, others suggested neither WSH/BSH were related to outcomes (Craske et al., 2008), whereas Cooper et al. (2017) suggested BSH is a stronger predictor of successful treatment than WSH. Another study found that BSH significantly predicted successful treatment of trauma, whereas WSH did not (Harned, et al., 2015). Fox experienced consistent decreases in rMSSD in session. The decreases in HRV for Fox in session would suggest reductions in vagal functioning after sessions which are associated with a lack of adaptive functioning, and poor health (Friedman & Thayer, 1998b). HRV is an indirect measure of vagal tone, and rMSSD represents HRV which is associated with and sensitive to vagal cardiac control (Penttila¨et al., 2001). The gradual trend of rMSSD increasing for all participants, and as all participants showed increases in rMSSD and decreases in HR at the start and end of treatment, this may suggest that the process of therapy increased vagal tone (as it is associated with elevated HRV), which may support the role of BSH. This may suggest the changes in rMSSD reflected the participants' vagal tone increasing, with higher vagal tone representing a person's 'flexibility' in varying physiological and psychological conditions (Friedman & Thayer, 1998b). These findings suggest that immediately after sessions Fox's vagal tone decreased, but as it generally increased through therapy and had increases pre-and-post therapy that NET may have led to positive physiological changes. For Raven and Wolverine, they experienced consistent increases in rMSSD in and between sessions supporting the role of WSH and BSH. These findings may suggest that habituation and changes in vagal tone and when they are experienced could be idiosyncratic to the individual, but that going through therapy may have led to positive physiological changes for participants at some time. The gradual increases in HRV for all participants across sessions may reflect that BSH as a process occurs in the hours and days following processing a traumatic event, with the immediate benefits not being observable in physiological measures. However, this could be due to how the heart data was

collected in the current study. BSH occurring after sessions maybe explained by the process of memory reconsolidation. As during sessions, the memory is reactivated and enters a reconsolidation period (Lane et al., 2015). The reconsolidation period is estimated to last for around five hours (Ecker et al., 2012), and during this new information can be added and thus encoded leading to therapeutic change (Ecker, 2021; Lane et al., 2015). After the five-hour window the labile neural circuits naturally reconsolidate and can only be updated with new learning when the memory is again reactivated (Ecker et al., 2012). Therefore, it would be interesting to measure heart data up to five hours after sessions to see if more can be uncovered regarding BSH.

Although objective physiological changes have been found, there were no changes in the BPQ-SF for any participant. Kolacz et al. (2022) concluded that the BPQ-SF was a valid self-report measure of autonomic symptoms, with higher symptoms (as measured by the BPQ-SF) indicating a higher level of impairment in autonomic flexibility (as assessed by physiological measures). Through personal communications with the authors of the BPQ-SF they have found a “correlation between less flexibility of the vagal brake (as measured by high frequency-HRV) is associated with higher self-reported autonomic reactivity symptoms” (J. Kolacz, personal communication, January 15th, 2022). Therefore, it was surprising to see no changes in the BPQ-SF for any participant despite them all experiencing increases in HRV and thus vagal tone. The authors of the current paper do not dispute the measure’s validity; however, the results from this study may be explained contextually. The existing research into the BPQ-SF and PTSD used a non-clinical sample (Kolacz et al., 2020) and did not test the measure as an outcome measure. The current study worked with people who have experienced multiple trauma which comes with somatization as a symptom. It could be the differences in using a clinical sample of people with CPTSD and testing the BPQ-SF as an outcome measure shows it is not sensitive to change for the study’s population. This suggestion could be challenged as two participants did not complete NET therapy, therefore, larger changes in heart data may occur at the end of therapy, which may result in changes in the BPQ-SF being noted. However, for the one person who did complete therapy, they only experienced a very small decrease in the BPQ-SF which was not significant.

5.3. Clinical Effectiveness. An aim of the study due to the NET protocol being adapted was to investigate the potential effectiveness of NET+ for trauma symptoms. Two participants showed improvements in PTSD, with one having a RC, another a RC (via sensitivity analysis) and CSC and moving from PTSD being a clinical concern to non-clinical. However, one did deteriorate at FU which may have been explained by an external event. DC analysis reflected only one showing a treatment effect; however, all three participants were below the baseline mean trend at FU. It is interesting DC analysis showed a treatment effect for the person who had the smallest effect size and showed no change in trend during the intervention phase. The small effect size could be due to human error while applying the PEM when drawing the horizontal line across phases. As the researcher disregarded two data points which appeared to be close to the line to manage a type 1 error which when included in analysis would have changed a debatable treatment effect to a moderate one. Only relying on the DC may also hide small effects, there is a lack of research critiquing the DC method. Therefore, in the current study, visual analysis, RC/CSC, and effect sizes were considered as opposed to just relying on DC analysis.

The adaptions to the protocol could have impacted the effectiveness of the intervention, with one reason potentially being due to asking participants to narrate their memories sensitising their emotional and physical responses in session. While this is a valid concern, research has shown that the level of fear initially experienced during the exposure is a predictor of successful treatment (Jaycox et al., 1998). Due to the researcher managing dissociation and attending to participant welfare during the free narration, the existing research would suggest any managed increases in arousal may actually be beneficial to treatment. Other potential explanations that could have limited the research findings come from Fox who stated at times they made themselves "*numb*" and wanted to avoid listening to the narrations when they were read back to them, and Wolverine's experiences with dissociation. These responses and experiences are completely understandable given the context of trauma; however, one wonders how much these experiences limited the full emotional and sensory engagement with the memory which may explain why bigger

reductions were not seen. Fox also commented, one of their favourite aspects of NET was looking for a flower after a "*negative thought*" which although may seem adaptive may limit exposure to the emotional aspect of memories. The current study suggests focusing on the vividness, sensory and emotional details to facilitate change. All participants were brave, and engaged well in sessions, however, it may be due to how difficult it is to speak/hear about trauma that at times they were not able to fully engage with the memory impacting recovery.

5.4. Secondary Outcomes. The study examined if NET had an impact on secondary outcomes such as depression, anxiety, stress, and general psychological distress as a whole. This was because there is research into NET having positive outcomes on depression (Lely et al., 2019; Raghuraman et al., 2021). Also, it is not uncommon for people who experience PTSD to have comorbid mental health conditions (Brady et al., 2000), and for adults in the UK PTSD is highly comorbid with depression and anxiety (Quassem et al., 2020). This study found a treatment effect in general psychological distress for two participants, a RC in anxiety and CSC in stress for one.

For the population accessing secondary care mental health services in the UK, they often have enduring mental health difficulties, and all participants in the study had comorbid mental health conditions. These comorbidities could have impacted the findings of the study. As during sessions all participants at one time noted external interpersonal difficulties which may have impacted their scores on the outcome measures. Fox also commented on struggling with their mood and at times the therapist did have to step away from NET to recommend techniques such as behavioural activation, which was noted as a helpful aspect of therapy in the CI.

5.5. Strengths and Clinical Implications. To the researcher's knowledge this is the first study to look at how ABMI changes through trauma therapy qualitatively and provided a coding tool to do so. The mixed methods and multiple methods of evaluation of the mechanisms of change have provided an in-depth investigation into the role of ABMI as a mechanism of change, and identified areas such as vividness, sensory and emotional details seeming pertinent in facilitating change. The role of

habituation has also been examined. The hope of the researcher is the findings of this study can help further develop the understanding of the mechanisms of change in the context of trauma. The naturalistic design allows for the findings from the study to be generalised and provides much needed research into the adaptions needed to NET for it to be successfully delivered within secondary care mental health outpatient services in the UK.

Literature regarding the treatment of CPTSD recommend a phased approach (Cloitre et al., 2012; Herman, 1992; Karatzias et al., 2019); however, phased approaches have been criticised for delaying access to treatment (Karatzias et al., 2019), increasing avoidance (DeJongh et al., 2016), and for adversely affecting the outcome of therapy and increasing drop-out (Cloitre et al., 2010). Despite research suggesting phased approaches can increase drop-out (Cloitre et al., 2010), this can be contested on the grounds that extending treatment for people with CPTSD can help to build the therapeutic relationship and lower attrition (Herman, 1992). Qualitative feedback from the study would support Herman's claims as the only adaption suggested to NET by a participant was to increase its length to include more sessions, as they cited their concern with 12 sessions "*scaring*" them as it would not be long enough to build a trusting therapeutic relationship. The feasibility of NET in its current state is called into question for this population. As two participants did not complete therapy and only processed around a third of their lifeline within 10-12 sessions, suggesting more than the stipulated 12 sessions in the NET protocol are needed (Schauer et al., 2011). This reflects that NET may not be a short-term intervention as initially proposed for secondary care mental health outpatient services in the UK, and that for the majority of people accessing these services they may need anywhere between 30-40 sessions. However, even stipulating a certain number of sessions may not be prudent. The study site only offers one-hour sessions, and from speaking to service clinicians they were unable to complete a lifeline in one hour. The NET protocol (Schauer et al., 2011) states that the lifeline must be completed within one session to not start the process of exposure; however, it often took the researcher in the current study between 180-210 minutes to complete a lifeline session. Therefore, longer than one-hour sessions are recommended to not cause harm to patients. Further support for longer sessions

comes from narration sessions often lasting between 120-180 minutes, with participants positively commenting on the duration of sessions. The NET protocol recommends 90-minute sessions; however, the increase in time in the current study was due to the added complexities faced by the study population. The study population experienced co-morbidities and difficulties with risk due to self-harm. This meant that the first 30-40 minutes of sessions were spent reviewing the week, going over risk assessments, and at times having to discuss techniques to manage risk or techniques such as behavioural activation to help with depression and other comorbidities.

The added complexities faced by the participants in the study suggests a phased approach should be adopted with NET being a strand of the intervention for this population. NET does not have a stabilisation phase and suggests that treatment should begin as quickly as possible (Schauer et al., 2011). However, for the current population who restarted self-harming having a stabilisation phase prior to starting a trauma intervention would be recommended to mitigate risk. Having a three-tiered approach including a stabilisation phase has received empirical backing and is recommended in the treatment of CPTSD (Cloitre et al., 2011; Reddemann & Piedfort-Marin, 2017). Key aspects of the three-tiered approach include initially building a secure base (Fallot & Harris, 2008), fostering safety, stabilisation, symptom management, and psychoeducation, before moving onto trauma focused therapy, and ending with integration, rehabilitation, and preparing for a new life (Cloitre et al., 2011; Reddemann & Piedfort-Marin, 2017). Regarding the researcher's experience with the study population as part of the stabilisation phase clinical judgement may have to be used regarding treating co-morbidities before or after starting the trauma focused intervention. Also, in clinical practice the linearity of the model may not be the most ecologically valid due to the clinician needing to be responsive to the participant's response to the intervention, as some difficulties may not be apparent until in the intervention phase (e.g., self-harm, dissociation, depression), and this may result in needing to step out of the linear approach to effectively respond to the participants need. That being said psychoeducation is recommended as part of stabilisation work and this is part of NET which participants

noted was helpful to improve insight into symptoms and, make them feel more normal, therefore, this should still be included as part of NET.

5.6. Limitations and Future Research. A limitation of the study comes down to its length, having a longer baseline phase would have allowed for a stable baseline to develop, this coupled with having a one-week FU period impacted the conclusions that could be made regarding the effectiveness and validity of NET in treating PTSD and general psychological distress (Kratochwill et al., 2010; Lobo et al., 2017; Morgan & Morgan, 2008; Morley, 2017). The same could be said regarding the length of the intervention phase as two participants did not complete therapy which may explain the findings regarding the effectiveness of the intervention. However, the study wanted to see if the NET protocol as it is in its current format can be delivered in secondary care mental health outpatient services in the UK. Not prolonging the baseline and FU phases was an ethical decision to not delay access to support for people already experiencing distress.

The sample used was made up of white British women and while this could be criticised due to not being diverse, it is representative of the people who access the service in the area. Research has shown that women are more likely to receive support than men for their mental health (Lubian et al., 2016), and white women are more likely to receive support than black ethnic minority groups (McGuire & Miranda, 2008). The systemic issues limiting the access to mental health services do need to be addressed, but they will not be discussed further in this paper.

Issues with technology meant heart data could only be captured at the beginning and end of session, and this resulted in not being able to examine the heart data as deeply as initially intended. If the appropriate technology was used it could collect continuous heart data in session which would allow for more inferences into WSH to be made. If technologically possible and participants consented to do so, wearing wrist monitors outside of session which collected heart data between sessions may give a better insight into BSH and explain the study's finding regarding HRV gradually increasing between sessions.

As the ABMICT was created for the purpose of this study its validation and reliability are an area for future research. If the tool was used in the same population of the study, the researcher would recommend using the adaptions suggested. Adapting the NET protocol to have a stabilisation phase (if needed) and having more and longer sessions so potential participants can complete therapy while applying the ABMICT as a process measure, would allow for further testing and validation of if certain ABM phenomenological constructs relate to recovery. The constructs highlighted from the current study are vividness, sensory and emotional details; however, this needs to be examined further. The other option is to be more selective of the population that are sampled and choosing one that have experienced less traumatic events who can complete therapy. Further use of the tool will give more insight into the role of ABMI and therapeutic change, allowing therapies to be tailored to tap into certain ABM constructs that relate to recovery. Further research into the tool will also allow for the potential issues with the operationalisation and scoring of certain areas to be refined.

Critical Reflections

Reflective practice is seen as a crucial to develop one's understanding and skills (Bennett-Levy et al., 2009; British Psychological Society, 2017). Therefore, this section outlines my pertinent reflections of the research process and write up.

6.1. Motivation for Research. Prior to starting clinical training, I had worked as a psychological wellbeing practitioner in an Improving Access to Psychological Therapy Service, and as part of my role I completed multiple assessments a day. Through completing assessments, I noticed I had an interest in the trauma population, and I started speaking with step 3 colleagues who were using trauma focused CBT, and step 4 colleagues who were using approaches such as Eye Movement Desensitisation and Reprocessing (EMDR). Speaking to colleagues further consolidated my interest in trauma and coming onto training I had a few interests I wanted to pursue. Through reading the research projects suggested by the course I noticed there was one on uncovering the mechanisms of change within NET, and I have to admit the advertisement of creating "ground-breaking research"

was something that attracted me to it. I then met with course staff and started to do my own reading of NET and CPTSD and found that in my eyes the treatment of this condition was not well researched and underdeveloped. I found this project helped me work with a population I was interested in and allowed me to potentially provide a major contribution to the psychotherapeutic community, which was something that motivated me throughout.

6.2. Recruitment. Recruitment of suitable participants was something that was flagged as a concern by one of the course staff during the research meetings. However, this was something that I was not overly concerned about. This may have been due to starting to develop this project with my first placement supervisor, which was also where the project took place. After working in the service and speaking with my field and research supervisors none of us were concerned about meeting the number of people stipulated in the design. In further research meetings with the course a different tutor critiqued the naturalistic sampling method and suggested going for a homogenous sample to not hide any potential treatment effects. This was something that was listened to and considered; however, given the severe delays in getting the project started due to the researcher's personal circumstances (being diagnosed with dyslexia and subsequently having to pause all assignments) recruitment was impacted. The recruitment site identified a number of potentially suitable and consenting people and the researcher met with the field supervisor to discuss their eligibility against the inclusion/exclusion criteria. Prior to starting the study, the researcher and chief investigator (TS) did speak about trying to find a sample who were able to complete therapy as it should allow for more valid inferences to be made. The eagerness and anxiety felt by the researcher to get the study started resulted in taking a more naturalistic sample, which while allowing for generalisability due to its ecological validity impacted the findings for the study. Looking back the researcher could have been more stringent with the inclusion criteria, particularly point 6 "assessed as appropriate for NET by the service" as this was intended to suggest a level of readiness by the potential participant, but also that they would be able to complete NET within 12 sessions (the researcher did say up to 14 would also be fine given the population). Assessing clinicians at the recruitment site often deemed the person suitable for the intervention, and this may

reflect the differences in interventions used for the purposes of research and clinically; as clinically NET was used in the recruitment site, but often exceeding the 12-session limit. It only became apparent to the researcher when the participant was consented into the study and collecting demographic information/the lifeline session, that the majority of participants would not complete the therapy within 12 sessions. This initially was disheartening to the researcher due to the potential implications it had on the study; however, this was balanced with the researcher knowing the sample was ecologically valid, and that it would not be ethical to then withdraw the participant from the study. Regarding the participant who withdrew from the study, the researcher felt pressured into accepting them, as clinicians at the recruitment site spoke about having conversations with them to ensure they would attend sessions. Unfortunately, the participant withdrew and due to how late it was in the study when this occurred, they were not able to be replaced. Moving forward if I was to supervise or conduct future research, I would ensure to be more rigorous in applying the inclusion/exclusion criteria and limit how much the emotion drives decisions.

6.3. Delivering Therapy. Prior to starting the intervention, I had read the NET manual multiple times, and received training from the people who created it, which was inspiring and further increased my motivation and confidence to deliver the intervention. I felt holding the dual role of therapist and researcher was important to limit confounding variables such as therapist factors, as I was able to ensure the therapy was delivered as it was supposed to be. Holding this role allowed me to familiarise myself with the data and develop my skills. Delivering the intervention alongside managing the demands of the course was extremely difficult. This was not helped as NET places a high level of demand on the therapist to ensure transcripts are completed weekly before the start of the following session. This resulted in the researcher having to use evenings and weekends to meet the demand of the course and study. There were times where I felt helpless as a practitioner, often when seeing participants getting worse before they got better, seeing quantitative scores increase, and hearing how difficult an intervention it was for participants. Fortunately, supervision and my own resources helped manage this helpless feeling, and participants also gave positive feedback about the therapy and me as a therapist. As a practitioner I had a tendency to like structured approaches/therapies like NET;

however, I felt the structured approach limited my skills. As noted, due to the comorbidities experienced by the study population at times, I felt it was necessary to step away from NET to add extra skills (e.g., behavioural activation), and I do believe for the study population a phased treatment approach with NET as part of that would be more beneficial.

There were times during the intervention where I had one or two participants in the day, and at times I had two three-hour sessions in one day. I really did notice a difference when only seeing one person a day. If I had a particularly heavy session or two long ones in a day, I started having headaches after sessions. Towards the end of the study after balancing course and research demands I was physically, mentally, and emotionally exhausted, and even experienced vicarious trauma. My experiences have provided me with valuable learning, but they do make me worry about practitioners who work in specialist trauma services and have high caseloads. I do not regret holding the dual role as it has given valuable learning experiences. I have been able to see the value in supervision and my own hobbies to help manage my own wellbeing, and I have learnt that I cannot do two three-hour trauma sessions a day. From this I have learnt if I was to work in a specialist trauma service or had a caseload requiring more frequent trauma work that I would have to request for more supervision and make more allowances to manage my time and wellbeing.

6.4. Supervision. Supervision was an important tool used throughout the study. I received weekly supervision which included reviewing session material, discussing any concerns/my own wellbeing, and observations regarding the research. I found supervision to manage participants safety and my own concerns (e.g., participants restarting self-harm) helpful and validating. Another key aspect was managing my own wellbeing especially relating to experiencing vicarious trauma, it was helpful to discuss my experiences which was normalising, and it was reassuring knowing someone else was attending to my wellbeing. My experiences working with the study population and the impact it had on my wellbeing makes me believe people working in trauma services need to have more frequent and longer supervision rather than the mandated bi-weekly sessions. The final aspect where supervision was helpful was to discuss initial hypotheses regarding clinical observations and how this related

to the study. I found sharing my observations and hypothesising helpful and invigorating which helped me finish the study.

6.5. Data Analysis and Write Up. When initially thinking about the project I was confident, and this was due to thinking SCDs seemed simple on paper and my previous experiences of conducting research. However, when reading about SCDs and the varying methods of analysis I soon realised it was more complex than I had initially thought. This was where it was very helpful to have support from my colleagues and supervisors. When starting the analysis, it caused me anxiety due to the variability of results in the study, the multiple methods used, and this made it difficult to know how to 'weight' certain methods. An example of this was the DC and PEM often having contradicting results, and even having different or vague descriptions of how to conduct them in existing literature. Again, this is where supervision was helpful, and reading multiple pieces of literature which was often laborious. Other difficult aspects of analysis included creating and testing the ABMICT (which in hindsight was probably a thesis in its own right) as when piloting the tool on freely accessible NET transcripts it appeared fine, but when applying it more rigorously to study data issues were uncovered that needed to be revised, which did cause anxiety.

The final stage of the thesis was writing it up. Getting to this point coincided with finishing all of my placements and course assignments and I had a sense of achievement; however, that soon turned to fatigue. This was especially true while writing the extended paper and I even questioned why it had to be done. Despite initially questioning having to write the extended paper due to the additional stress it caused, as I got to the end of it, I could see why it was helpful. Going through the process of writing both papers, but particularly the extended paper has further built my confidence and research skills as a whole, but particularly in the use of SCDs. Developing my confidence in skills and research has allowed me to be more critical, reflective, and confident particularly of NET and working with the trauma population, which will be helpful for my future practice.

Extended Paper References

Alharahsheh, H. H., & Pius, A. (2020). A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, *2*(3), 39-43. https://doi.org/10.36348/gajhss.2020.v02i03.001

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

American Psychiatric Association (1980). *Diagnostic and Statistical Manual of Mental Disorders.* 3rd ed.

Annett, J. (2002). Subjective rating scales: Science or art?. *Ergonomics, 45*(14-15), 966–987. https://doi.org/10.1080/00140130210166951

Armstrong R. A. (2014). When to use the bonferroni correction. *Ophthalmic & Physiological Optics: The Journal of the British College of Ophthalmic Opticians (Optometrists)*, *34*(5), 502–508. https://doi.org/10.1111/opo.12131

Atkins, D. C., Bedics, J. D., McGlinchey, J. B., & Beauchaine, T. P. (2005). Assessing clinical significance: Does it matter which method we use? *Journal of Consulting and Clinical Psychology*, *73*(5), 982-989. https://doi.org/10.1037/0022-006X.73.5.982

Baker, A., Mystkowski, J., Culver, N., Yi, R., Mortazavi, A., & Craske, M. G. (2010). Does habituation matter? Emotional processing theory and exposure therapy for

acrophobia. *Behaviour Research and Therapy*, *48*(11), 1139-1143. doi: 10.1016/j.brat.2010.07.009

Bares, C. B., Andrade, F., Delva, J., & Grogan-Kaylor, A. (2011). Examining the factor structure of anxiety and depression symptom Items among adolescents in santiago, chile. *Journal of the Society for Social Work and Research, 2*(1), 23–38. https://doi.org/10.5243/jsswr.2011.1

Barkham, M., Hardy, G. E., & Mellor-Clark, J. (Eds.). (2010). *Developing and delivering practice-based evidence*. https://doi.org/10.1002/9780470687994

Barlow, D.H., Nock, M.K., & Hersen, M. (2009). Single case experimental design: Strategies for studying behaviour change (3rd ed.). Pearson Education Inc.

Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology.* Cambridge University Press.

Beck, J. G., Grant, D. M., Read, J. P., Clapp, J. D., Coffey, S. F., Miller, L. M., & Palyo, S. A. (2008). The impact of event scale-revised: psychometric properties in a sample of motor vehicle accident survivors. *Journal of Anxiety Disorders, 22*(2), 187–198. https://doi.org/10.1016/j.janxdis.2007.02.007

Beckers, F., Verheyden, B., & Aubert, A. E. (2006). Aging and nonlinear heart rate control in a healthy population. *American Journal of Physiology-Heart and Circulatory Physiology, 290*(6), H2560–H2570. https://doi.org/10.1152/ajpheart.00903.2005

Bedard-Gilligan, M., Zoellner, L. A., & Feeny, N. C. (2017). Is trauma memory special? Trauma narrative fragmentation in PTSD: Effects of treatment and response. *Clinical Psychological Science*, *5*(2), 212-225. https://doi.org/10.1177/2167702616676581

Bedford, A., & Foulds, G. A. (1977). Validation of the delusions-symptoms-states inventory. *British Journal of Medical Psychology, 50*(2), 163–171. https://doi.org/10.1111/j.2044-8341.1977.tb02409.x

Belli, F, R. (1998). The structure of autobiographical memory and the event history calendar: Potential improvements in the quality of retrospective reports in surveys, *Memory, 6*(4), 383-406, https://doi.org/10.1080/741942610

Bennett-Levy, J., McManus, F., Westling, B., & Fennell, M. J. V. (2009). Acquiring and refining CBT skills and competencies: Which training methods are perceived to be most effective? *Behavioural and Cognitive Psychotherapy, 37*, 571–583. https://dx.doi.org/ 10.1017/S1352465809990270

Berntson, G. G., Lozano, D. L., & Chen, Y.J. (2005). Filter properties of root mean square successive difference (RMSSD) for heart rate. *Psychophysiology, 42*(2), 246–252. https://doi.org/10.1111/j.1469-8986.2005.00277.x

Bigger, J. J., Fleiss, J., Rolnitzky, L., & Steinman, R. (1992). Stability over time of heart period variability in patients with previous myocardial infarction and ventricular

arrhythmias. The CAPS and ESVEM investigators. *American Journal of Cardiology, 69*(8), 718-723. https://doi.org/10.1016/0002-9149(92)90493-i

Bisson, J. I., Cosgrove, S., Lewis, C., & Robert, N. P. (2015). Post-traumatic stress disorder. *BMJ (Clinical research ed.)*, *351*. https://doi.org/10.1136/bmj.h6161

Bonne, O., Brandes, D., Gilboa, A., Gomori, J. M., Shenton, M. E., Pitman, R. K., & Shalev, A. Y. (2001). Longitudinal MRI study of hippocampal volume in trauma survivors With PTSD. *American Journal of Psychiatry, 158*(8), 1248–1251. https://doi.org/10.1176/appi.ajp.158.8.1248

Borckardt, J. J. (2006). *SMA simulation modelling analysis time series analysis program for short time series data streams version 8.3.3 user's guide.* https://www.clinicalresearcher.org/SMA_Guide.pdf

Borckardt, J. J., & Nash, M. R. (2014). Simulation modelling analysis for small sets of single-subject data collected over time. *Neuropsychological Rehabilitation, 24*(3- 4), 492-506. https://doi.org/10.1080/09602011.2014.895390

Borckardt, J. J., Nash, M. R., Murphy, M. D., Moore, M., Shaw, D., & O'Neil, P. (2008). Clinical practice as natural laboratory for psychotherapy research: a guide to case-based time-series analysis. *American Psychologist, 63*(2), 77-95. https://doi.org/10.1037/0003-066X.63.2.77.

Boyacioglu, I., & Akfirat, S. (2015). Development and psychometric properties of a new measure for memory phenomenology: The autobiographical memory characteristics questionnaire. *Memory*, *23*(7), 1070-1092. https://doi.org/10.1080/09658211.2104.953960

Brady, K. T., Killeen, T. K., Brewerton, T., & Lucerini, S. (2000). Comorbidity of psychiatric disorders and posttraumatic stress disorder. *The Journal of Clinical Psychiatry*, *61(7)*, 22–32. https://pubmed.ncbi.nlm.nih.gov/10795606/

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bremner, J. D. (2002). *Does stress damage the brain? Understanding trauma-related disorders from a mind-body perspective.* W W Norton & Co.

Brewin, C. R. (2006). Understanding cognitive behaviour therapy: A retrieval competition account. *Behaviour Research and Therapy, 44*(6), 765–784. https://doi.org/10.1016/j.brat.2006.02.005

Brewin, C. R. (2001). Memory processes in post-traumatic stress disorder. *International Review of Psychiatry, 13*(3), 159–163. https://doi.org/10.1080/09540260120074019

Brewin, C. R. (2014). Episodic memory, perceptual memory, and their interaction: Foundations for a theory of posttraumatic stress disorder. *Psychological Bulletin, 140(*1), 69–97. https://doi.org/10.1037/a0033722

Brewin, C. R. (2015). Reconsolidation versus retrieval competition: Rival hypotheses to explain memory change in psychotherapy. *Behavioral and Brain Sciences, 38*. https://doi.org/10.1017/s0140525x14000144

Brewin, C. R. (2016). Coherence, disorganization, and fragmentation in traumatic memory reconsidered: A response to Rubin et al. (2016). *Journal of Abnormal Psychology, 125*(7), 1011–1017. https://doi.org/10.1037/abn0000154

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, *68*(5), 748–766. https://doi.org/10.1037/0022-006X.68.5.748

Brewin, C. R., & Burgess, N. (2014). Contextualisation in the revised dual representation theory of PTSD: A response to pearson and colleagues. *Journal of Behavior Therapy and Experimental Psychiatry, 45*(1), 217–219. https://doi.org/10.1016/j.jbtep.2013.07.011

Brewin, C. R., Cloitre, M., Hyland, P., Shevlin, M., Maercker, A., Bryant, R. A., Humayun, A., Jones, L. M., Kagee, A., Rousseau, C., Somasundaram, D., Suzuki, Y., Wessely, S., van Ommeren, M., & Reed, G. M. (2017). A review of current evidence regarding the ICD-11 proposals for diagnosing PTSD and complex PTSD. *Clinical psychology review*, *58*, 1–15. https://doi.org/10.1016/j.cpr.2017.09.001

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103*(4), 670–686. https://doi.org/10.1037/0033-295x.103.4.670

Brewin, C.R., Gregory, J.D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*(1), 210-232. https://doi.org/10.1037/a0018113

Brewin, C. R., & Holmes, E. A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23*(3), 339–376. https://doi.org/10.1016/S0272-7358(03)00033-3

Bremner, J. D., Vythilingam, M., Vermetten, E., Southwick, S. M., McGlashan, T., Nazeer, A., Khan, S., Vaccarino, L. V., Soufer, R., Garg, P. K., Ng, C. K., Staib, L. H., Duncan, J. S., & Charney, D. S. (2003). MRI and PET study of deficits in hippocampal structure and function in women with childhood sexual abuse and posttraumatic stress disorder. *The American Journal of Psychiatry*, *160*(5), 924–932. https://doi.org/10.1176/appi.ajp.160.5.924

Briere, J., & Scott, C. (2015). Complex Trauma in Adolescents and Adults. *Psychiatric Clinics of North America, 38*(3), 515–527. https://doi.org/10.1016/j.psc.2015.05.004

British Psychological Society. (2017). *Practice Guidelines (3rd ed.).* https://www.bps.org.uk/sites/bps.org.uk/files/Policy/Policy%20-%20Files/BPS%20Practice%20Guidelines%20%28Third%20Edition%29.pdf

Broman-Fulks, J. J., Ruggiero, K. J., Green, B. A., Kilpatrick, D. G., Danielson, C. K., Resnick, H. S., & Saunders, B. E. (2006). Taxometric Investigation of PTSD: Data from two nationally representative Samples. *Behavior Therapy, 37(*4), 364–380. https://doi.org/10.1016/j.beth.2006.02.006

Buchanan, T. W., & Lovallo, W. R. (2001). Enhanced memory for emotional material following stress-level cortisol treatment in humans. *Psychoneuroendocrinology, 26*(3), 307–317. https://doi.org/10.1016/s0306-4530(00)00058-5

Buckley, T. C., & Kaloupek, D. G. (2001). A meta-analytic examination of basal cardiovascular activity in posttraumatic stress disorder. *Psychosomatic Medicine, 63*(4), 585–594. https://doi.org/10.1097/00006842-200107000-00011

Burke, A., Heuer, F., & Reisberg, D. (1992). Remembering emotional events. *Memory & Cognition*, *20*, 277-290. https://doi.org/10.3758/bf03199665

Cabrera, A., Kolacz, J., Pailhez, G., Bulbena-Cabre, A., Bulbena, A., & Porges, S. W. (2018). Body Perception Questionnaire--Short Form. *PsycTESTS Dataset*. https://doi.org/10.1037/t84573-000

Cardinal, R. N., Parkinson, J. A., Hall, J., & Everitt, B. J. (2002). Emotion and motivation: the role of the amygdala, ventral striatum, and prefrontal cortex. *Neuroscience & Biobehavioral Reviews, 26(*3), 321–352. https://doi.org/10.1016/s0149-7634(02)00007-6

Castaldo, R., Montesinos, L., Melillo, P., James, C., & Pecchia, L. (2019). Ultra-short term HRV features as surrogates of short term HRV: a case study on mental stress detection in real life. *BMC Medical Informatics and Decision Making, 19*(1). https://doi.org/10.1186/s12911-019-0742-y

Cavanagh, S. (1997) Content analysis: concepts, methods and applications. *Nurse Researcher,* 4(3), 5–16. https://doi.org/10.7748/nr.4.3.5.s2

Chalmers, J. A., Quintana, D. S., Abbott, M. J.-A., & Kemp, A. H. (2014). Anxiety disorders are associated with reduced heart rate variability: A meta-analysis. *Frontiers in Psychiatry, 5*. https://doi.org/10.3389/fpsyt.2014.00080

Chemtob, C., Roitblat, H. L., Hamada, R. S., Carlson, J. G., & Twentyman, C. T. (1988). A cognitive action theory of post-traumatic stress disorder. *Journal of Anxiety Disorders, 2*(3), 253–275. https://doi.org/10.1016/0887-6185(88)90006-0

Christianson, S., & Marren, J. (2012). The impact of event scale - Revised (IES-R). *Medsurg Nursing : Official Journal of the Academy of Medical-Surgical Nurses, 21*(5), 321-322.

http://nottingham.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/impact-event-scale-revised-ies-r/docview/1240900888/se-2

Cloitre, M. (2020). ICD-11 complex post-traumatic stress disorder: Simplifying diagnosis in trauma populations. *The British Journal of Psychiatry, 216*(3), 129-131. https://doi.org/10.1192/bjp.2020.43

Cloitre, M., Courtois, C. A., Charuvastra, A., Carapezza, R., Stolbach, B. C., & Green, B. L. (2011). Treatment of complex PTSD: Results of the ISTSS expert clinician survey on best practices. *Journal of Traumatic Stress, 24*(6), 615–627. https://doi.org/10.1002/jts.20697

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, *4*, 10. https://doi.org/10.3402/ejpt.v4i0.20706

Cloitre, M., Petkova, E., Wang, J., & Lu Lassell, F. (2012). An examination of the influence of a sequential treatment on the course and impact of dissociation amoung women with PTSD related to childhood abuse. *Depression and Anxiety, 29*(8), 709–717. https://doi.org/10.1002/da.21920

Cloitre, M., Stovall-McClough, K. C., Nooner, K., Zorbas, P., Cherry, S., Jackson, C. L., Gan, W., & Petkova, E. (2010). Treatment for PTSD related to childhood abuse: A randomized controlled trial. *American Journal of Psychiatry, 167*(8), 915–924. https://doi.org/10.1176/appi.ajp.2010.09081247

Cohen, H., Matar, M., Kaplan, Z., & Kotler, M. (1999). Power spectral analysis of heart rate variability in psychiatry. *Psychotherapy Psychosomatics, 68*(2), 59-66. https://doi.org/10.1159/000012314

Cole, F. L. (1988) Content analysis: Process and application. *Clinical Nurse Specialist*, 2(1), 53–57. https://doi.org/10.1097/00002800-198800210-00025

Conway, M. A. (2001). Sensory–perceptual episodic memory and its context: Autobiographical memory. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *356*(1413), 1375-1384. https://doi.org/10.1098/rstb.2001.0940

Conway, M. A., & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review,* 107, 261-288. https://doi.org/10.1037//0033-295X.107.2.261.

Cooper, A. A., Clifton, E. G., & Feeny, N. C. (2017). An empirical review of potential mediators and mechanisms of prolonged exposure therapy. *Clinical Psychology Review*, *56*, 106-121.https://doi.org/10.1016/j.cpr.2017.07.003

Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy*, *46*(1), 5-27. https://doi.org/10.1016/j.brat.2007.10.003

Crawford, J. R., & Henry, J. D. (2003). The depression anxiety stress scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, 42, 111–131.

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the impact of event scale revised. *Behaviour Research and Therapy*, *41*(12), 1489-1496.

Cukor, J., Olden, M., Lee, F., & Difede, J. (2010). Evidence-based treatments for PTSD, new directions, and special challenges. *Psychiatric and Neurologic Aspects of War, 1208*, 82–89. https://doi.org/10.1111/j.1749-6632.2010.05793.x

Damasio, A. R., Grabowski, T. J., Bechara, A., Damasio, H., Ponto, L. L., Parvizi, J., & Hichwa, R. D. (2000). Subcortical and cortical brain activity during the feeling of self-generated emotions. *Nature Neuroscience*, *3*(10), 1049–1056. https://doi.org/10.1038/79871

De Jongh, A., Resick, P. A., Zoellner, L. A., van Minnen, A., Lee, C. W., Monson, C. M., Foa, E. B., Wheeler, K., Broeke, E. ten, Feeny, N., Rauch, S. A. M., Chard, K. M., Mueser, K. T., Sloan, D. M., van der Gaag, M., Rothbaum, B. O., Neuner, F., de Roos, C., Hehenkamp, L. M. J., … & Bicanic, I. A. E. (2016). Critical analysis of the current treatment guidelines for complex PTSD in adults. *Depression and Anxiety, 33*(5), 359–369. https://doi.org/10.1002/da.22469

Dekker, J., Crow, R., Folsom, A., Hannan, P., Liao, D., Sweene, C., Schouten, E. (2000). Low heart rate variability in a 2-minute rhythm strip predicts risk of coronary heart

disease and mortality from several causes: the ARIC study. *Circulation, 102: 1239-1244. https://doi.org/10.1161/01.cir.102.11.1239*

Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: A revisit with new data and methods. *Science*, *313*(5789), 979–982. https://doi.org/10.1126/science.1128944

Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management, 39*(1), 118–128. https://doi.org/10.1016/j.indmarman.2008.06.004

Eckart, C., Stoppel, C., Kaufmann, J., Tempelmann, C., Hinrichs, H., Elbert, T., Heinze, H.,J….& Kolassa, I.T. (2010). Structural alterations in lateral prefrontal, parietal and posterior midline regions of men with chronic posttraumatic stress disorder. *Journal of Psychiatry and Neuroscience, 36(*3), 176–186. https://doi.org/10.1503/jpn.100010

Ecker, B. (2021). Reconsolidation behavioral updating of human emotional memory: A comprehensive review and unified analysis of successes, replication failures, and clinical translation. *Psyarvix.* https://doi.org/10.31234/osf.io/atz3m

Ecker, B., Ticic, R., & Hulley, L., (2012). *Unlocking the emotional brain eliminating symptoms at their roots using memory reconsolidation*. Routledge. https://www.coherencetherapy.org/files/Ecker-etal-NPT2013April-Primer.pdf

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319–345. https://doi.org/10.1016/s0005-7967(99)00123-0

Elbert, T., & Schauer, M. (2002). Psychological trauma: Burnt into memory. *Nature, 419*(6910), 883. https://doi.org/10.1038/419883a

Elbert, T., Schauer, M., & Neuner, F. (2015). Narrative Exposure Therapy (NET): Reorganizing memories of traumatic stress, fear, and violence. *Evidence Based Treatments for Trauma-Related Psychological Disorders*, 229–253. https://doi.org/10.1007/978-3-319-07109-1_12

El Haj, M., Nandrino, J. L., Antoine, P., Boucart, M., & Lenoble, Q. (2017). Eye movement during retrieval of emotional autobiographical memories. *Acta Psychologica,* 174, 54-58. https://doi.org/10.1016/j.actpsy.2017.02.002

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing, 62(1),* 107–115.https://do.org:10.1111/j.1365-2648.2007.04569

Elliott, R. (2002). Hermeneutic Single-Case Efficacy Design. *Psychotherapy Research, 12*(1), 1–21. https://doi.org/10.1093/ptr/12.1.1

Elliott, R., Slatick, E., & Urman, M. (2001). Qualitative change process research on psychotherapy: Alternate strategies. *Psycholgishche Beitrage, 43*(3), 69-111.

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, *7*(3), 93–99. https://doi.org/10.1016/j.afjem.2017.08.001

Evans, C., Connell, J., Barkham, M., Margison, F., McGrath, G., Mellor-Clark, J., & Audin, K. (2002). Towards a standardised brief outcome measure: Psychometric properties and utility of the CORE–OM. *British Journal of Psychiatry, 180*(1), 51–60. https://doi.org/10.1192/bjp.180.1.51

Fallot, R.D., & Harris, M. (2008). Trauma-informed services. In Reyes, G., Elhai, J.D., & Ford, J.D. (Eds.). *The Encyclopaedia of Psychological Trauma,* 660- 662. John Wiley.

Fisher W.W, Kelley M.E, & Lomas J.E. (2003) Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis, 36*(3), 387–406. https://doi.org/10.1901/jaba.2003.36-387

Fivush, R. (2011). The development of autobiographical memory. *Annual Review of Psychology*, *62*(1), 559-582. https://doi.org/10.1146/annurev.psych.121208.131702

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment, 9(*4), 445–451. https://doi.org/10.1037/1040-3590.9.4.445

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment, 11*(3), 303–314. https://doi.org/10.1037/1040-3590.11.3.303

Foa, E. B., Feske, U., Murdock, T. B., Kozak, M. J., & McCarthy, P. R. (1991). Processing of threat-related information in rape victims. *Journal of Abnormal Psychology, 100*(2), 156–162. https://doi.org/10.1037/0021-843x.100.2.156

Foa, E. B., Hembree, E., & Rothbaum, B. (2007). *Prolonged exposure therapy for PTSD: Therapist guide*. https://doi.org/10.1093/med:psych/9780195308501.001.0001

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*(1), 20–35. https://doi.org/10.1037/0033-2909.99.1.20

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8*(4), 675–690. https://doi.org/10.1002/jts.2490080409

Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape: Cognitive-behavioral therapy for PTSD.* Guilford Press.

Foa, E. B., Rothbaum, B. O., & Furr, J. M. (2003). Augmenting exposure therapy with other CBT procedures. *Psychiatric Annals*, *33*(1), 47-53. https://doi.org/10.3928/0048-5713-20030101-08

Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy, 20*(2), 155–176. https://doi.org/10.1016/s0005-7894(89)80067-x

Forbes, D., Haslam, N., Williams, B. J., & Creamer, M. (2005). Testing the latent structure of posttraumatic stress disorder: A taxometric study of combat veterans. *Journal of Traumatic Stress, 18*(6), 647–656. https://doi.org/10.1002/jts.20073

Frank, J. D. (1971). *Persuasion and Healing: A comparative study of psychotherapy.* Schocken Books. https://doi.org/10.56021/9780801840678

Friedman, B., & Thayer, J. (1998a). Autonomic balance revisited: Phobic anxiety and heart rate variability. *Journal of Psychomatic Research, 44(*1), 133 151. https://doi.org/10.1016/s0022-3999(97)00202-x

Friedman, B. H., & Thayer, J. F. (1998b). Anxiety and autonomic flexibility: A cardiovascular approach. *Biological Psychology, 49*, 303-323. https://doi.org/10.1016/s0301-0511(97)00027-6

Frustaci, A., & Lanza, G., Fernandez, I., di Giannantonio, M., & Pozzi, G. (2010). Changes in psychological symptoms and heart rate variability during EMDR treatment: A case series of subthreshold PTSD. *Journal of Emdr Practice and Research, 4*, 3-11. https://doi.org/10.1891/1933-3196413

Gaebel, W., Stricker, J., & Kerst, A. (2020). Changes from ICD-10 to ICD-11 and future directions in psychiatric classification. *Dialogues in Clinical Neuroscience, 22(*1), 7–15. https://doi.org/10.31887/dcns.2020.22.1/wgaebe

Gbrich, C. (2007). *Qualitative Data Analysis: An Introduction* (1st edn). Sage Publications.

Gergen, K. J. (2001). Psychological science in a postmodern context. *American Psychologist, 56*(10), 803–813. https://doi.org/10.1037/0003-066x.56.10.803

Gevirtz, R. N., Lehrer, P. M., & Schwartz, M. S. (2016). Cardiorespiratory biofeedback. 4th ed. In: Schwartz MS, Andrasik F, editors. *Biofeedback: A Practitioner's Guide*. (pp. 196–213). The Guilford Press.

Gilgen-Ammann, R., Schweizer, T., Wyss, T. (2019). RR interval signal quality of a heart rate monitor and an ECG Holter at rest and during exercise. *European Journal Applied Physiology.*,119(7), 1525-1532. https://doi.org/10.1007/s00421-019-04142-5

Goodyer, I. M., Reynolds, S., Barrett, B., Byford, S., Dubicka, B., Hill, J., ... & Fonagy, P. (2017). Cognitive behavioural therapy and short-term psychoanalytical psychotherapy versus a brief psychosocial intervention in adolescents with unipolar major depressive disorder (IMPACT): a multicentre, pragmatic, observer-blind, randomised controlled superiority trial. *The Lancet Psychiatry*, *4*(2), 109-119. https://doi.org/10.1016/S2215-0366(16)30378-9

Goldberger, A. L. (1991). Is the normal heartbeat chaotic or homeostatic? *News in Physiological Sciences, 6*, 87-91. https://doi.org/10.1152/physiologyonline.1991.6.2.87

Gomez, R., Stavropoulos, V., & Griffiths, M. D. (2020). Confirmatory factor analysis and exploratory structural equation modelling of the factor structure of the Depression Anxiety and Stress Scales-21. *PloS One,* 15(6), e0233998–e0233998. https://doi.org/10.1371/journal.pone.0233998

Green, J., & Thorogood, N. (2004) *Qualitative methods for health research* (2nd ed). Sage Publications.

Griffith, J. W., Sumner, J. A., Raes, F., Barnhofer, T., Debeer, E., & Hermans, D. (2012). Current psychometric and methodological issues in the measurement of overgeneral autobiographical memory. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, S21-S31. https://doi.org/10.1016/j.jbtep.2011.05.008

Harned, M. S., Ruork, A. K., Liu, J., & Tkachuck, M. A. (2015). Emotional activation and habituation during imaginal exposure for PTSD among women with borderline personality disorder. *Journal of Traumatic Stress, 28*(3), 253–257. https://doi.org/10.1002/jts.22013

Harvey, A. G., Bryant, R. A., (1999). Brief report: A qualitative investigation of the organization of traumatic memories. *British Journal of Clinical Psychology, (38),*401–405. https://doi.org/10.1348/014466599162999

Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress, 5*(3), 377–391. https://doi.org/10.1002/jts.2490050305

Heyvaert, M., Maes, B., Van den Noortgate, W., Kuppens, S., & Onghena, P. (2012). A multilevel meta-analysis of single-case and small-n research on interventions for reducing challenging behavior in persons with intellectual disabilities. *Research in Developmental Disabilities, 33*(2), 766–780. https://doi.org/10.1016/j.ridd.2011.10.010

Hill, L. K., & Siebenbrock, A. (2009). Are all measures created equal? Heart rate variability and respiration. *Biomedical Sciences Instrumentation*, *45*, 71–76. https://pubmed.ncbi.nlm.nih.gov/19369742/

Hilliard, R. B. (1993). Single-case methodology in psychotherapy process and outcome research. *Journal of Consulting and Clinical Psychology, 61*(3), 373–380. https://doi.org/10.1037/0022-006x.61.3.373

Hsieh, H.F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research, 15(*9), 1277–1288. https://doi.org/10.1177/1049732305276687

Jacobs, W. J., & Nadel, L. (1985). Stress-induced recovery of fears and phobias. *Psychological Review, 92*(4), 512–531. https://doi.org/10.1037/0033-295x.92.4.512

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, *59*(1), 12-19. https://doi.org/10.1037/0022-006X.59.1.12

Jaeger, J., Lindblom, K. M., Parker-Guilbert, K., & Zoellner, L. A. (2014). Trauma narratives: It's what you say, not how you say it. *Psychological Trauma: Theory, Research, Practice and Policy*, *6*(5), 473–481. https://doi.org/10.1037/a0035239

Jaycox, L. H., Foa, E. B., & Morral, A. R. (1998). Influence of emotional engagement and habituation on exposure therapy for PTSD. *Journal of Consulting and Clinical Psychology, 66*(1), 185–192. https://doi.org/10.1037/0022-006x.66.1.185

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1998). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology*: *General, 117*(4), 371-376. https://doi.org/10.1037/0096-3445.117.4.371

Jones, R. R., Weinrott, M. R., & Vaught, R. S. (1978). Effects of serial dependency on the agreement between visual and statistical inference. *Journal of Applied Behavior Analysis, 11*(2), 277–283. https://doi.org/10.1901/jaba.1978.11-277

Jongedijk, R. A. (2014). Narrative exposure therapy: an evidence-based treatment for multiple and complex trauma. *European Journal of Psychotraumatology, 5*(1). https://doi.org/10.3402/ejpt.v5.26522

Kangaslampi, S. & Peltonen, K. (2019). Changes in traumatic memories and posttraumatic cognitions associate with PTSD symptom improvement in treatment of multiply traumatized children and adolescents. *Journal of Child & Adolescent Trauma, 13*, 103–112. https://doi.org/10.1007/s40653-019-00255-3

Karatzias, T., Murphy, P., Cloitre, M., Bisson, J., Roberts, N., Shevlin, M., Hyland, P., Maercker, A., Ben-Ezra, M., Coventry, P., Mason-Roberts, S., Bradley, A., & Hutton, P. (2019). Psychological interventions for ICD-11 complex PTSD symptoms: systematic review and meta-analysis. *Psychological Medicine*, *49*(11), 1761–1775. https://doi.org/10.1017/S0033291719000436

Karlsson, M., Hörnsten, R., Rydberg, A., & Wiklund, U. (2012). Automatic filtering of outliers in RR intervals before analysis of heart rate variability in Holter recordings: a comparison with carefully edited data. *BioMedical Engineering OnLine, 11*(1). https://doi.org/10.1186/1475-925x-11-2

Kazdin, A. E. (1982). *Single Case Research Designs: Methods for Clinical and Applied Settings*. Oxford University Press.

Keane, T. M., Kolb, L. C., Kaloupek, D. G., Orr, S. P., Blanchard, E. B., Thomas, R. G., Hsieh, F. Y., & Lavori, P. W. (1998). Utility of psychophysiological measurement in the diagnosis of posttraumatic stress disorder: Results from a Department of Veterans Affairs cooperative study. *Journal of Consulting and Clinical Psychology, 66*(6), 914–923. https://doi.org/10.1037/0022-006x.66.6.914

Keane, T. M., Zimering, R. T., & Caddell, J. M. (1985). A behavioral formulation of posttraumatic stress disorder in Vietnam veterans. *The Behavior Therapist, 8*(1), 9–12. https://psycnet.apa.org/record/1985-20292-001

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, *52*(12), 1048-1060. https://doi.org/10.1001/archpsyc.1995.03950240066012

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National Estimates of Exposure to Traumatic Events and PTSD Prevalence Using DSM-IV and DSM-5Criteria. *Journal of Traumatic Stress, 26(*5), 537–547. https://doi.org/10.1002/jts.21848

Kiyimba, N., & O'Reilly, M. (2020). The clinical use of subjective units of distress scales (SUDs) in child mental health assessments: A thematic evaluation. *Journal of Mental Health, 29*(4), 418-423. https://doi.org/10.1080/09638237.2017.1340616

Koebach, A., Carleial, S., Elbert, T., Schmitt, S., & Robjant, K. (2021). Treating trauma and aggression with narrative exposure therapy in former child and adult soldiers: A randomized controlled trial in Eastern DR Congo. *Journal of Consulting and Clinical Psychology, 89*(3), 143–155. https://doi.org/10.1037/ccp0000632

Kolacz, J., Chen, X., Nix, E. J., Roath, O. K., Holmes, L. G., Tokash, C., Porges, S. W., & Lewis, G. F. (2022). Measuring autonomic symptoms with the body perception questionnaire short form (BPQ-SF): Factor analysis, derivation of U.S. adult normative values, and association with sensor-based physiological measures. *medRxiv*. https://doi.org/10.1101/2022.04.27.22274391

Kolacz, J., Dale, L. P., Nix, E. J., Roath, O. K., Lewis, G. F., & Porges, S. W. (2020). Adversity history predicts self-reported autonomic reactivity and mental health in US residents during the COVID-19 Pandemic. *Frontiers in Psychiatry, 11*. https://doi.org/10.3389/fpsyt.2020.577728

Kolassa, I.T., & Elbert, T. (2007). Structural and functional neuroplasticity in relation to traumatic stress. *Current Directions in Psychological Science, 16(*6), 321–325. https://doi.org/10.1111/j.1467-8721.2007.00529.x

Kondracki, N. L., & Wellman, N. S. (2002). Content analysis: Review of methods and their applications in nutrition education. *Journal of Nutrition Education and Behavior*, *34*, 224-230. https://doi.org/10.1016/s1499-4046(06)60097-3

Kopelman, M. D., Wilson, B. A., & Baddeley, A. D. (1989). The autobiographical memory interview: A new assessment of autobiographical and personal semantic memory in amnesic patients. *Journal of Clinical and Experimental Neuropsychology*, *11*(5), 724-744. https://doi.org/10.1080/016886389400928

Kovach, C. R. (1993). Development and testing of the autobiographical memory coding tool. *Journal of Advanced Nursing*, *18*(4), 669-674. https://doi.org/10.1046/j.1365-2648.1993.18040669.x

Kraemer, H. C., Noda, A., & O'Hara, R. (2004). Categorical versus dimensional approaches to diagnosis: Methodological challenges. *Journal of Psychiatric Research,* 38(1), 17-25. https://doi.org/10.1016/s0022-3956(03)00097-9

Kratochwill, T.R., Hitchcock, J., Horner, R.H., Levin, J.R., Odom, S., Rindskopf, D., M., & Shadish, W.R. (2010). Single case designs technical documentation. *What Works Clearinghouse*. Retrieved from: https://files.eric.ed.gov/fulltext/ED510743.pdf

Krueger, R. F., & Bezdjian, S. (2009). Enhancing research and treatment of mental disorders with dimensional concepts: toward DSM-V and ICD-11. *World Psychiatry*, *8*(1), 3. https://doi.org/10.1002/j.2051-5545.2009.tb00197.x

Kyngaॅs H., & Vanhanen, L. (1999) Content analysis. *Hoitotiede*, 11, 3–12.

Lambert, M. J., & Ogles, B. M. (2009). Using clinical significance in psychotherapy outcome research: The need for a common procedure and validity data. *Psychotherapy Research*, *19*(4-5), 493-501. https://doi.org/10.1080/10503300902849483

Lane, J. D., & Gast, D. L. (2014). Visual analysis in single case experiment design studies: Brief review and guidelines. *Neuropsychological Rehabilitation, 24*(3), 445-463. https://doi.org/10.1080/09602011.2013.815636

Lane, R. D., Ryan, L., Nadel, L., & Greenberg, L. (2015). Memory reconsolidation, emotional arousal, and the process of change in psychotherapy: New insights from brain science. *The Behavioral and Brain Sciences, 38(*1), e1–e1. https://doi.org/10.1017/S0140525X14000041

Lang, P. J. (1979). A bio-informational theory of emotional imagery. *Psychophysiology*, *16*(6), 495-512. https://doi.org/doi: 10.1111/j.1469-8986.1979.tb01511.x

Lauri, S., & Kynga¨s, H. (2005) *Developing Nursing Theories (Finnish: Hoitotieteen Teorian Kehitta¨minen).* Werner So¨derstro¨m, Dark Oy, Vantaa.

Leahy, F., Ridout, N., Mushtaq, F., & Holland, C. (2018). Improving specific autobiographical memory in older adults: impacts on mood, social problem solving, and functional limitations*. Aging Neuropsychology & Cognition,* 25(5), 695-723. https://doi.org/10.1080/13825585.2017.1365815

Lebois, L. A., Harnett, N. G., van Rooij, S. J., Ely, T. D., Jovanovic, T., Bruce, S. E., ... & Ressler, K. J. (2022). Persistent dissociation and its neural correlates in predicting outcomes after trauma exposure. *American Journal of Psychiatry*, *179*(9), 661-672. https://doi.org/10.1176/appi.ajp.21090911

Lely, J. C., Smid, G. E., Jongedijk, R. A., W. Knipscheer, J., & Kleber, R. J. (2019). The effectiveness of narrative exposure therapy: A review, meta-analysis and meta-regression analysis. *European Journal of Psychotraumatology, 10*(1), 1550344. https://doi.org/10.1080/20008198.2018.1550344

Lenz, A. S. (2013). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, *46*(1), 64-73. https://doi.org/10.1177/0748175612456401

Leung, D. Y., & Chung, B. P. M. (2019). Content analysis: Using critical realism to extend its utility. *Handbook of Research Methods in Health Social Sciences,* 827–841. https://doi.org/10.1007/978-981-10-5251-4_102

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging*, *17*(4), 677-689. https://doi.org/10.1037/0882-7974.17.4.677

Libby, L. K., & Eibach, R. P. (2002). Looking back in time: Self-concept change affects visual perspective in autobiographical memory. *Journal of Personality and Social Psychology, 82*(2), 167–179. https://doi.org/10.1037/0022-3514.82.2.167

Lobo, M. A., Moeyaert, M., Baraldi Cunha, A., & Babik, I. (2017). Single-case design, analysis, and quality assessment for intervention research. *Journal of Neurologic Physical Therapy: JNPT*, *41*(3), 187–197. https://doi.org/10.1097/npt.0000000000000187

LoSavio, S. T., Dillon, K. H., & Resick, P. A. (2017). Cognitive factors in the development, maintenance, and treatment of post-traumatic stress disorder. *Current Opinion in Psychology, 14*, 18–22. https://doi.org/10.1016/j.copsyc.2016.09.006

Lovibond, S, H., & Lovibond, P, F. (1995). *Manual for the depression anxiety stress scales*. Sydney Psychology Foundation Australia. https://doi.org/10.1037/t01004-000

Lubian, K., Weich, S., Stansfeld, S., Bebbington, P., Brugha, T., Spiers, N., & Cooper, C. (2016). *Chapter 3: Mental health treatment and services*. In S. McManus, P. Bebbington, R. Jenkins, & T. Brugha (Eds.), Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014. NHS Digital.

Ma, H. H. (2006). An alternative method for quantitative synthesis of single-subject researches: Percentage of data points exceeding the median. *Behaviour Modification, 30*(5), 598-617. https://doi.org/10.1177/0145445504272974

Makara-Studzińska, M., Tyburski, E., Załuski, M., Adamczyk, K., Mesterhazy, J., & Mesterhazy, A. (2022). Confirmatory factor analysis of three versions of the depression anxiety stress scale (DASS-42, DASS-21, and DASS-12) in polish adults. *Frontiers in Psychiatry, 12*, 770532–770532. https://doi.org/10.3389/fpsyt.2021.770532

Malins, S., Moghaddam, N., Morriss, R., Schröder, T., Brown, P., & Boycott, N. (2020). Predicting outcomes and sudden gains from initial in-session interactions during

remote cognitive-behavioural therapy for severe health anxiety. *Clinical Psychology & Psychotherapy*, 10.1002/cpp.2543. Advance online publication. https://doi.org/10.1002/cpp.2543

Mayring, P. (2000). Qualitative Content Analysis. *Qualitative Social Research*, *1*(20).

Maxwell, J. A., & Mittapalli, K. (2010). Realism as a stance for mixed methods research. *SAGE Handbook of Mixed Methods in Social & Behavioral Research,* 145–168. https://doi.org/10.4135/9781506335193.n6

McCraty, R., & Shaffer, F. (2015). Heart rate variability: New perspectives on physiological mechanisms, assessment of self-regulatory capacity, and health risk. *Global Advances in Health and Medicine, 4*(1), 46–61. https://doi.org/10.7453/gahmj.2014.073

McGaugh, J. L. (2002). Memory consolidation and the amygdala: A systems perspective. *Trends in Neurosciences, 25*(9), 456–461. https://doi.org/10.1016/s0166-2236(02)02211-7

McGuire, T. G., ., & Miranda, J. J. (2008). Racial and ethnic disparities in mental health care: Evidence and policy implications. *Health Affairs (Project Hope), 27*(2), 393–403. https://doi.org/10.1377/hlthaff.27.2.393

McKinnon, A., Brewer, N., Meiser-Stedman, R., & Nixon, R. D. V. (2017). Trauma memory characteristics and the development of acute stress disorder and post-traumatic

stress disorder in youth. *Journal of Behavior Therapy and Experimental Psychiatry*, 54, 112–119. https://doi.org/10.1016/j.jbtep.2016.07.009.

McLean, C. P., & Foa, E. B. (2011). Prolonged exposure therapy for post-traumatic stress disorder: A review of evidence and dissemination. *Expert Review of Neurotherapeutics, 11*(8), 1151–1163. https://doi.org/10.1586/ern.11.94

McMillan, D. & Morley, S. (2010). Single-case quantitative methods. In M. Barkham & G. E. Hardy (eds), *A Core Approach to Delivering Practice-based Evidence*. Wiley.

Missirlian, T. M., Toukmanian, S. G., Warwar, S. H., & Greenberg, L. S. (2005). Emotional arousal, client perceptual processing, and the working alliance in experiential psychotherapy for depression. *Journal of Consulting and Clinical Psychology, 73*(5), 861–871. https://doi.org/10.1037/0022-006x.73.5.861

Morelli, D., Rossi, A., Cairo, M., & Clifton, D. A. (2019). Analysis of the impact of interpolation methods of missing RR-intervals caused by motion artifacts on HRV features estimations. *Sensors, 19*(14), 3163. https://doi.org/10.3390/s19143163

Morgan, D., & Morgan, R. (2008). *Single-case research methods for the behavioral and health sciences*. Sage publications.

Mørkved, N., Hartmann, K., Aarsheim, L. M., Holen, D., Milde, A.M., Bomyea, J., & Thorp, S.R. (2014). A comparison of narrative exposure therapy and prolonged exposure

therapy for PTSD. *Clinical Psychology Review*, 34(6), 453-467. https://doi.org/10.1016/j.cpr.2014.06.005

Morley, S. (2017). *Single Case Methods in Clinical Psychology*. Taylor & Francis Group. https://doi.org/10.4324/9781315412931

Moya-Ramon, M., Mateo-March, M., Peña-González, I., Zabala, M., Javaloyes, A. (2022). Validity and reliability of different smartphones applications to measure HRV during short and ultra-short measurements in elite athletes*. Computer Methods and Programs in Biomedicine, 217*, 106696. https://doi.org/10.1016/j.cmpb.2022.106696.

Moscovitch, M., & Nadel, L. (1999). Multiple-trace theory and semantic dementia: Response to K.S. Graham (1999). *Trends in Cognitive Sciences, 3*(3), 87–89. https://doi.org/10.1016/s1364-6613(99)01290-5

Moscovitch, M., Nadel, L., Winocur, G., Gilboa, A., & Rosenbaum, R. S. (2006). The cognitive neuroscience of remote episodic, semantic and spatial memory. *Current Opinion In Neurobiology*, *16*(2), 179–190. https://doi.org/10.1016/j.conb.2006.03.013

Motlagh, H. (2010). Impact of event scale-revised. *Journal of Physiotherapy, (56),*3 203. https://doi.org/10.1016/s1836-9553(10)70029-1

Mowrer, O. H. (1960). Two-factor learning theory: Versions one and two. In O. H. Mowrer, *Learning theory and behavior* (pp. 63–91). John Wiley & Sons Inc. https://doi.org/10.1037/10802-003

Munoz, M. L., van Roon, A., Riese, H., Thio, C., Oostenbroek, E., Westrik, I., de Geus, E. J. C., Gansevoort, R., Lefrandt, J., Nolte, I. M., & Snieder, H. (2015). Validity of (Ultra-)short recordings for heart rate variability measurements. *PLOS ONE, 10*(9), e0138921. https://doi.org/10.1371/journal.pone.0138921

National Institute for Health and Care Excellence (2018). *Post-traumatic stress disorder*. Guideline NG116. Retrieved from: https://www.nice.org.uk/guidance/ng116/chapter/Recommendations

Nadel, L., Campbell, J., & Ryan, L. (2007). Autobiographical memory retrieval and hippocampal activation as a function of repetition and the passage of time. *Neural Plasticity*, 1–14. https://doi.org/10.1155/2007/90472

Nadel, L., & Jacobs, W. J. (1998). Traumatic memory is special. *Current Directions in Psychological Science, 7*(5), 154–157. https://doi.org/10.1111/1467-8721.ep10836842

Nadel, L., Samsonovich, A., Ryan, L., & Moscovitch, M. (2000). Multiple trace theory of human memory: Computational, neuroimaging, and neuropsychological results. *Hippocampus, 10*(4), 352–368. https://doi.org/10.1002/1098-1063

Nazem, S., Spitzer, E. G., Brenner, L. A., & Bahraini, N. H. (2014). Beyond categorical classifications: The importance of Identifying posttrauma symptom trajectories and

associated negative outcomes. *The Journal of Clinical Psychiatry, 75(*09), e947–e949. https://doi.org/10.4088/jcp.14com09450

Neuner, F., Schauer, M., Roth, W. T., & Elbert, T. (2002). A narrative exposure treatment as intervention in a refugee camp: A case report. *Behavioural and Cognitive Psychotherapy*, *30*(2), 205-209. https://doi.org/10.1017/s1352465802002072

Neisser, U., & Harsch, N. (1992). Phantom flashbulbs: False recollections of hearing the news about Challenger. In E. Winograd & U. Neisser (Eds.), *Affect and accuracy in recall: Studies of "flashbulb" memories* (pp. 9–31). Cambridge University Press. https://doi.org/10.1017/CBO9780511664069.003

Norton, P. J. (2007). Depression anxiety and stress scales (DASS-21): Psychometric analysis across four racial groups. *Anxiety, Stress, and Coping*, *20*(3), 253-265.

Nutt, D. J., & Malizia, A. L. (2004). Structural and functional brain changes in posttraumatic stress disorder. *Journal of Clinical Psychiatry*, *65*, 11-17. https://www.psychiatrist.com/read-pdf/20094/

Oei, T. P. S., Sawang, S., Goh, Y. W., & Mukhtar, F. (2013). Using the depression anxiety stress scale 21 (DASS-21) across cultures. *International Journal of Psychology, 48*(6), 1018–1029. https://doi.org/10.1080/00207594.2012.755535

Orr, S. P., Metzger, L. J., Lasko, N. B., Macklin, M. L., Hu, F. B., Shalev, A. Y., Pitman, R. K., & Harvard/Veterans Affairs Post-traumatic Stress Disorder Twin Study

Investigators (2003). Physiologic responses to sudden, loud tones in monozygotic twins discordant for combat exposure: association with posttraumatic stress disorder. *Archives of General Psychiatry*, *60*(3), 283–288. https://doi.org/10.1001/archpsyc.60.3.283

Owen, N., & Steptoe, A. (2003). Natural killer cell and proinflammatory cytokine responses to mental stress: associations with heart rate and heart rate variability. *Biological Psychology, 63*(2), 101–115. https://doi.org/10.1016/s0301-0511(03)00023-1

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129*(1), 52–73. https://doi.org/10.1037/0033-2909.129.1.52

Paintain, E., & Cassidy, S. (2018). First-line therapy for post-traumatic stress disorder: A systematic review of cognitive behavioural therapy and psychodynamic approaches. *Counselling and Psychotherapy Research, 18*(3), 237–250. Portico. https://doi.org/10.1002/capr.12174

Park, Y. S., Konge, L., & Artino, A. R. (2020). The positivism paradigm of research. *Academic Medicine, 95*(5), 690–694.https://doi.org/10.1097/acm.0000000000003093

Parker, R. I., Hagan-Burke, S., & Vannest, K. (2007). Percentage of all non- overlapping data (PAND) an alternative to PND. *The Journal of Special Education*, *40*(4), 194-204. doi: 10.1177/00224669070400040101

Pasupathi, M., Mansour, E., & Brubaker, J. R. (2007). Developing a life story: Constructing relations between self and experience in autobiographical narratives. *Human Development, 50*(2-3), 85- 110. https://doi.org/10.1159/000100939

Palombo, D. J., Williams, L. J., Abdi, H., & Levine, B. (2013). The survey of autobiographical memory (SAM): A novel measure of trait mnemonics in everyday life. *Cortex*, *49*(6), 1526-1540. https://doi.org/10.1016/j.cortex.2012.08.023

Pecchia, L., Castaldo, R., Montesinos, L., & Melillo, P. (2018). Are ultra-short heart rate variability features good surrogates of short-term ones? State-of-the-art review and recommendations. *Healthcare Technology Letters, 5*(3), 94–100. https://doi.org/10.1049/htl.2017.0090

Penttilä, J., Helminen, A., Jartti, T., Kuusela, T., Huikuri, H. V., Tulppo, M. P., Coffeng, R., & Scheinin, H. (2001). Time domain, geometrical and frequency domain analysis of cardiac vagal outflow: Effects of various respiratory patterns. *Clinical Physiology, 21(*3), 365–376. https://doi.org/10.1046/j.1365-2281.2001.00337.x

Penny, A., & Teatero, M. (2015). Subjective units of distress scale In R. McCabe & I. Milosevic (Eds.), *In phobias: The psychology of irrational fear*. (p361-362). Greenwood.

Pignotti, M., & Steinberg, M. (2001). Heart rate variability as an outcome measure for Thought Field Therapy in clinical practice. *Journal of Clinical Psychology, 57*(10), 1193–1206. https://doi.org/10.1002/jclp.1086

Pope, C., Ziebland, S., & Mays, N. (2006). Analysing qualitative data. In: Pope C, Mays N (eds). *Qualitative Research in Health Care* (3rd edn). Blackwell Publishing, 63–81.

Porges, S. W. (1993). *Body perception questionnaire*. Laboratory of Developmental Assessment: University of Maryland.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology, 74*(2), 116–143. https://doi.org/10.1016/j.biopsycho.2006.06.009

Powers, B., & Knapp, T. (2006) *Dictionary of Nursing Theory and Research* (3rd edn). Springer Publishing Company.

Qassem, T., Aly-ElGabry, D., Alzarouni, A, Abdel-Aziz, K., & Arnone, D. (2021). Psychiatric co-morbidities in post-traumatic stress disorder: Detailed findings from the adult psychiatric morbidity survey in the english population. *Psychiatric Quarterly, (92),* 321–330. https://doi.org/10.1007/s11126-020-09797-4

Quednow, B. B., Jessen, F., Kuhn, K. U., Maier, W., Daum, I., Wagner, M. (2006). Memory deficits in abstinent MDMA (ecstasy) users: Neuropsychological evidence of frontal dysfunction. *Journal of Psychopharmacology. 20(*3), 373-384. https://doi.org/10.1177/0269881106061200

Raghuraman, S., Stuttard, N., & Hunt, N. (2021). Evaluating narrative exposure therapy for post-traumatic stress disorder and depression symptoms: A meta-analysis of the

evidence base. *Clinical Psychology & Psychotherapy*, *28*(1), 1-23. https://doi.org/10.1002/cpp.2486

Rash, C. J., Coffey, S. F., Baschnagel, J. S., Drobes, D. J., & Saladin, M. E. (2008). Psychometric properties of the IES-R in traumatized substance dependent individuals with and without PTSD. *Addictive Behaviors, 33(*8), 1039–1047. https://doi.org/10.1016/j.addbeh.2008.04.006

Reed, G. M. (2010). Toward ICD-11: Improving the clinical utility of WHO's International Classification of mental disorders. *Professional Psychology: Research and Practice*, *41*(6), 457. https://doi.org/10.1037/a0021701

Reddemann, L., & Piedfort-Marin, O. (2017). Stabilization in the treatment of complex post-traumatic stress disorders: Concepts and principles. *European Journal of Trauma & Dissociation, 1*(1), 11–17. https://doi.org/10.1016/j.ejtd.2017.01.009

Robjant, K., Koebach, A., Schmitt, S., Chibashimba, A., Carleial, S., & Elbert, T. (2019). The treatment of posttraumatic stress symptoms and aggression in female former child soldiers using adapted narrative exposure therapy–a RCT in eastern democratic republic of congo. *Behaviour Research and Therapy*, *123*, 103482. https://doi.org/10.1016/j.brat.2019.103482

Robjant, K., Roberts, J., & Katona, C. (2017). Treating posttraumatic stress disorder in female victims of trafficking using narrative exposure therapy: A retrospective audit. *Frontiers in Psychiatry, 8*. https://doi.org/10.3389/fpsyt.2017.00063

Roggenkamp, H., Abbass, A., Town, J. M., Kisely, S., & Johansson, R. (2021). Healthcare cost reduction and psychiatric symptom improvement in posttraumatic stress disorder patients treated with intensive short-term dynamic psychotherapy. European *Journal of Trauma & Dissociation, 5*(3), 100-122. https://doi.org/10.1016/j.ejtd.2019.100122

Ronk, F. R., Korman, J. R., Hooke, G. R., & Page, A. C. (2013). Assessing clinical significance of treatment outcomes using the DASS-21. *Psychological assessment, 25*(4), 1103. https://doi.org/10.1037/a0033100

Rossi, A., Pedreschi, D., Clifton, D. A., & Morelli, D. (2020). Error estimation of ultra-short heart rate variability parameters: Effect of missing data caused by motion artifacts. *Sensors, 20*(24), 7122. https://doi.org/10.3390/s20247122

Roth, S., Newman, E., Pelcovitz, D., Van Der Kolk, B., & Mandel, F. S. (1997). Complex PTSD in victims exposed to sexual and physical abuse: Results from the DSM-IV field trial for posttraumatic stress disorder. *Journal of Traumatic Stress*, *10*, 539-555. https://doi.org/10.1002/jts.2490100403

Rubin, D. C., Deffler, S. A., Ogle, C. M., Dowell, N. M., Graesser, A. C., & Beckham, J. C. (2016). Participant, rater, and computer measures of coherence in posttraumatic stress disorder. *Journal of Abnormal Psychology, 125,* 11–25. http://dx.doi.org/10.1037/abn0000126

Rubin, D. C., Schrauf, R. W., & Grenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, *31*(6), 887-901. https://doi.org/10.3758/bf03196443

Ruscio, A. M., Ruscio, J., & Keane, T. M. (2002). The latent structure of posttraumatic stress disorder: A taxometric investigation of reactions to extreme stress. *Journal of Abnormal Psychology, 111*(2), 290–301. https://doi.org/10.1037/0021-843x.111.2.290

Ryan, L., Cox, C., Hayes, S. M., & Nadel, L. (2008). Hippocampal activation during episodic and semantic memory retrieval: Comparing category production and category cued recall. *Neuropsychologia, 46*(8), 2109–2121. https://doi.org/10.1016/j.neuropsychologia.2008.02.030

Safarnia, A., Ahmadi, V., & Mami, S. (2020). Comparing the effects of intensive short-term dynamic psychotherapy and mindfulness-based cognitive therapy on posttraumatic stress disorder. *Middle Eastern Journal of Disability Studies, 10(*1) 0-0, https://sid.ir/paper/988247/en

Sandelowski, M. (1995) Qualitative analysis: what it is and how to begin? *Research in Nursing & Health,* 18(4), 371–375. https://doi.org/10.1002/nur.4770180411

Sareen, J., Stein, B., M., & Friedman, M. (2022). *Posttraumatic stress disorder in adults: Epidemiology, pathophysiology, clinical manifestations, course, assessment, and diagnosis*. https://www.uptodate.com/contents/posttraumatic-stress-disorder-in-

adults-epidemiology-pathophysiology-clinical-manifestations-course-assessment-and-diagnosis#disclaimerContent

Saul, J. P. (1990). Beat-to-beat variations of heart rate reflect modulation of cardiac autonomic outflow. *News in Physiological Sciences, 5,* 32-37. https://doi.org/10.1152/physiologyonline.1990.5.1.32

Schacter, D L., Addis, D, R., & Bucker, R.L. (2008). Episodic stimulation of future events: concepts, data, and applications. *Annals of the New York Academy of Sciences, 1124(1),* 39-60. https://doi.org/10.1196/annals.1440.001

Schäfer, S. K., Ihmig, F. R., Neurohr, F., Kiefer, S., Staginnus, M., Lass-Hennemann, J., & Michael, T. (2018). Effects of heart rate variability biofeedback during exposure to fear-provoking stimuli within spider-fearful individuals: Study protocol for a randomized controlled trial. *Trials*, *19*(1), 184. https://doi.org/10.1186/s13063-018-2554-2

Schauer, M., Neuner, F., & Elbert, T. (2011). *Narrative exposure therapy: A short-term treatment for traumatic stress disorders* (2nd rev. and expanded ed.). Hogrefe Publishing

Schauer, M., Robjant, K., Elbert, T., & Neuner, F. (2020). Narrative Exposure Therapy. In J. D. Ford & C. A. Courtois (Eds.), *Treating Complex Traumatic Stress Disorders in Adults (2nd ed.): Scientific Foundations and Therapeutic Models* (pp. 309-329). The Guildford Press.

Schnyder, U., Ehlers, A., Elbert, T., Foa, E. B., Gersons, B. P., Resick, P. A., ... & Cloitre, M. (2015). Psychotherapies for PTSD: what do they have in common? *European Journal of Psychotraumatology*, *6*(1), 28186. https://doi.org/10.3402/ejpt.v6.28186

Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. *BMJ, 340*, c332–c332. https://doi.org/10.1136/bmj.c332

Schork, N. J. (2015). Personalized medicine: Time for one-person trials. *Nature, 520*(7549), 609–611. https://doi.org/10.1038/520609a

Sciarra, D. (1999). The role of the qualitative researcher. *Using Qualitative Methods in Psychology*, 37–48. https://doi.org/10.4135/9781452225487.n4

Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research. *Remedial and Special Education, 8*(2), 24–33. https://doi.org/10.1177/074193258700800206

Shaffer, F., & Ginsberg, J. P. (2017). An overview of heart rate variability metrics and norms. *Frontiers in Public Health*, *5*, 258. https://doi.org/10.3389/fpubh.2017.00258

Shadish, W. R., Rindskopf, D. M., Hedges, L. V., & Sullivan, K. J. (2012). Bayesian estimates of autocorrelations in single-case designs. *Behavior Research Methods, 45*(3), 813–821. https://doi.org/10.3758/s13428-012-0282-1

Shaffer, F., McCraty, R., & Zerr, C. L. (2014). A healthy heart is not a metronome: An integrative review of the heart's anatomy and heart rate variability. *Frontiers In Psychology*, *5*, 1040. https://doi.org/10.3389/fpsyg.2014.01040

Sheth, B. R., & Young, R. (2016). Two visual pathways in primates based on sampling of space: Exploitation and exploration of visual information. *Frontiers in Integrative Neuroscience*, 10. https://doi.org/10.3389/fnint.2016.00037

Siehl, S., Robjant., K & Crombach, A. (2021). Systematic review and meta-analyses of the long-term efficacy of narrative exposure therapy for adults, children and perpetrators, *Psychotherapy Research, 31*(6), 695-710. https://doi.org10.1080/10503307.2020.1847345

Speer, K. E., Semple, S., Naumovski, N., McKune, A.J. (2020). Measuring heart rate variability using commercially available devices in healthy children: A validity and reliability study. *European Journal Investigating Health Psychology Education, 10*, 390-404. https://doi.org/10.3390/ejihpe10010029

Spitzer, R. L., Kroenke, K., Williams, J. B. (1999). Patient health questionnaire primary care study group, & validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Jama*, *282*(18), 1737-1744.https://doi.org/10.1037/t06166-000

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder. *Archives of Internal Medicine, 166*(10), 1092. https://doi.org/10.1001/archinte.166.10.1092

Squire, L. R. (1994). Declarative and nondeclarative memory: Multiple brain systems supporting learning and memory. In D. L. Schacter & E. Tulving (Eds.), *Memory systems 1994* (pp. 203–231). The MIT Press.

Squire, L. R. (2004). Memory systems of the brain: A brief history and current perspective. *Neurobiology of Learning and Memory*, *82*(3), 171-177. https://doi.org/10.1016/j.nlm.2004.06.005

Stein, P. K., Bosner, M. S., Kleiger, R. E., & Conger, B. M. (1994). Heart rate variability: A measure of cardiac automic tone. *American Heart Journal, 127,* 1376-1381. https://doi.org/10.1016/0002-8703(94)90059-0

Stein, P. K., Domitrovich, P. P., Hui, N., Rautaharju, P., & Gottdiener, J. (2005). Sometimes higher heart rate variability is not better heart rate variability: Results of graphical and nonlinear analyses. *Journal of Cardiovascular Electrophysiology*, *16*(9), 954–959. https://doi.org/10.1111/j.1540-8167.2005.40788.x

Stein, D. J., McLaughlin, K. A., Koenen, K. C., Atwoli, L., Friedman, M. J., Hill, E. D., Maercker, A., Petukhova, M., Shahly, V., van Ommeren, M., Alonso, J., Borges, G., de Girolamo, G., de Jonge, P., Demyttenaere, K., Florescu, S., Karam, E. G., Kawakami, N., Matschinger, H., … Kessler, R. C. (2014). DSM-5 and ICD-11 definitions of posttraumatic stress disorder: Investigating “narrow” and “broad” approaches. *Depression and Anxiety, 31*(6), 494–505. https://doi.org/10.1002/da.22279

Stein, D. J., Seedat, S., Iversen, A., & Wessely, S. (2007). Post-traumatic stress disorder: Medicine and politics. *The Lancet, 369 (*9556), 139–144. https://doi.org/10.1016/s0140-6736(07)60075-0

Sumner, J. A., Mineka, S., & McAdams, D. P. (2013). Specificity in autobiographical memory narratives correlates with performance on the autobiographical memory test and prospectively predicts depressive symptoms. *Memory*, *21*(6), 646-656. https://doi.org/10.1080/09658211.2012.746372

Sutin, A. R., & Robins, R. W. (2007). Phenomenology of autobiographical memories: The memory experiences questionnaire. *Memory*, *15*(4), 390-411. https://doi.org/10.1080/09658210701256654

Talarico, J. M., LaBar, K. S., & Rubin, D. C. (2004). Emotional intensity predicts autobiographical memory experience. *Memory & Cognition, 32*(7), 1118–1132. https://doi.org/10.3758/bf03196886

Thompson, C. P., Skowronski, J. J., Larsen, S. F., & Betz, A. (1996). *Autobiographical memory: Remembering what and remembering when.* Lawrence Erlbaum Associates, Inc.

Tsuji, H., Larson, M.G., Vanditti, F.J., Manders, E.S., Evans, J.C., Feldman, C.L., Levey, D. (1996). Impact of reduced heart rate variability on risk for cardiac events: the

Framingham Heart Study. *Circulation, 94*, 2850-2855. https://doi.org/10.1161/01.cir.94.11.2850

Tulving, E. (1972). Episodic and semantic memory. In Tulving, E., and Donaldson, W. (eds.), *Organization of Memory* (pp. 381-403), Academic Press.

Tulving, E. (2002). Episodic memory: From mind to brain. *Annual Review of Psychology*, *53*(1), 1-25. https://doi.org/10.1146/annurev.psych.53.100901.135114

Vaismoradi, M., Turunen, H. & Bondas, T. (2013). Qualitative descriptive study. *Nursing Health Science, 15*, 398-405. https://doi.org/10.1111/nhs.12048

van Der Kolk, B. A., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8*(4), 505–525. https://doi.org/10.1002/jts.2490080402

Van Minnen, A., Arntz, A., & Keijsers, G. P. (2002). Prolonged exposure in patients with chronic PTSD: Predictors of treatment outcome and dropout. *Behaviour Research and Therapy, 40*(4), 439–457. https://doi.org/10.1016/s0005-7967(01)00024-9

Vannucci, M., Chiorri, C., & Marchetti, I. (2020). Shaping our personal past: Assessing the phenomenology of autobiographical memory and its association with object and spatial imagery. *Scandinavian Journal of Psychology, 61*(5), 599-606. https://doi.org/10.1111/sjop.12639

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5) – LEC-5 and Extended Criterion A* [Measurement instrument]. Available from http://www.ptsd.va.gov/

Weisæth, L. (1998), Vulnerability and protective factors for posttraumatic stress disorder. *Psychiatry and Clinical Neurosciences, 52*, 39-S44. https://doi.org/10.1046/j.1440-1819.1998.0520s5083.x

Weiss, D. S., & Marmar, C. R. (1997). The impact of Event Scale-Revised. In J.P Wilson, & T.M Keane (Eds.), *Assessing psychologicaltTrauma and PTSD: A practitioner'shHandbook* (pp. 399-411). Guilford Press.

Welch, S., Klassen, C., Borisova, O., & Clothier, H. (2013). The DSM-5 Controversies. *Canadian Psychology = Psychologie Canadienne, 54(*3), 166–175. https://doi.org/10.1037/a0033841

Westen, D., Novotny, C. M. & Thompson-Brenner, H. (2004). The empirical status of empirically supported psychotherapies: Assumptions, findings, and reporting in controlled clinical trials. *Psychological Bulletin, 130* (4), 631– 63. https://doi.org/10.1037/0033-2909.130.4.631

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology, 95*(2), 144-149. https://doi.org/10.1037/0021-843x.95.2.144

Wolery, M., Busick, M., Reichow, B., & Barton, E. E. (2010). Comparison of overlap methods for quantitatively synthesizing single-subject data. *The Journal of Special Education*, *44*(1), 18-28. https://doi.org/10.1177/0022466908328009

Wolpe, J. (1969). *The Practice of Behavior Therapy*. Pergamon Press.

Wolpe, J., & Lazarus, A. A. (1966). *The Commonwealth and international library. Mental health and social medicine division. Behavior therapy techniques: A guide to the treatment of neuroses.* Pergamon Press.

World Health Organization. (2019). *International statistical classification of diseases and related health problems* (11th ed.). https://icd.who.int/

Wynn, D., & Williams, C., K. (2012). Principles for conducting critical realist case study research in information systems. *MIS Quarterly, 36*(3), 787. https://doi.org/10.2307/41703481

Yehuda, R., & McFarlane, A. C. (1995). Conflict between current knowledge about posttraumatic stress disorder and its original conceptual basis. *American Journal of Psychiatry, 152(*12), 1705–1713. https://doi.org/10.1176/ajp.152.12.1705

Zhang, Y., Kuhn, S.K., Jobson, L & Haque, S. (2019). A review of autobiographical memory studies on patients with schizophrenia spectrum disorders. *BMC Psychiatry*, *19*(1)*,* 361. https://doi.org/10.1186/s12888-019-2346-6

Zygmunt, A., & Stanczyk, J. (2010). Methods of evaluation of autonomic nervous system function. *Archives of Medical Science, 1*, 11–18. https://doi.org/10.5114/aoms.2010.13500

APPENDICIES

Autobiographical Memory Integration Coding Tool (ABMICT; Lord et al., 2023)

Background

Traumas are events which include witnessing or being at the risk of, death, violence, and sexual violation (American Psychological Association; APA, 2013). Experiencing trauma can lead to psychological and physiological changes (Frustaci et al., 2010), and an individual's mental health can deteriorate to the point where a diagnosis of post-traumatic stress disorder (PTSD) is given. While being exposed to trauma does not lead to PTSD, there is a dose-response relationship between the severity and duration of traumatic events and developing PTSD (Dohrenwend et al., 2006), suggesting that more complex forms of PTSD can develop if a person is subjected to multiple traumatic events. Complex post-traumatic stress disorder (CPTSD) occurs when a person is subjected to multiple prolonged traumas of an interpersonal nature, where escape is impossible (Mørkved et al., 2014; The International Classification of Diseases and Related Health Problems-11, World Health Organisation, 2018).

One therapy which has received support for treating CPTSD is Narrative Exposure Therapy (NET; Schauer et al., 2011). The central aim of a NET treatment is re-integration of contextual information and the traumatic memory into an autobiographical lifeline; this occurs through narrating the memory and involves prolonged exposure and habituation (Schauer et al., 2011), and integration of the trauma memory into an autobiographical context (Lely et al., 2019; Schauer et al., 2011). However, despite NET's successes, its mechanisms of change have not been evidenced empirically, especially the element of contextualisation and integration of trauma into autobiographical memory (ABM; Kangaslampi & Peltonen, 2019). Zalta (2015) argued that identifying the mechanisms of change within therapy is crucial for further development, effective dissemination, and improving future treatments. Therefore, further research into the proposed mechanisms of change for NET is needed, and the researcher proposes analysing trauma narratives may help to uncover the autobiographical memory integration element of NET.

An issue with self-reports of trauma via quantitative measures, is that self-reports can be influenced by demand characteristics, and the memory could be seen more as a person's perception of their memory quality, and rather represent the frequency of their symptoms (Kangaslampi & Peltonen, 2019; McKinnon et al., 2017; Pasupathi, 2007). Analysing trauma narratives with an observer-rated index allows for a more nuanced understanding of the trauma memory based on its content (Kangaslampi & Peltonen, 2019); ultimately allowing a researcher to see the effects of treatment to the narrative over time, and to see if it is integrated into the autobiographical lifeline. Limited research into how trauma narratives change over the process of therapy was provided by Lane (2019). Lane (2019) took an existing coding measure from Jaeger et al. (2014). However, as Jaeger et al.'s (2014) measure did not include constructs of ABM, it would not be appropriate to use in its current form to measure the Autobiographical Memory Integration (ABMI) change mechanism posited by NET. Therefore, the initial step of the proposed study is to build on previous research from Lane (2019) by developing Jaeger et al.'s (2014) existing framework, to add phenomenological constructs of ABM, to make a more robust measure which will be tested as a process measure.

The initial step in developing the autobiographical memory integration coding tool (AMBICT) was for the researcher to conduct a systematic literature review of how ABM is assessed while critiquing the psychometrics and methodological issues. Through reviewing the literature, the researcher noted that various methods have been used to study ABM; structured interviews - the Autobiographical Memory Interview (AMI; Kopelman et al., 1989), cue word tasks - the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), to narrative measures - The Autobiographical Memory Coding Tool (ABMCT; Kovach, 1993). Memory narratives, however, provide a promising alternative method as they can address several limitations of self-report and cue word methodologies. Narratives are less fallible to demand characteristics and may better reflect the recollection process of naturalistic memory (Kangaslampi & Peltonen, 2019; Sumner et al., 2013).

As part of the literature review the researcher was also able to identify the constructs that were assessed the most often in the existing measures. Any construct that was assessed four or more times was deemed a core factor. Therefore, vividness, emotional intensity, sensory details, coherence, and belief in accuracy were deemed as core factors when assessing ABM. As vividness, emotional distancing, sensory details, and narrative coherence were all deemed to be core factors and were relevant when assessing trauma narratives, they were included in the ABMICT. Time and place details was assessed three times in the existing measures; however, given a key aspect of NET being adding contextual information (cold memories) as part of treatment it was included in the AMBICT. Fragmentation, disorganisation, and total word count were also included due to being part of Jaeger et al.'s (2014) measure.

After reviewing the literature and deciding on the factors that were to be included in the measure the researcher reviewed the existing definitions to operationalise the AMBIAs for the coding tool. To help develop the coding tool both the Consultation Interactions Coding Scheme (CICS; Mallins et al., 2020) and The Autobiographical Interview (AI; Levine et al., 2002) were reviewed when creating the tool.

N.B. Please note the coding tool is copyrighted as the intellectual property of Mr Jackson Lord. The tool was created with support from Professor Thomas Schröder, Dr Rachel Sabin-Farrell, and Dr Rohan Naidoo. Please seek permission before using the tool.

Guidance for Coders

Definition of Coding Terms

Turn- A turn is when a patient/participant or therapist speaks continually until the other person beings to speak, or there is a pause in either person's speech. This could be indicated by use of a speech filler (e.g., erm), or noted in the transcript (e.g., [pause]).

Segment- An extract of the transcript that is to be coded, this could be one turn or multiple turns.

Autobiographical Memory Integration Area (ABMIA)- A posited area of autobiographical memory that is to be coded in line with the description and scoring guidelines provided in the manual.

Coder Training

To ensure the inter-rater reliability of the transcripts, it is recommended to have checks conducted by an external rater who has been trained to analyse the transcripts for the ABMIA laid out in the manual. The pre- and post-transcripts should be blinded to the rater. The scores of the ABMIA will be compared, and if the ratings of each coder are within 80% similarity of each other the transcripts they will be deemed reliable. If the ABMIA analysed are less than 80% similar, the rater and external rater will discuss this until they reach 80% similarity.

Transcripts for Coding

The NET intervention used will be a modified version of the protocol provided in Schauer et al.'s (2011) manual.

In a routine first narration session, the person starts speaking about their life and with the help of the therapist narrates the first trauma. In a routine re-narration session, the therapist would start by re-reading the narrative from the previous session. As the narrative is being read, the person is asked to fully imagine and relive the incident. Once complete the therapist and person move onto the next trauma.

The adaptations made will take place at the start of the sessions. When the session starts, the therapist will look at the lifeline and see which trauma should be narrated for that session; then the researcher will say to the participant "Tell me in as much detail as you can about the (traumatic event)". The participant will give as free an account of their trauma as possible. When the participant has stopped, they will then re-narrate the trauma with the help of the therapist, and the normal session content will resume. In the following session, the therapist will start by saying "Last time we talked about (previous trauma), tell me about it again in your own words". The person freely narrates the previous sessions trauma, before going through the process of re-narration with the therapist; then the session continues with another free narration of a new trauma and re-narration of that trauma with the therapist.

The adaptions made will allow for the researcher to investigate the proposed change mechanisms of NET. Having patients/participants freely narrate their trauma at the beginning of the sessions allows the therapist to transcribe, compare, and code the narrated traumas and have two transcripts of the same trauma (one from the initial session and another from the following session). As such, the researchers will assess any narrative changes to the transcripts as a process measure as this will be repeated every session.

Segmenting

While analysing the transcripts one ABMIA should be applied to each turn of speech from the patient/participant. Apply the ABMIA and score that seems the best fit for the segment. As the transcripts taken are to have as little therapist intervention as possible the likelihood of therapist interruption is small. The segments may incorporate turns of speech between the therapist and patient/participant; however, only the segments from the patient/participant should be scored.

If during the re-narration exert a patient/participant references how they felt at the time of the event and then states how they feel in the moment e.g., “At the time of the attack I was scared, but now I realise I am safe”, this could be seen as evidence of the memory processing. Consider this to be a complete segment and score appropriately.

Coding Levels

Coding a session transcript using this manual requires that session recordings are transcribed verbatim. The use of audio-visual recording would support and enhance the coding but are not required. Code the transcript in terms of how it matches the ABMIA outlined. All of the ABMIA bar (narrative coherence and total word count) are coded on a scale ranging from 1-4. When coding the transcript start at the bottom (1) and move up or down the scale as appropriate given the level of evidence in the transcript.

Apply the score that seems the best for the extract that is being reviewed. After coding transcript:

- Review the ABMIA that have already been allocated with knowledge of the whole session. Revise the ABMIAs and add/remove ABMIAs that were not apparent on first review, some of the scores of the ABMIAs may need readjusting.
- After the ABMIAs and scores have been reviewed, follow the scoring procedure.

Before coding any transcripts, the coders should familiarise themselves with each ABMIA and their descriptions. An ABMIA summary page is provided at the end of the manual and can be referred to as necessary while coding (Appendix 1).

Decision Tree

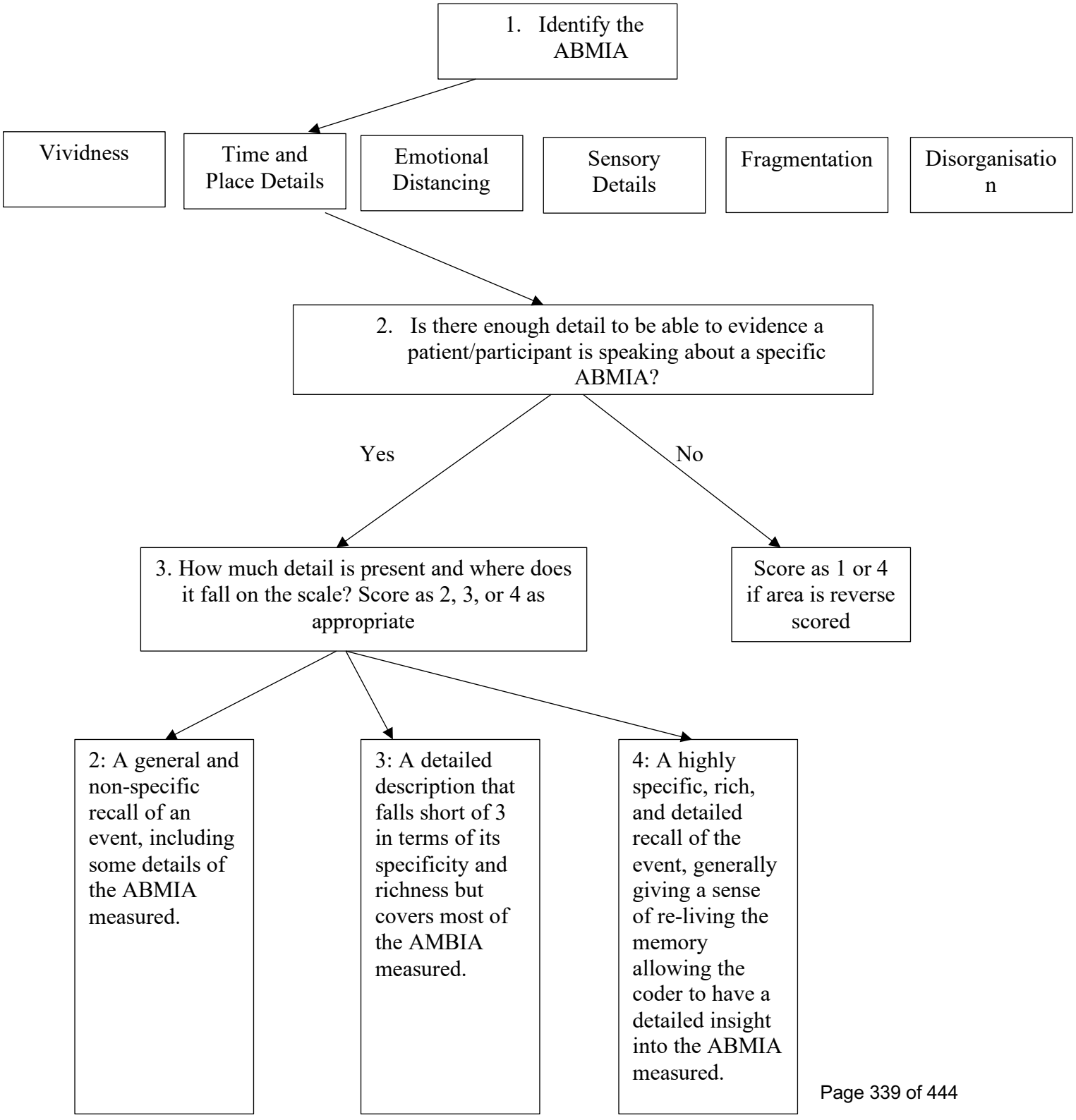
Coding involves a three-stage decision making process:

1. Identify the ABMIA the patient/participant is speaking about.
2. Is there enough detail to be able to evidence a patient/participant is speaking about a specific ABMIA?
3. If yes, how much detail is present and where does it fall on the scale? (Score 1, 2, 3, or 4 as appropriate).

The first step is for the coder to decide which ABMIA the patient/participant is speaking about (e.g., time and place details). This is followed by the coder deciding if there is enough detail to evidence the ABMIA assessed, before deciding what score to assign to the section of the transcript (e.g., 1, 2, 3, or 4). Coders should assign a score they feel is the best fit given the evidence in the section of transcript, if there is a lack of clarity the coder should give the lesser score (i.e., 1 instead of 2).

Decision-Tree Example:

Patient/participant: Erm, so it happened at home and I erm think in the evening probably around 8 pm. It was still light, so I think it was in the summer.



Decision Rule for ABMIA Choice

If the patient/participant speaks about two ABMIAs in the same sentence or passage of speech and one ABMIA has enough detail to score it, score that ABMIA. If two ABMIAs are mentioned and neither of them have enough detail in them and the sentence is broken score it as a 1.

Example

***Patient/participant*:** They burnt down my father's shop. I saw it; I was at home. It was 6:00am and we were sleeping. We heard people shouting: "Fire!" and I could smell it because the fire was very big; the sky was red everywhere. I jumped out of bed and ran outside. My dad, mom, and younger brothers followed. There were a lot of people outside. I discovered that it was my father's shop that was on fire.	Example of multiple ABMIAs in the same section and sentence with score I saw it; I was at home. It was 6:00am (Time and Place Details +4) We heard people shouting: "Fire!" and I could smell it because the fire was very big; the sky was red everywhere. (Sensory Details +3 and Vividness +4 scored whole segment)

Example

***Patient/participant*:** They burnt down my father's shop. I can't remember when. I don't remember what I could see or smell.	Example of two ABMIAs with no score I can't remember when (Time and Place Details). I don't remember what I could see or

	smell (Vividness and Sensory Details).

Scoring

Scoring aims to provide a summary and overall picture of the spread of ABMIAs across a segment or session transcript, providing an analytic and visual understanding of the level of detail and frequency of the ABMIAs assessed in the transcript.

As total word count of the transcripts is to be recorded, this allows for the coder to assess the percentage and average score of the ABMIAs covered in the transcript. The researcher will be able to count every word used when an ABMIA is discussed and combine every instance of when an ABMIA is discussed and then divide this number by the total word count. This will give the percentage of the transcript that is coded to a specific ABMIA. Recording the word count of each ABMIA assessed will also provide the researcher with the proportion of the transcript coded for certain ABMIAs, therefore the researcher would be able to see what percentage of one ABMIA of the transcript is coded for by dividing it from the total word count. This will then allow for the researcher to score the segment of the transcript. For example, if there were three instances of the ABMIA time and place details being discussed and each time they were discussed 20 words were spoken, the researcher would add these words together to get 60. If the total word count of the transcript was 600, this would then be divided by 60 and turned into a percentage to get 10% meaning AMBIA time and place details would account for 10% of the transcript. If 10% of the transcript is coded as time and place details with a score of +2, the researcher would multiply these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each ABMIA, the average score for each ABMIA should be calculated.

The average scores and percentages should be calculated to two decimal places.

4: A highly specific, rich, and detailed recall of the event, generally giving a sense of re-living the memory allowing the coder to have a detailed insight into the ABMIA measured.

There is ample direct evidence that this ABMIA applies to the experience recalled by the patient/participant.

3: A detailed description that falls short of 3 in terms of its specificity and richness but covers most of the ABMIA measured.

There is clearly some direct evidence that this ABMIA applies to the experience recalled by the patient/participant.

2: A general and non-specific recall of an event, including some details of the ABMIA measured.

There is little or no direct evidence that this area applies to the experience recalled by the patient/participant.

1: A recall which provides no specific or general information, which may be due to the recall being unstructured. The recalled event does not give enough detail that allows the coder to examine the ABMIA measured.

There is no evidence that this area applies to the experience recalled by the patient/participant.

Implications

Once the average scores of the ABMIAs assessed have been collected this will allow for the pre- and post-comparison of the transcripts to see how they change as part of therapy. This will allow the research team to investigate the posited mechanism of change proposed by NET.

ABMIA Examples

Vividness

Vividness can be reduced down to how clear, detailed, and specific the image of the memory is in the person's mind. Vividness is operationalised as the level of detail and clarity of the visual image the person can convey when recalling the event.

Patient/participant: They burnt down my father's shop. I saw it; I was at home. It was 6:00am and we were sleeping. We heard people shouting: "Fire!" and I could smell it because the fire was very big; the sky was red everywhere. I jumped out of bed and ran outside. My dad, mom, and younger brothers followed. There were a lot of people outside. I discovered that it was my father's shop that was on fire.	4

4. A rich, highly detailed description of the event which gives a sense of clear recall. The person is able to give a strong recollection the event in detail and explain it so one can have a strong visual image of the event and the location it took place, this will be through describing colours, peoples features etc. To score a 4 the description must mention the visual image "the sky was red everywhere".

3. A detailed description that gives a sense of recalling the event but falls short of a score of 4. The description given by the person may lack specific details such as location, colours, descriptions of people features meaning the coder is not fully be able to 'paint a picture' in their mind. Therefore, a score of 3 is

given when there is not a clear 'picture'/visual image in the scorer's mind, from the previous example the description would be missing "the sky was red everywhere".

2. A vague account of the event that lacks detail but gives a sense of recall painting a weak visual image in the coders mind. This may read like the person is listing the facts of the event(s) as opposed to describing the image in detail.

1. A recall of the event, lacking detail, giving no strong sense of recall. The visual image created is vague lacking detail.

Patient/participant: They burnt down my father's shop. I saw it erm I can't remember the time but we were sleeping.	1

Time and Place Details

Time and place details is the amount of contextual information that places the memory in time and place, including people (e.g., close relationships) and life events (e.g., moving schools). Time and place details are operationalised as the amount of clarity, specificity, and contextual information of the time and place details of the memory during recall.

Scoring advice for this section is the more specific the description and anything that adds contextual information related to the person's life at the time, the higher it scores.

Patient/participant: Erm, so when the attack happened, I was twenty it happened near my home on Church Street, I erm think in the evening probably around 8 pm as it was still light, so I think it was in the summer.	4

4. A rich, highly specific, clear, and detailed recall of the event which places it in a specific time and place by including an estimated time (e.g., year, season, time, month, day), place (e.g., location, county, city, street, building/outside, detail of room), and important people or events happening at the time in the person's life. If the person provides either a specific time and place or is more general but provides 3/4 areas (e.g., time, people, event) score a 4.

3. A detailed description that gives a clear and detailed recall of the event, but falls short of scoring a 3, as the recall may not include a specific time, or place the event occurred. Information on people and life events at the time can be scored, if only 2/4 areas are present score a 3.

2. A general description that can orientate to time and/or place, but lacks depth and specificity (e.g., “It happened in the summer”; “It was when my mum was ill”).

1. A weak unspecific recall that does not include a time or place detail, either a time and place detail regardless of specificity is needed to achieve a score of 1.

Patient/participant: Erm, so it happened some time erm a few years ago erm I’m….. not too sure	1

Emotional Distancing

Emotional distancing is the amount the person distances themselves from the emotions of the event. It is operationalised as the extent that a person attempts to distance themselves from the emotional experience of the memory when recalled. This area is reverse scored, as the more the person attempts to distance themselves from the memory the higher the score. A higher score will be very distanced from any emotion and for example may label thoughts instead of naming an emotion, whereas a low score would be a very open recall of the event where the person is able to explain how they felt at the time. If the person names an emotion at the time of recalling the memory in the session (in the here and now) this can also be scored if the person links it to the event they experienced.

If the person mentions a lack of/not feeling an emotion in the initial recall transcript e.g., “I was not scared” this is to be considered emotional distancing and should score a 4. If the patient/participant mentions a lack of emotion in the second recall transcript e.g., “I was scared then, but I am not now”, this could be due to the memory being processed and should be scored appropriately. If the person is crying during the narration, it is seen as them showing their emotion and should score a 2 and below.

An emotion in the coding tool is based on Plutchik’s (1982) theory of emotions, the emotions assessed are: anger, fear, sadness, disgust, surprise, anticipation, trust, and joy. This theory was chosen due to it giving eight emotions and therefore a wider breadth for the coder to be able to score. If a patient/participant names one of the emotions labelled in Plutchik’s theory, it will be scored as a 3 and below as they have identified an emotion. If a patient/participant uses a synonym, idiolect, or colloquium that the coder is able to identify as being related to one of Plutchik’s (1982) emotions it may be scored as a 3 and below.

If a patient/participant names a secondary emotion for example experiencing shame as a result of their anger, it may be scored as a 3 and below. If a patient/participant names a self-conscious emotion (empathy, pride, shame, guilt, and embarrassment) score a 3 and below.

Patient/participant: Erm, so when the attack happened, I just thought It was bad, I haven't thought about it too much since it happened.	4

4. No emotion mentioned when recalling the event, or if a person mentions a lack of emotion e.g. "I wasn't scared".

3. An account which may name an emotion that the person experienced at the time but does not explore it in detail, or the emotion is minimised. E.g., "The attack didn't really make me feel scared".

2. A detailed account that names the emotion(s) experienced at the time of the event, but where the person may appear hesitant to describe/discuss the emotion in detail. The narration lacks a description of why person felt the way they did.

1. A rich, highly detailed recall of the emotion(s) experienced at the time of the event. The recall gives a strong sense of emotional context, describing why the person felt the way they did, and the emotion does not appear to be minimised.

Patient/participant: Erm, so when the attack happened it terrified me, I was scared because he had a knife, I noticed my heart was pounding and I needed to escape because I thought I was going to die.	1

Sensory Details

Sensory details are the amount of sensory detail recalled of the event, while it can include aspects of visual imagery, this should be scored for the vividness category. Sensory details are operationalised as the amount of sensory details (auditory, tactile, olfactory, gustatory details, and body position) that is recalled of the event. To score this category the patient/participant does not need to label the sensory information in the first person, if the patient/participant references sensory information it should be scored e.g., "there was so much yelling"; "the house was quiet".

Patient/participant: The man who attacked me was a big man and but he was wearing a hoody so I couldn't see him properly. I just remember I heard some footsteps behind me and then he grabbed me from behind. As he grabbed me, he spun me around and	4

punched me in the face which made my mouth and nosebleed so I could taste blood. It made my eyes water so I couldn't see much other than the black hoody he was wearing, I just remember the man had a strong smell of cologne.	

4. A rich, highly detailed recall of the event accounting for at least three of the senses (apart from visual), giving a sense of re-experiencing.

3. A detailed description that is not as detailed as a score of 3. The recall includes at least two of the senses and gives a sense of re-experiencing.

2. A description that is generally lacking in sensory details as it only includes one of the senses.

1. A description that is lacking in any sensory information.

Patient/participant: I don't really remember much from the attack, it all happened so fast I just think I saw he was wearing a black hoody.	1

Fragmentation

Fragmentation is informed by Foa et al. (1995) and Jaeger et al. (2014) as unfinished thoughts e.g. "So then...", repetition of words within the same phrase e.g. My my my head my head was spinning", speech filler counted on each individual occasion e.g. "Um….er". This AMBIA is reverse coded as the higher the score, the more fragmentated the recall.

Patient/participant: So erm erm erm so the attack the man….the man….. the man… urm… the attack they……so…. I…erm ….. was attacked….	4

4. A fragmentated account is one that is laden with unfinished thoughts, repetition of words, and speech fillers. The coder is not able to understand the recalled event and the fluency of the event is poor.

3. An account that is mainly full of the use of unfinished thoughts, repetition of words, and speech fillers. The coder is able to have a vague understanding of the event, the fluency of the event is ok.

2. An account that has little use of unfinished thoughts, repetition of words, and speech fillers. The event is able to be understood but has minor fluency issues.

1. There are the infrequent use unfinished thoughts, repetition of words, and speech fillers. Generally, the event is able to be understood and is explained well with little fluency issues.

Patient/participant: So erm the man who attacked me was a big man… erm he was big but he was wearing a hoody so I couldn't see him properly. I just remember I heard some footsteps behind me and then he grabbed me from behind. So he grabbed me from behind and as he grabbed me……. he spun me around and ermm punched... punched me in the face which made my mouth and nosebleed so I could taste blood. Erm……It made my eyes water so I couldn't see much other than the black hoody he was wearing, yeah it was a black hoody he was wearing, I just remember the man had a strong smell of cologne.	1

Disorganisation

Disorganisation is informed by Harvey and Bryant (1999) and Jaeger et al. (2014) as repetition of phrases following each other in narrative e.g. "I couldn't get away... I couldn't get away", confusion e.g. "I don't know how I got up", and disjointedness e.g. "He I was go brought with over". This ABMIA is reverse coded as the higher the score, the more disorganised the recall.

Patient/participant: So erm erm so the attack the man….the man….. the man… urm… he grabbed and punched me, he grabbed and punched me……so…. I…erm ….. was attacked…. and on the floor I don't know what happened	4

4. A disorganised account is one that is laden with repeated phrases, confusion, and disjointedness. The coder is not able to understand the recalled event and the fluency of the event is poor.

3. An account that is mainly full of the use of repeated phrases, confusion, and disjointedness. The coder is able to have a vague understanding of the event, the fluency of the event is ok.

2. An account that has little use of repeated phrases, confusion, and disjointedness. The event is able to be understood but has minor fluency issues.

1. There is the infrequent use repeated phrases, confusion, and disjointedness. Generally, the event is able to be understood and is explained well with little fluency issues.

Patient/participant: So erm the man who attacked me was a big man, he was big but he was wearing a hoody so I couldn't see him properly. I just remember I heard some footsteps behind me and then he grabbed me from behind, he grabbed me from behind and as he grabbed me……. he spun me around and ermm punched... punched me in the face, I wasn't sure what happened but it made my mouth and nosebleed so I could taste blood. Erm……It made my eyes water so I couldn't see much other than the black hoody he was wearing……the black hoody he was wearing, I just remember the man had a strong smell of cologne.	1

Total Word Count of Narratives

Total word count of narratives will also be collected and analysed as Gray and Lombardo (2001) found that there were differences between non-trauma and trauma narratives, as trauma narratives tended to be longer. This may be explained in part due to them being more fragmented and disorganised (Gray & Lombardo, 2001), and it would be interesting to see the effect of therapy on the total word count. Collecting the total word count will also allow the coder to assess the total percentage of area covered in a transcript and calculate the total score.

Narrative Coherence

Narrative Coherence is operationalised as if a storyline is coherent and following a logical story in a specific time and place as opposed to it being fragmented (Boyacioglu & Akfirat, 2015; Sutin & Robins, 2007). Gray and Lombardo (2001) found that researchers reported seeing more fragmented and disorganised accounts of trauma, before becoming more coherent, organised, and detailed as therapy progressed.

Therefore, Narrative Coherence is marked categorically as either improved or not. For Narrative Coherence to have improved the overall average scores from the Fragmentation, and Disorganisation need to be lower on the second narration and Time and Place Details must have increased on the second narration. All three criteria must be met to mark an improvement in Narrative Coherence.

References

American Psychiatric Association. (2013). *Diagnostic and statistical Manual of mental disorders. (5th Ed.).* https://doi.org/10.1108/rr-10-2013-0256.

Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: A revisit with new data and methods. *Science*, *313*(5789), 979–982. https://doi.org/10.1126/science.1128944

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress 8*(4),675-690. https://doi.org/10.1002/jts.2490080409

Frustaci, A., Lanza, G. A., Fernandez, I., di Giannantonio, M., & Pozzi, G. (2010). Changes in psychological symptoms and heart rate variability during EMDR treatment: A case series of subthreshold PTSD. *Journal of EMDR Practice and Research*, *4*(1), 3. https://doi.org/10.1891/1933-3196.4.1.3

Gray, M. J., & Lombardo, T. W. (2001). Complexity of trauma narratives as an index of fragmented memory in PTSD: A critical analysis. *Applied Cognitive Psychology*, *15*(7), S171–S186. https://doi.org/10.1002/acp.840

Jaeger, J., Lindblom, K. M., Parker-Guilbert, K., & Zoellner, L. A. (2014). Trauma narratives: It's what you say, not how you say it. *Psychological Trauma: Theory, Research, Practice and Policy*, *6*(5), 473–481. https://doi.org/10.1037/a0035239

Kangaslampi, S.. & Peltonen, K. (2019). Changes in traumatic memories and posttraumatic cognitions associate with PTSD symptom improvement in treatment of multiply traumatized children and adolescents. *Journal of Child & Adolescent Trauma, 13,* 103–112. https://doi.org/10.1007/s40653-019-00255-3

Kopelman, M. D., Wilson, B. A., & Baddeley, A. D. (1989). The autobiographical memory interview: A new assessment of autobiographical and personal semantic memory in amnesic patient/participants. *Journal of Clinical and Experimental Neuropsychology*, *11*(5), 724-744. https://doi.org/10.1080/016886389400928

Kovach, C. R. (1993). Development and testing of the autobiographical memory coding tool. *Journal of Advanced Nursing*, *18*(4), 669-674. https://doi.org/10.1046/j.1365-2648.1993.18040669.x

Lane, S. (2019). *Using narrative exposure therapy to treat women with a history of intimate partner violence for post-traumatic stress. A series of single case studies***.** **(**Unpublished doctoral dissertation). University of Nottingham, Nottingham.

Lely, J. C., Smid, G. E., Jongedijk, R. A.,W. Knipscheer, J., & Kleber, R. J. (2019). The effectiveness of narrative exposure therapy: A review, meta-analysis and meta-

regression analysis. *European Journal of Psychotraumatology, 10*(1), 1550344. https://doi.org/10.1080/20008198.2018.1550344

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging*, *17*(4), 677-689. https://doi.org/10.1037/0882-7974.17.4.677

Malins, S., Moghaddam, N., Morriss, R., Schröder, T., Brown, P., & Boycott, N. (2020). Predicting outcomes and sudden gains from initial in-session interactions during remote cognitive-behavioural therapy for severe health anxiety. *Clinical Psychology & Psychotherapy*, 10.1002/cpp.2543. Advance online publication. https://doi.org/10.1002/cpp.2543

McKinnon, A., Brewer, N., Meiser-Stedman, R., & Nixon, R. D. V. (2017). Trauma memory characteristics and the development of acute stress disorder and post-traumatic stress disorder in youth. *Journal of Behavior Therapy and Experimental Psychiatry,* 54, 112–119. https://doi.org/10.1016/j.jbtep.2016.07.009.

Mørkved, N., Hartmann, K., Aarsheim, L. M., Holen, D., Milde, A.M., Bomyea, J., & Thorp, S.R. (2014). A comparison of narrative exposure therapy and prolonged exposure therapy for PTSD. *Clinical Psychology Review*, 34(6), 453-467. https://doi.org/10.1016/j.cpr.2014.06.005

Pasupathi, M., Mansour, E., & Brubaker, J. R. (2007). Developing a life story: Constructing relations between self and experience in autobiographical narratives. *Human Development, 50*(2-3), 85–110. https://doi.org/10.1159/000100939

Plutchik R. (1982) A psychoevolutionary theory of emotions. *Social Science Information, 21*, 529-553. https://doi.org/10.1177/053901882021004003

Schauer, M., Neuner, F., & Elbert, T. (2011). *Narrative exposure therapy: A short-term treatment for traumatic stress disorders* (2nd rev. and expanded ed.). Hogrefe Publishing

Sumner, J. A., Mineka, S., & McAdams, D. P. (2013). Specificity in autobiographical memory narratives correlates with performance on the autobiographical memory test and prospectively predicts depressive symptoms. *Memory*, *21*(6), 646-656. https://doi.org/10.1080/09658211.2012.746372

van der Kolk, B., A, & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress 8*(4) 505-525. https://doi.org/10.1002/jts.2490080402

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology, 95*(2), 144-149. https://doi.org/10.1037/0021-843x.95.2.144

World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics* (11th Revision). https://icd.who.int/browse11/l-m/en

Zalta A. K. (2015). Psychological mechanisms of effective cognitive-behavioral treatments for PTSD. *Current Psychiatry Reports*, *17*(4), 560. https://doi.org/10.1007/s11920-015-0560-6

Appendices

Appendix 1: Autobiographical Memory Integration Areas (AMBIA) Summary and Scoring Sheet

ABMIA	Area Summary	+4	1
Vividness	The level of detail and clarity of the visual image the person can convey when recalling the event.	A rich, highly detailed description of the event which gives a sense of clear recall. The person is able to give a strong recollection the event in detail and explain it so one can have a strong visual image of the event and the location it took place, this will be through describing colours, peoples features etc. To score a 4 the description has to mention the visual image “the sky was red everywhere”.	A recall of the event, lacking detail, giving no strong sense of recall. The visual image created is vague lacking detail.
Time and Place Details	The amount of clarity and specificity of the time and place details of the memory during recall.	A rich, highly specific, clear, and detailed recall of the event which places it in a specific time and place by including an estimated time (e.g., year, season, time, month, day), place (e.g., location, county, city, street, building/outside, detail of room), and important people or events happening at the time in the person’s life. If the person provides either a specific time and place or is more general but provides 3/4 areas (e.g., time, people, event) score a 4.	A recall that does not include both a time and place detail.

Emotional Distancing	The extent that a person attempts to distances themselves from the emotional experience of the memory when recalled.	No emotion mentioned when recalling the event (Reverse Scored).	The recall gives a strong sense of emotional context, describing why the person felt the way they did, and the emotion does not appear to be minimised (Reverse Scored).
Sensory Details	The amount of sensory details (auditory, tactile, olfactory, gustatory details, and body position) that is recalled of the event. N.B Visual details are scored under vividness.	A rich, highly detailed recall of the event accounting for at least three of the senses (apart from visual), giving a sense of re-experiencing.	A description that is lacking in any sensory information.
Fragmentation	Unfinished thoughts, repetition of words within the same phrase, and speech filler counted on each individual occasion.	Recall is laden with unfinished thoughts, repetition of words, and speech fillers. The coder is not able to understand the recalled event and the fluency of the event is poor (Reverse Scored).	There is the infrequent use of unfinished thoughts, repetition of words, and speech fillers. Generally, the event is able to be understood and is explained well with little fluency issues (Reverse Scored).
Disorganisation	Repetition of phrases following each other, confusion, and disjointedness.	A disorganised account is one that is laden with repeated phrases, confusion, and disjointedness. The coder is not able to understand the recalled event and the fluency of the event is poor (Reverse Scored).	There is the infrequent use of repeated phrases, confusion, and disjointedness. Generally, the event is able to be understood and is explained well with little fluency issues (Reverse Scored).
Total Word Count of Narratives	Total Number of Words in the transcript.	N/A.	N/A.
Narrative Coherence	If the recall is coherent or disjointed and following a logical story in a specific time and place. For Narrative Coherence to have improved the overall average scores	N/A.	N/A.

	from the Fragmentation, and Disorganisation need to be lower on the second narration and Time and Place Details must have increased on the second narration. All three criteria must be met to mark an improvement in Narrative Coherence.		

Appendix 2: ABMIA Scoring Sheet

Instructions: As total word count of the transcripts is to be recorded, this allows for the coder to assess the percentage of the areas covered in the transcript. The researcher will be able to count every word used when an area is discussed and combine every instance of when an area is discussed and then divide this number by the total word count. This will give the percentage of the transcript that is coded to a specific area. Recording the word count of each area assessed will also prove the researcher with the proportion of the transcript coded for certain areas, therefore the researcher would be able to see what percentage of one area of the transcript is coded for by dividing it from the total word count. This will then allow for the researcher to score the segment of the transcript. For example, if 10% of the transcript is coded as Time and Place Details with a score of +2, the researcher would multiple these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each area, the average score for each area should be calculated.

N.B. Please calculate to two decimal places; RS= Reverse Scored

ABMIA	Score	Total Word Count	Percentage (word count/total transcript word count)	Total AMBIA Score (score x percentage)	Overall ABMIA Score (sum of total AMBIA score/4)
Vividness	4				
	3				
	2				
	1				
Time and Place Details	4				
	3				
	2				
	1				
Emotional Distancing (RS)	4				
	3				
	2				

	1				
Sensory Details	4				
	3				
	2				
	1				
Fragmentation (RS)	4				
	3				
	2				
	1				
Disorganisation (RS)	4				
	3				
	2				
	1				

Appendix 3: Pre and Post Comparison Tool

Adapted Coding Framework Scoring Tool

Comparison Tool

Participant		
Trauma Narrative	First- total word count:	Second- total word count:
Vividness		
Time and Place Details		
Emotional Distancing (RS)		
Sensory Details		
Disorganisation (RS)		
Repetition of Phrases		
Confusion		
Disjointedness		
Total Words and Score	Words= Score=	Words= Score=
Fragmentation (RS)		
Unfinished Thoughts		
Repetition of Words		
Speech Filler		
Total Words and Score	Words= Score=	Words= Score=
Narrative Coherence (yes/no)		

Note: RS= Reverse Scored

Appendix B: Research Ethics Committee Favourable Opinion Letter

NHS
Health Research Authority

East Midlands - Derby Research Ethics Committee
Equinox House
City Link
Nottingham
NG2 4LA

Please note: This is the favourable opinion of the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

31 August 2021

Dr Thomas Schröder
Division of Psychiatry and Applied Psychology,
School of Medicine, University of Nottingham,
B12 YANG Fujia Building, Jubilee Campus,
NG8 1BB

Dear Dr Schröder

Study title:	**Exposing Narrative Exposure Therapy: A series of single case studies**
REC reference:	**21/EM/0172**
Protocol number:	**21041**
IRAS project ID:	**295623**

Thank you for your letter of 13 August 2021, responding to the Research Ethics Committee's (REC) request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Appendix C: Health Research Authority Approval Letter

Dr Thomas Schröder
Division of Psychiatry and Applied Psychology,
School of Medicine, University of Nottingham,
B12 YANG Fujia Building, Jubilee Campus,
NG8 1BB

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

01 September 2021

Dear Dr Schröder

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**Exposing Narrative Exposure Therapy: A series of single case studies**
IRAS project ID:	**295623**
Protocol number:	**21041**
REC reference:	**21/EM/0172**
Sponsor	**University of Nottingham**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Appendix D: University of Nottingham Ethics Approval

University of Nottingham
UK | CHINA | MALAYSIA

Research and Innovation
University of Nottingham
East Atrium, Jubilee Conference Centre
Triumph Road
Nottingham
NG8 1DH

Our reference: R&I: 21041
IRAS Project ID: 295623

0115 8467906
sponsor@nottingham.ac.uk

Health Research Authority
Research Ethics Committee

Prof Thomas Schröder
Trent Doctorate in Clinical Psychology
Room B12, YANG Fujia Building
Jubilee Campus
Division of Psychiatry and Applied Psychology
School of Medicine, University of Nottingham
Wollaton Road
Nottingham
NG8 1BB

25th May 2021

Dear Sir or Madam,

Sponsorship Statement

Re: *Exposing Narrative Exposure Therapy: A series of single case studies*

I can confirm that this research proposal has been discussed with the Chief Investigator and agreement to sponsor the research is in place.

An appropriate process of scientific critique has demonstrated that this research proposal is worthwhile and of high scientific quality.*

Any necessary indemnity or insurance arrangements will be in place before this research starts. Arrangements will be in place before the study starts for the research team to access resources and support to deliver the research as proposed.

Wording has been included in the participant information sheets to address the requirements of GDPR for transparency information and has been drafted by the sponsor to ensure consistency and compliance with the University's privacy notice, HRA guidance and the expectations of other organisations, therefore the HRA template wording has not been used verbatim.

Arrangements to allocate responsibilities for the management, monitoring and reporting of the research will be in place before the research starts.

The duties of sponsors set out in the UK Policy Framework for Health and Social Care Research will be undertaken in relation to this research.**

* Not applicable to student research (except doctoral research).
** Not applicable to research outside the scope of the Research Governance Framework.

Yours faithfully

Angela Shone
Head of Research Governance
University of Nottingham

world-changing research
from The University of Nottingham

Appendix E: Confirmation of Support from Trust's Research and Development Team

From: Research and Evidence Team <Research@nottshc.nhs.uk>
Sent: 22 September 2021 16:34
To: Lord Jackson - Trainee Clinical Psychologist
Cc: sponsor@nottingham.ac.uk; SCHRODER Thomas - Visiting Therapist <T >
Subject: C&C Sign-off - ABMI - Jackson Lord

Dear Study Team

Study: Autobiographical Memory Integration Components of Narrative Exposure Therapy – Jackson Lord – EDGE: 141516

Please accept this email as formal confirmation that Nottinghamshire Healthcare NHS Foundation Trust have the capability and capacity to conduct this research in line with the attached signed mNCA agreement.

I have attached a copy of the signed agreement for your records. If you haven't already signed the document can you please return it to us as a fully signed copy before the study begins.

Can you please confirm a date for the study to commence.

I wish you every success for your study.

Wendy
Wendy Smith
Research and Evidence Governance Facilitator
Research and Evidence Department
Nottinghamshire Healthcare NHS Foundation Trust
Duncan Macmillan House
Porchester Road
Nottingham
NG3 6AA

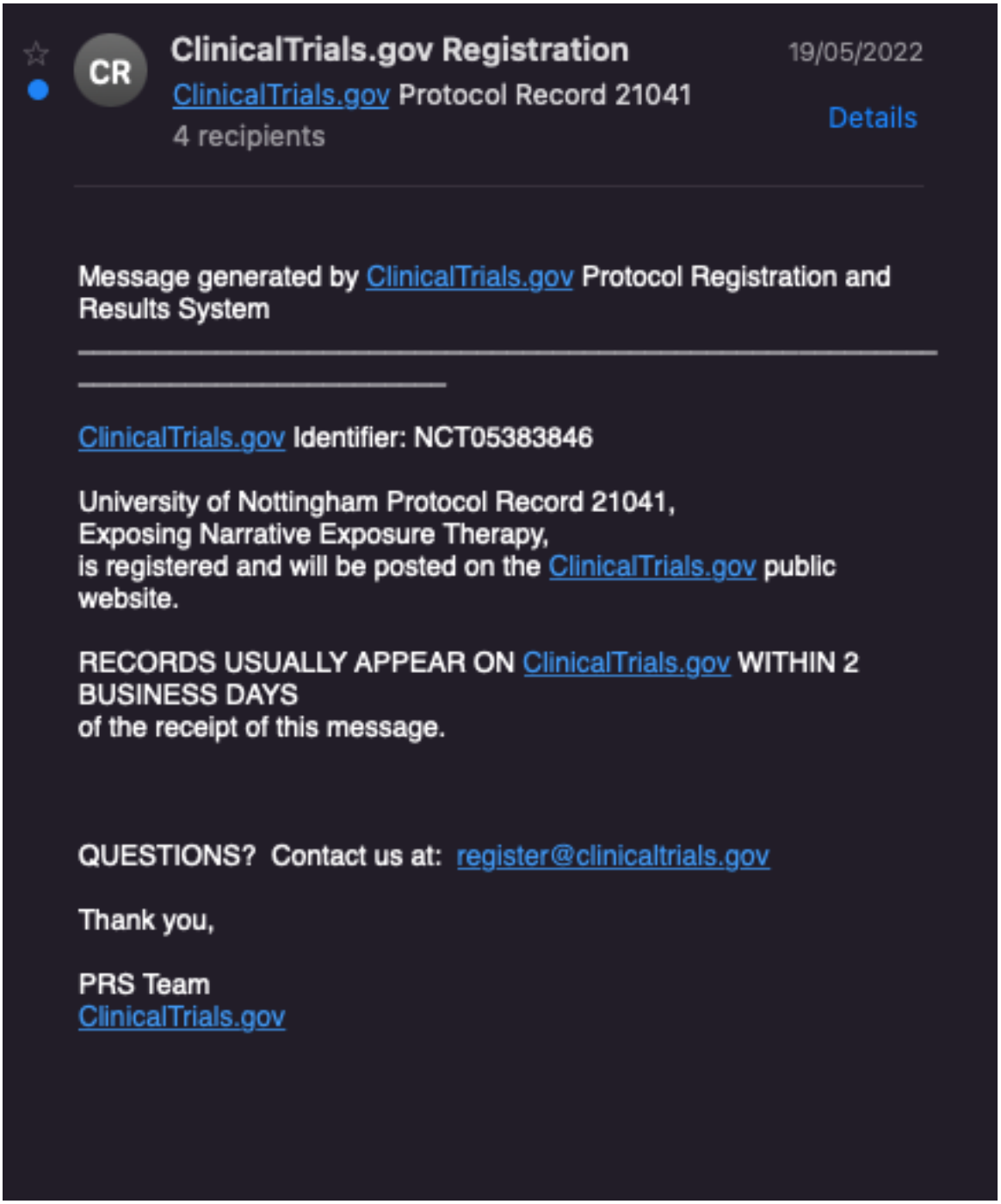
Email: wendy.smith2@nottshc.nhs.uk
Email: Generic inbox: research@nottshc.nhs.uk

https://connect/research-and-evidence
www.nottinghamshirehealthcare.nhs.uk

Making a Difference
Trust Honesty Respect Compassion Teamwork

RESEARCH AND EVIDENCE: Engaging and enthusing everyone to deliver evidence based care at all times

Appendix F: Clinical Trails Registration E-mail



CR

ClinicalTrials.gov Registration 19/05/2022

ClinicalTrials.gov Protocol Record 21041

4 recipients Details

Message generated by ClinicalTrials.gov Protocol Registration and Results System

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ClinicalTrials.gov Identifier: NCT05383846

University of Nottingham Protocol Record 21041,
Exposing Narrative Exposure Therapy,
is registered and will be posted on the ClinicalTrials.gov public website.

RECORDS USUALLY APPEAR ON ClinicalTrials.gov WITHIN 2 BUSINESS DAYS
of the receipt of this message.

QUESTIONS? Contact us at: register@clinicaltrials.gov

Thank you,

PRS Team
ClinicalTrials.gov

Appendix G: Participant Information Page

Local Letterhead to be added

Participant Information Sheet
(Final version 1.0: 21/05/21)
IRAS Project ID: 295623

Title of Study: **Exposing Narrative Exposure Therapy: A series of single case studies**

Name of Researcher(s): Jackson Lord, Thomas Schroder, and Rachel Sabin-Farrell
We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. Talk to others about the study if you wish. Ask us if there is anything that is not clear.

What is the purpose of the study?
The purpose of the study is to investigate the mechanisms of change (how the therapy makes an effect) specific to Narrative Exposure Therapy. Narrative Exposure Therapy (NET) is used to treat Complex Post-traumatic Stress Disorder (CPTSD); however, we do not fully understand how it works. Post-traumatic stress disorder (PTSD) can result from being involved or witnessing a traumatic event. Symptoms of PTSD include intrusive images, avoidance of reminders, hypervigilance, and negative thoughts. People who experience multiple traumatic events in their life are more likely to develop PTSD. If the traumatic events were prolonged, repeated and happened when they were young, they are more likely to experience complex PTSD (CPTSD). CPTSD has the same symptoms of PTSD, but also includes difficulty with emotions and relationships.

Why have I been invited?
You are being invited to take part because you are seeking psychological treatment for difficulties related to post traumatic stress. We are inviting four-six participants like you to take part.

Do I have to take part?
It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason. This would not affect your legal rights.

What will happen to me if I take part?

1. If you express an interest to take part in this study, you will be called by Jackson Lord after your assessment at least 24 hours after being given this information sheet. They will then ask if you would like to take part in this study.

2. If you say yes, an appointment will be arranged for you to come into the service to meet the researcher and give your consent. When you come to the service and meet the researcher who is conducting the study (Jackson Lord), you will be able to ask any questions you have about the study prior to signing the consent form. Signing the consent form will enable you to take part in the study, but also give your consent for the sessions to be audio/video recorded. Audio/video recording of sessions is part of routine clinical practice, as it can be used for supervision purposes to ensure and enhance the quality of therapy. All audio/video records will be stored securely on a password protected computer and will only be used for the purposes of this study. Upon completion of the study, all audio/video recording will be destroyed. All sessions recorded will also be transcribed by the person delivering Narrative Exposure Therapy with you (Jackson Lord).

3. If you consent to taking part in the research, you will be asked to complete a few short questionnaires collecting information regarding symptoms of post-traumatic stress and general psychological distress. A copy of these questionnaires will either be posted out to you or you will be e-mailed a link to complete them online before your initial meeting with the researcher, and you will be asked to complete these as close to the day that you had your assessment as possible. You will then also be asked to complete another set of the same questionnaires during the initial meeting appointment, and once more prior to starting the therapy. It is estimated that it should take no longer than twenty minutes to complete all of the session's questionnaires. You will also be asked at the start of therapy to complete a questionnaire to provide demographic (characteristic) information and this should take no longer than ten minutes. The practicalities of therapy (such as times, dates and place of appointments) will then be explained to you by Jackson.

4. Jackson will then arrange to meet you on a regular basis for your therapy. Normally Narrative Exposure Therapy sessions take place weekly and last between 60-90 minutes. The number of sessions you require may vary dependent on your need; however, up to twelve sessions will be offered and reviewed as appropriate. Narrative Exposure Therapy is routinely offered as part of the service and usual clinical care; you may be offered this therapy even if you were not participating in this study. Further expectations, details and the structure of the therapy will be explained to you at your first session; however, you will be expected to attend all appointments at the service to receive the

most benefit from them. During the sessions, you will be asked to complete a few short questionnaires prior to the start of every session and to wear a chest strap (heart rate measuring device) throughout the session. This is to monitor the progress and possible improvements made during therapy, but also to investigate how the therapy possibly makes change(s).

5. The researcher will work in line with the trust's and service's current policies and procedures regarding standard practice related to COVID-19 to ensure the study is covid secure. The recruitment sites are operating a mix of face-to-face and virtual sessions. Given the most recent announcement outlining the countries roadmap and the good progress of the vaccination program it seems the proposed study will be able to be delivered face to face. However, if there is a resurgence of covid and the vaccination program does not have the intended effect, the study may have to move online. If sessions must take place virtually (via Microsoft teams for example), the trusts' policies and procedure regarding data security, anonymity, and confidentially will be followed. If sessions were to take place virtually, it would mean that the heart rate data would not be able to be collected, in this case the researcher will attempt to substitute the measure with a different appropriate measure. If further adaptions are needed these will be discussed with the research team as necessary, before being discussed with you.

6. After completing the therapy, you will be asked to take part in an interview. The interview will take place up to four weeks after completing your final session of therapy. The purpose of the interview is to ask your thoughts and feelings about the therapy, but also to see what parts you found either helpful or unhelpful. This will be done by a person who is not involved in the research process.

Expenses and payments
Participants will not be paid to participate in the study.

What are the possible disadvantages and risks of taking part?
There is the possibility for participants to feel distressed during the therapy sessions, or to feel as if they are getting worse before getting better. However, this is not a difficulty unique to this study as this can be the case with any form of psychological therapy. This is something that will be reviewed on a session-by-session basis with the researcher (Jackson Lord). If your level of distress comes to a point where it is not safe to take part/continue in the study, the continuation of your participation in the research will be discussed with you and you will be supported to find the appropriate level of care/treatment. The additional research components are unlikely to increase distress in participants; however, it may be uncomfortable for some participants to wear a chest strap (the chest strap is adjustable) for 60-90 minutes. If at the end of therapy your difficulties related to post traumatic stress have not improved, you will be offered a review at the service to discuss other treatment

options. If Narrative Exposure Therapy is just one part of your treatment, you will receive the other elements of treatment upon completion of the study.

What are the possible benefits of taking part?
We cannot promise the study will help you, but the information we get from this study may help to gain more understanding on how Narrative Exposure Therapy works and makes change(s). This would help us further understand the therapy, to potentially develop it to make it more effective, and inform future research.

What happens when the research study stops?
The aim upon completing the study is once it has been written-up, that the results will be disseminated in an academic journal. The research team will be happy to give you an overview of the findings once the study has been finished, if you would like to know the results of the study, please e-mail jackson.lord@nottingham.ac.uk, or another member of the research team.

As mentioned previously if Narrative Exposure Therapy is just one part of your treatment, you will receive the other elements of treatment upon completion of the study.

What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. The researchers' contact details are given at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this by contacting the Patient Advice and Liaison Service by writing to: Patient Experience Team, Highbury Hospital, Highbury Road, Nottingham NG6 9DR, or e-mailing PALS@nottshc.nhs.uk or complaints@nottshc.nhs.uk, or phoning: 0115 20993 204542.

In the event that something does go wrong, and you are harmed during the research and this is due to someone's negligence then you may have grounds for a legal action for compensation against the University of Nottingham, but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

Will my taking part in the study be kept confidential?
We will follow ethical and legal practice and all information about you will be handled in confidence.

If you join the study, we will use information collected from you during the course of the research. This information will be kept **strictly confidential**, stored in a secure and locked office, and on a password protected database at the University of Nottingham. Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your

information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights, we will use the minimum personally identifiable information possible.

You can find out more about how we use your information and to read our privacy notice at:

https://www.nottingham.ac.uk/utilities/privacy.aspx.

The data collected for the study will be looked at and stored by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people from regulatory organisations to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty.

The sessions and the final interview after completing therapy will be video/audio recorded. Recording will be taken to ensure the quality of the therapy, but to also allow for transcription of the sessions as part of the research. The transcripts will be anonymised and transcribed by either the researcher or the University's automated transcription service. The service is confidential as it uses automated systems and is secure as all data processed and produced by the service stays on secure servers and only the researcher will have access to it.

The research team will access relevant sections of your medical notes, as this will allow for demographic data to be collected (e.g. age, gender, ethnicity), and also so the researcher can have access to your contact details should they need to contact you. Allowing the researcher to have access to your medical notes will also although them to see the information gathered from the assessment and any other previous contacts with services which will help the researcher understand more about you to tailor your care.

Where possible, information about you which leaves the research site will have your name and address removed, meaning it will be anonymised and a unique code will be used so that you cannot be recognised from it. However, sometimes we need to ensure that we can recognise you to link the research data with your medical records so in these instances we will need to know your name and date of birth.

Your contact information will be kept by the University of Nottingham for up to twelve months after the end of the study so that we are able to contact you about the findings of the study and possible follow-up studies (unless you advise us that you do not wish to be contacted). This information will be kept separately from the research data collected and only those who need to will have access to it.

After completing the study your personal information (name, address, telephone, and audio/video recordings), will be held for a 6-12-month period and then destroyed. Your personal information will be kept separately from the data collected as part of the research, and only those who will need to have access to the data will be able to do so. The transcribed narratives collected at the end of your therapy will be stored as part of your medical records. All other data collected as part of your therapy, such

as anonymised narratives, photos of the lifeline, and questionnaire data will be kept securely for 7 years. After this time your data will be disposed of securely. During this time all precautions will be taken by all those involved to maintain your confidentiality, only members of the research team given permission by the data custodian will have access to your personal data.

In accordance with the University of Nottingham's, the Government's and our funders' policies we may share our research data with researchers in other Universities and organisations, including those in other countries, for research in health and social care. Sharing research data is important to allow peer scrutiny, re-use (and therefore avoiding duplication of research) and to understand the bigger picture in particular areas of research. Data sharing in this way is usually anonymised (so that you could not be identified) but if we need to share identifiable information, we will seek your consent for this and ensure it is secure. If this is the case, you will then be made aware if the data is to be shared with countries whose data protection laws differ to those of the UK, and how we will endeavour to protect your confidentiality.

The limits of confidentiality within therapy will be explained to you in session. What you discuss in therapy is confidential between you and the researcher/therapist. The researcher/therapist will have regular supervision, where they may discuss your sessions, but this is to ensure you receive the best care possible. Although what you say to us is confidential, should you disclose anything to us which we feel puts you or anyone else at any risk, we may feel it necessary to report this to the appropriate persons.

As the study takes place within an NHS service, clinical records will be taken as part of the service's routine care and stored securely in accordance with the trust policies and procedures.

What will happen if I don't want to carry on with the study?
Your participation is voluntary, and you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you decide to withdraw from the study, it may not be possible for the data previously collected to be extracted from the analysis and destroyed. If you withdraw we will no longer collect any information about you or from you, but we will keep the information about you that we have already obtained as this information may have already been used in some analyses and may still be used in the final study analyses. To safeguard your rights, we will use the minimum personally identifiable information possible.

Withdrawing from the study will not impact your care or treatment options as NET is routinely offered in the service. If you want to withdraw from the study, but not your treatment, you will move to another member of the care team to continue treatment.

Involvement of the General Practitioner/Family doctor (GP)
As part of your routine care after your assessment, your GP (with your consent) will be informed that you are engaging in psychological therapies. They will be informed that you are receiving Narrative Exposure Therapy as part of a research study and

the outcome of the therapy. The only other time your GP would be contacted without your consent, is to inform them of any concerns of the welfare of yourself or others.

What will happen to the results of the research study?
The aim upon completing the study is once it has been written-up, that the results will be disseminated in an academic journal; hopefully within a year of the study ending. All participant information published will be anonymised to retain confidentiality.

The research team will be happy to give you an overview of the findings once the study has been finished, if you would like to know the results of the study, please e-mail jackson.lord@nottingham.ac.uk, or another member of the research team.

Who is organising and funding the research?
This research is being organised by the University of Nottingham and is being funded by Health Education England and the Trent Doctoral course in Clinical Psychology.

Who has reviewed the study?
All research in healthcare is looked at by independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by Derby REC Committee. The study has also been internally reviewed by the University Research Governance team and also the Division of Psychiatry and Applied Psychology at the University of Nottingham.

Further information and contact details

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NG8 1DH

(N.B. Contact details removed from this copy).

Appendix H: Participant Consent Page

(Form to be printed on local headed paper)

CONSENT FORM
(Final Version 1.0: 21/05/21)

Title of Study: Exposing Narrative Exposure Therapy: A series of single case studies

IRAS Project ID: 295623

Name of Researcher: Jackson Lord, Thomas Schroder, Rachel Sabin-Farrell

Name of Participant: **Please initial box**

1. I confirm that I have read and understand the information sheet version number 1 dated 21/5/20 for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis. If you withdraw, we will no longer collect any information about you or from you, but we will keep the information about you that we have already collected. ☐

3. I understand that relevant sections of my medical notes and data collected in the study may be looked at by authorised individuals from the University of Nottingham, the research group and regulatory authorities where it is relevant to my taking part in this study. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential. ☐

4. I consent to video/audio recordings being made of the therapy sessions and these may be shared with a member of the research team who is helping the lead researcher. I understand that anonymised direct quotes may be taken from these recordings, or from the interview at the end of therapy to be used in the study results. ☐

5. I consent to wearing a chest strap (heart rate measuring device) during sessions. ☐

6. I agree to my GP being informed of my participation in the study. ☐

7. I have had the opportunity to ask questions and I agree to take part in the above study. ☐

_____	_____	_____
Name of Participant	**Date**	**Signature**
_____	_____	_____
Name of Person taking consent	**Date**	**Signature**

Appendix I: Participant Consent to Contact Page

(Form to be printed on local headed paper)

CONSENT TO BE CONTACTED FORM
(Final Version 1.0: 21/05/21)

Title of Study: Exposing Narrative Exposure Therapy: A series of single case studies

IRAS Project ID: 295623

Name(s) of Researcher: Jackson Lord, Thomas Schroder, Rachel Sabin-Farrell

Name of Participant: **Please initial box**

1. I confirm that I have read and understand the information sheet version number 1 dated 16/5/21 for the above study and have had the opportunity to ask questions. ☐

2. I give my consent for my contact details to be passed onto a member of the research team, and I allow them to use my details to contact me to discuss the study. ☐

_____	_____	_____	_____
Name of Participant	**Date**	**Signature**	**Phone Number**

_____	_____	_____
Name of Person taking consent	**Date**	**Signature**

Appendix J: Participant Debrief Page

University of Nottingham
UK | CHINA | MALAYSIA

PARTICIPANT DEBRIEF FORM

(Final version 1.0: date 21/05/21)

Title of Study: Exposing Narrative Exposure Therapy: A series of single case studies

IRAS Project ID: 295623

Name of Researcher: Jackson Lord, Thomas Schroder, Rachel Sabin-Farrell

Thank you for taking part in the study which has looked at the proposed mechanisms of change (how the therapy makes its change/works) in Narrative Exposure Therapy.

Any personal information that you have provided as part of the study will remain confidential; the data that has been analysed as part of the study will be anonymous. If you would like a copy of the results once they have been analysed, interpreted and written up, we would be able to send you a copy. If you would like a copy, please contact a member of the research team on the details provided below.

If you have any further questions, please feel free to contact the lead researcher or supervisors on the contact details provided below. If you have experienced any distress as a result of the study, that you do not want to discuss with us, please seek support and advice on the helpline(s) below:

Samaritans: ring 116123 (for free), or e-mail jo@samaritians.org, or visit https://www.samaritans.org

More details of relevant support agencies/teams can be found on: https://www.nhs.uk/conditions/stress-anxiety-depression/mental-health-helplines/

<u>Contact Details of Research Team:</u>

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(N.B. Contact details removed from this copy).

Appendix K: Template Fidelity Check Form

Quality Check: Psychoeducation session

Session no.	**1**
Review of therapy purpose and session overview	yes/no
Normalises, legitimises, and names trauma reactions and symptoms.	Scale
Explains defence cascade	yes/no
Explains difference between 'hot' and 'cold' memories.	yes/no
Explains NET processes, i.e., habituation through exposure and autobiographical integration.	yes/no
Explains overview of therapy sessions (e.g., content, number, length of sessions etc.).	yes/no
Discusses possible negative reactions and adverse events.	yes/no
Discusses expectations re not interrupting exposure and highlights rationale.	yes/no
Explains written narrative (testimony).	yes/no
Invites questions and comments.	Scale
Safety planning: E.G. local emergency and crisis contacts.	yes/no
Safety planning: Discusses anti-dissociation/grounding strategies.	yes/no

0 = never, 1 = sometimes, 2 = often, 3 = most of the time, 4 = always. ✓= yes, × = no

Criterion for face-to-face delivery:
Both scaled items are scored above 2 **and** no more than 2 items (20%) scored × = no

Quality Check: Lifeline session

Session no.	**2**
Review of lifeline instructions, including meaning of the flowers and stones.	yes/no
Reminder of lifeline purpose and difference with narration sessions (i.e., 'bird's eye view' versus exposure through detailed narration)	yes/no
Facilitates building of the lifeline chronologically.	Scale
Facilitates labelling of events	Scale
Asks appropriate questions about events (e.g., when and where).	Scale
Deviations from task are appropriately managed.	Scale
Invites reflection on the overall lifeline and process.	yes/no
Review of how the lifeline will be used in future sessions & invites questions.	yes/no

0 = never, 1 = sometimes, 2 = often, 3 = most of the time, 4 = always. ✓= yes, × = no

Criterion:
No more than 1 occasion (25%) of × = no and no item scored below 3

Quality Check: Narration sessions

Session no.	
Event (Stone, Flower)	
Re-narration: Further details/corrections elicited	Scale
Re-narration: Further processing not interrupted	Scale
General context elicited.	Scale
Event-specific details elicited.	Scale
Not stopping a session during the height of fear and anxiety	yes/no
Staying in trauma narration until arousal has subsided.	Scale
Past AND current feelings/physical sensations elicited.	Scale
Avoidance and dissociation prevented/managed.	Scale
Chronology adhered to (preventing going back and forth in time).	Scale
Not mixing exposure and closure	Scale
Narration ends at a 'point of safety'.	yes/no

0 = never/not, 1 = sometimes/a little, 2 = often/partially, 3 = most of the time/mostly, 4 = always/fully.

✓= yes, × = no

Criterion: × = 0 **and** 7 (78%) scaled items rated 3 or above

Appendix L: Change Interview Schedule

(Final version 1.0: 21/05/21)
IRAS Project ID: 295623

Change Interview Schedule

Interviewer introduces themselves and states: “After completing your therapy with Jackson, I would like to ask you some questions to find out your thoughts about it. I have several questions that I will ask you as part of the interview, and I would like you to answer the questions in as much detail as you possibly can. Please be aware today’s appointment, is not a therapy session, as such we will not be discussing your difficulties. The plan for today’s appointment will be to go through the following questions that I have here (participant provided with copy of questions), is that ok? [wait for participant’s response] Do you have any questions?” [answer participant’s response]

“Before we start the interview, I would like to complete these two questionnaires that you may remember from your therapy sessions” [interviewer provides participant with copies of IES-R and DASS-21 and waits for them to be completed].

Interview thanks person for completing questionnaires, reminds person we are not here for discussing difficulties and starts interview by stating: “Thank you, let us get started”.

General Questions:

- How have you been feeling generally?

Acceptability/Feasibility Questions:

- Looking back, what was therapy like for you as a whole?
- You were specifically asked to freely narrate a trauma before then re-narrating it with the help of the therapist in session, normally, how was this for you?
- How was it to hear someone re-read your previous session’s narrative to you each session?
- NET has a psychoeducation session, this is where Jackson will have explained to you what happens in our minds and body when we experience traumatic stress and how therapy is meant to help with that, did it make sense to you?
    - Can you recall any of it? And if so, what was the most important aspect of it?
- What was it like to talk about the contextual details (e.g. specific details of each event such as the room/time) of each traumatic event?
- Given the time limited and structured nature of NET, how was that for you?

Change Questions:

- Have you noticed any positive or negative change(s) during and after therapy?
- Was there any specific point in therapy (e.g. session number, or introduction of intervention) where you noticed a change(s)?
- If you have noticed any change(s), how important is this to you?

- If you have noticed a change, what aspect of therapy do you feel was the most important to cause the change?
- Do you feel the change was due to the techniques used in the therapy, or other significant factors in your life? (e.g. relationship with therapist, changes in factors outside of therapy)

Participant Resources:

- What personal strengths/aspects of your life do you feel has helped you to make use of the therapy?

Helpful Aspects Questions:

- What were the helpful aspects of therapy?
- Was there any aspect of the therapy which you feel could be added to make it more helpful?
- Compared to other trauma-based therapies, what made this therapy more helpful (if appropriate)

Unhelpful Aspects Questions:

- What were the unhelpful aspects of therapy?
- Was there either an aspect or time in therapy that you feel you could not carry on? And why/what this? If so, what helped you complete the therapy?

Finishing Questions:

- Was there anything during the therapy that took you by surprise or was unexpected?
- If you could make any changes to the therapy, what would they be?

End the interview by thanking the participant for their time and asking the participant if they have any questions. If the participant expresses any problematic feelings or risk direct them to their GP, crisis service and debrief sheet. If the participant asks a question you feel unable to answer, inform them you will direct the question to the researcher and supervisors involved.

Appendix M: ABMICT Scoring Templates

ABMIA Scoring Sheet

Instructions: As total word count of the transcripts is to be recorded, this allows for the coder to assess the percentage of the areas covered in the transcript. The researcher will be able to count every word used when an area is discussed and combine every instance of when an area is discussed and then divide this number by the total word count. This will give the percentage of the transcript that is coded to a specific area. Recording the word count of each area assessed will also prove the researcher with the proportion of the transcript coded for certain areas, therefore the researcher would be able to see what percentage of one area of the transcript is coded for by dividing it from the total word count. This will then allow for the researcher to score the segment of the transcript. For example, if 10% of the transcript is coded as Time and Place Details with a score of +2, the researcher would multiple these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each area, the average score for each area should be calculated.

N.B. Please calculate to two decimal places; RS= Reverse Scored

ABMIA	Score	Total Word Count	Percentage (word count/total transcript word count)	Total AMBIA Score (score x percentage)	Overall ABMIA Score (sum of total AMBIA score/4)
Vividness	4				
	3				
	2				
	1				
Time and Place Details	4				
	3				
	2				
	1				
Emotional Distancing (RS)	4				
	3				
	2				

	1				
Sensory Details	4				
	3				
	2				
	1				
Fragmentation (RS)	4				
	3				
	2				
	1				
Disorganisation (RS)	4				
	3				
	2				
	1				

Pre and Post Comparison Tool

Comparison Tool

Participant		
Trauma Narrative	First- total word count:	Second- total word count:
Vividness		
Time and Place Details		
Emotional Distancing (RS)		
Sensory Details		
Disorganisation (RS)		
Repetition of Phrases		
Confusion		
Disjointedness		
Total Words and Score	Words= Score=	Words= Score=
Fragmentation (RS)		
Unfinished Thoughts		
Repetition of Words		
Speech Filler		
Total Words and Score	Words= Score=	Words= Score=
Narrative Coherence (yes/no)		

Note: RS= Reverse Scored

Appendix N: Example Transcript and Scoring of ABMICT

Participant Second Narration of (Event) by (Person A)

Participant Data	Coding (ABMIA, Score, First-last word, total words)
Participant: Ok erm it was a (day) and I think it was probably my birthday in (month) erm it was (year) and erm I'd been to (location A) with (family members A & B) they picked me up on the (day) erm usually between (time) we'd go to (location A) we'd park in the back entrance and we'd have a walk around erm I usually get a nice ice cream and we'd feed the ducks and then when we've finished on the pond or the lake bit erm before we head back to the car I'd have a go on the adventure playground and do the swings, and trye swings and things erm [pause] we would get back for the news religiously and then erm we'd have erm un-cut bread with ham vitalite butter and usually something like an	Time and Place Details, 4, it (line 1)-around (line 6), 61 Vividness, 3, it (line 1)- usually (line 18), 176 Sensory Details, 2, I (line 6)- bit (line 9), 24 Time and Place Details, 2, we (line 11)-then (line 12), 10 Sensory Details, 2, we'd (line 12)-pudding (line 15), 21

apple pie or something sweet for pudding erm then (family member A) would go to sleep and (family member B) would sort of nod off or potter about erm I had the paddling pool out because it was a warm (time) and usually erm if I didn't want to play alone erm I would go on to the street and ask some of the friends from across the road and play out with me erm one of them was (person A) sometimes I'd ask (person B) and (person C) across the road to come over erm it depends on if they were in or not on this occasion I'd got my swimsuit on I think it was a green tankini it was a tankini of some sorts so top and bottoms erm and I went across the road barefoot erm to ask if (person A) was gonna come over and play I remember going through the gate and I remember the dog barking erm I don't remember who answered	Time and Place Details and Sensory Details, 2, I (line 17)-usually (line 18), 14 Vividness, 4, erm (line 23)-erm (line 49), 266 Sensory Details, 3, and (line 26)-barking (line 29), 29

the door but then erm obviously after a while (person A) appeared and we went back across the road together [pause] erm we'd go through the gate and down the garden the paddling pool was on the longer bit of the lawn near the conifer hedges because that had better grass erm it was a metal frame of the pool and the plastic was sort of draped in it erm the frame was dark blue the plastic was sort of a light bluey colour erm we'd maybe play slip side for a bit erm and then we would be in the pool I decided to take my top down at some point I don't know why erm and then [pause] after a bit (person A) took their (clothing item) (redacted) erm and presented (body object) and laughed about it and then erm (person A) proceeded to come up behind me drop my tankini shorts down and press themselves against erm against my body with	Time and Place Details, 3, obviously (line 30)- grass (line 35), 44 Sensory Details, 3, and (line 38)- erm (line 49), 100

their (body object) erm they then started shouting (redacted) erm and then they said something about oh you know this this is called shagging erm I felt very embarrassed erm very awkward erm [pause] and then I don't really know what happened	Emotional Distancing, 3, and (line 47)- awkward (line 49), 22 Fragmentation Repeated Word, this (line 48)-this (line 48), 2

Word Count: 501

N.B Fillers in red; gender neutral pronouns used for further anonymity; redactions lower word count.

Participant Second Narration of (Event) by (Person A) Example ABMIA Scoring Sheet

Instructions: As total word count of the transcripts is to be recorded, this allows for the coder to assess the percentage of the areas covered in the transcript. The researcher will be able to count every word used when an area is discussed and combine every instance of when an area is discussed and then divide this number by the total word count. This will give the percentage of the transcript that is coded to a specific area. Recording the word count of each area assessed will also prove the researcher with the proportion of the transcript coded for certain areas, therefore the researcher would be able to see what percentage of one area of the transcript is coded for by dividing it from the total word count. This will then allow for the researcher to score the segment of the transcript. For example, if 10% of the transcript is coded as Time and Place Details with a score of +2, the researcher would multiple these numbers together to get a score of 20 (+2 x 10). To calculate the overall score for each area, the average score for each area should be calculated.

N.B. Please calculate to two decimal places; RS= Reverse Scored

ABMIA	Score	Total Word Count 501	Percentage (word count/total transcript word count)	Total AMBIA Score (score x percentage)	Overall ABMIA Score (sum of total AMBIA score/4)
Vividness	4	266	53.09	212.38	79.44
	3	176	35.13	105.4	
	2				
	1				
Time and Place Details	4	61	12.18	48.72	21.16
	3	44	8.78	26.34	
	2	24	4.79	9.58	
	1				
Emotional Distancing (RS)	4				3.29
	3	22	4.39	13.17	
	2				

	1				
Sensory Details	4				25.2
	3	129	25.79	77.25	
	2	59	11.78	23.55	
	1				
Fragmentation (RS)	4				1.70
	3				
	2				
	1	34	6.79	6.79	
Disorganisation (RS)	4				1 (none)
	3				
	2				
	1	0	0	0	

Participant Second Narration of (Event) by (Person A) Example Pre and Post Comparison Tool

Comparison Tool

Participant		
Trauma Narrative	First- total word count: 781	Second- total word count: 501
Vividness	30.54	79.44
Time and Place Details	43.28	21.16
Emotional Distancing (RS)	4.55	3.29
Sensory Details	17.41	25.2
Disorganisation (RS)		
Repetition of Phrases	4 words	0
Confusion	36 words	0
Disjointedness	21 words	0
Total Words and Score	Words=61 Score= 1.95	Words=0 Score=1 (none)
Fragmentation (RS)		
Unfinished Thoughts	0	0
Repetition of Words	2	2
Speech Filler	45	32
Total Words and Score	Words=47 Score=1.5	Words=34 Score=1.7
Narrative Coherence (yes/no)		No

Note: RS= Reverse Scored

Appendix O: Completed Fidelity Check Forms

Fidelity check by Chief Investigator (TS): Psychoeducation Session

Session no: Psychoeducation Wolverine	**1**
Review of therapy purpose and session overview	✓
Normalises, legitimises, and names trauma reactions and symptoms.	**4**
Explains defence cascade	✓
Explains difference between 'hot' and 'cold' memories.	✓
Explains NET processes, i.e. habituation through exposure and autobiographical integration.	✓
Explains overview of therapy sessions (e.g. content, number, length of sessions etc.).	✓
Discusses possible negative reactions and adverse events.	✓
Discusses expectations re not interrupting exposure and highlights rationale.	✓
Explains written narrative (testimony).	✓
Invites questions and comments.	**3**
Safety planning: E.G., local emergency and crisis contacts.	✓
Safety planning: Discusses anti-dissociation/grounding strategies.	✓

0 = never, 1 = sometimes, 2 = often, 3 = most of the time, 4 = always. ✓= yes, × = no

Criterion:
Both scaled items are scored above 2 **and** no more than 2 items (20%) scored × = no

Criterion is met.

Fidelity check by Chief Investigator (TS): Lifeline Session

Session no: Lifeline Buddy	**2**
Review of lifeline instructions, including meaning of the flowers and stones.	✓
Reminder of lifeline purpose and difference with narration sessions (i.e. 'bird's eye view' versus exposure through detailed narration)	✓
Facilitates building of the lifeline chronologically.	4
Facilitates labelling of events	4
Asks appropriate questions about events (e.g. when and where).	4
Deviations from task are appropriately managed.	N/A
Invites reflection on the overall lifeline and process.	✓
Review of how the lifeline will be used in future sessions & invites questions.	✓

0 = never, 1 = sometimes, 2 = often, 3 = most of the time, 4 = always. ✓= yes, × = no

Criterion:
No more than 1 occasion (25%) of × = no and no item scored below 3

Criterion is met.

N.B. Buddy was the pseudonym of the male participant who dropped out; however, a session was still chosen for a fidelity check to assess the quality of treatment received.

Fidelity Check by Chief Investigator (TS): Narration sessions

Session no: Narration Wolverine	**4**
Event (Stone)	
Re-narration: Further details/corrections elicited	4
Re-narration: Further processing not interrupted	4
General context elicited.	3
Event-specific details elicited.	4
Not stopping a session during the height of fear and anxiety	✓
Staying in trauma narration until arousal has subsided.	4
Past AND current feelings/physical sensations elicited.	4
Avoidance and dissociation prevented/managed.	4
Chronology adhered to (preventing going back and forth in time).	4
Not mixing exposure and closure	4
Narration ends at a 'point of safety'.	✓

0 = never/not, 1 = sometimes/a little, 2 = often/partially, 3 = most of the time/mostly, 4 = always/fully.

✓= yes, × = no

Criterion: × = 0 **and** 7 (78%) scaled items rated 3 or above

Criterion is met.

Fidelity Check by Chief Investigator (TS): Narration sessions

Session no: Narration Raven	**6**
Event (Stone)	
Re-narration: Further details/corrections elicited	1
Re-narration: Further processing not interrupted	4
General context elicited.	4
Event-specific details elicited.	4
Not stopping a session during the height of fear and anxiety	✓
Staying in trauma narration until arousal has subsided.	4
Past AND current feelings/physical sensations elicited.	4
Avoidance and dissociation prevented/managed.	N/A
Chronology adhered to (preventing going back and forth in time).	4
Not mixing exposure and closure	4
Narration ends at a 'point of safety'.	✓

0 = never/not, 1 = sometimes/a little, 2 = often/partially, 3 = most of the time/mostly, 4 = always/fully.

✓= yes, × = no

Criterion: × = 0 **and** no more than 2 (22%) scaled items rated below 3

Criterion is met.

Fidelity Check by Chief Investigator (TS): Narration sessions

Session no: Narration Fox	**5**
Event (Stone)	
Re-narration: Further details/corrections elicited	2
Re-narration: Further processing not interrupted	4
General context elicited.	3
Event-specific details elicited.	4
Not stopping a session during the height of fear and anxiety	✓
Staying in trauma narration until arousal has subsided.	4
Past AND current feelings/physical sensations elicited.	3
Avoidance and dissociation prevented/managed.	N/A
Chronology adhered to (preventing going back and forth in time).	4
Not mixing exposure and closure	4
Narration ends at a 'point of safety'.	✓

0 = never/not, 1 = sometimes/a little, 2 = often/partially, 3 = most of the time/mostly, 4 = always/fully.

✓= yes, × = no

Criterion: × = 0 **and** no more than 2 (22%) scaled items rated below 3

Criterion is met.

POSTER

Exposing Narrative Exposure Therapy

Jackson Lord, Thomas Schröder, Rachel Sabin-Farrell, Rohan Naidoo

Trent Doctorate in Clinical Psychology

University of Nottingham UK | CHINA | MALAYSIA

UNIVERSITY OF LINCOLN

INTRODUCTION

- Experiencing trauma can lead to a diagnosis of Post-traumatic Stress Disorder (PTSD). There is a dose response relationship been the severity and duration of trauma[1], and when a person has experienced multiple traumatic events it can lead to a diagnosis of complex PTSD (CPTSD).
- Effectively treating PTSD and CPTSD can be difficult[2].
- Narrative Exposure Therapy (NET)[3] is a NICE recommended treatment for CPTSD. NET uses imaginal exposure and testimony therapy to create a lifelong narrative for the person. Doing so allows the person to narrate their life and traumas integrating their traumatic memory into an autobiographical lifeline and context.
- NET's posited mechanisms of change are exposure and habituation and autobiographical memory integration (ABMI).
- However, the ABMI mechanism of change has not been demonstrated empirically.

AIMS

1. To develop a measure to investigate the AMBI process of NET.
2. To investigate the exposure and habituation processes of NET.
3. Does NET reduce PTSD?
4. Does NET affect Depression, Anxiety, and Stress?
5. Is NET feasible and acceptable to use?

METHODS

- A naturalistic, mixed method, A-B, single case design was used.
- 3 female participants aged 28-35 completed 10-12 sessions of NET and were recruited from a secondary care mental health service.
- Participant's completed questionnaires, wore a chest strap, and completed a change interview after the study.

Data Analysis

Visual analysis with dual criterion was undertaken. The Percentage of Data Points Exceeding the Median (PEM) Simulation Modelling (SMA), Reliable Change (RC), Clinically Significant Change (CSC) were calculated. Therapy transcripts were coded for differences in ABMI. Content Analysis (CA) was used on follow up data.

RESULTS

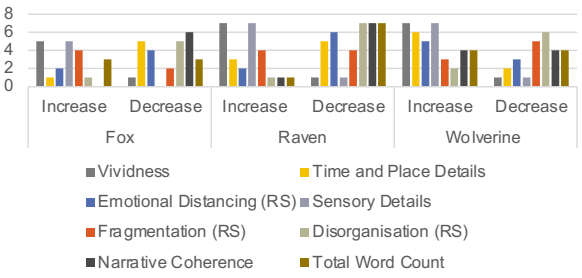
Impact of Events Scale Revised-One participant deteriorated, another experienced a RC and another a RC and CSC.

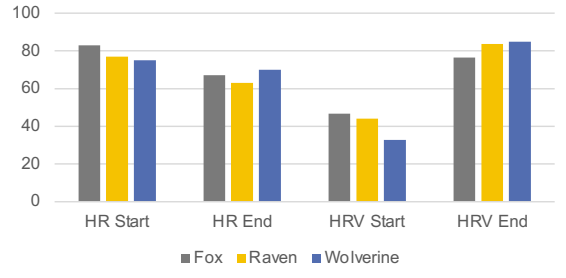
Depression, Anxiety, and Stress Scale-21-Two participants experienced reductions in psychological distress as a whole, one had a RC and CSC in anxiety.

Heart Rate (HR), Heart Rate Variability (HRV), and Subjective Units of Distress (SUDS)-Two participants experienced consistent in session habituation. All participants showed increases in HRV and decreases in HR at the start and end of treatment. Participant's SUDs rarely reflected habituation and did not match participants heart rate data.

ABMI-For all participants there were increases in vividness, sensory details, and decreases in disorganisation. Two participants had consistent decreases in time and place details, emotional distancing, and narrative coherence. There were mixed results regarding fragmentation and total word count.

Acceptability and Feasibility -NET was a hard, but acceptable therapy. The only suggestion was to include more sessions. However, to be delivered for this population it needs to be adapted.





DISCUSSION

- This is the first study to look at how ABM changes qualitatively through trauma therapy and has led to the development of an ABMI measure which did not exist before.
- NET is potentially helpful in reducing trauma, psychological distress, and anxiety.
- Results from the coding of transcripts do not support NET's claims of integrating contextual ABMI as a mechanism of change.
- Trauma therapies should focus on ABMI areas such as vividness, sensory and emotional details to facilitate change.
- Future research developing the coding tool is needed to allow the role of ABM phenomenology in trauma to be better understood.

REFERENCES

1 Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: a revisit with new data and methods. *Science (New York, N.Y.)*, *313*(5789), 979–982. https://doi.org/10.1126/science.1128944 2. Bisson, J. I., Cosgrove, S., Lewis, C., & Robert, N. P. (2015). Post-traumatic stress disorder. *BMJ (Clinical research ed.)*, *351*. https://doi.org/10.1136/bmj.h6161 3. Schauer, M., Neuner, F., & Elbert, T. (2011). *Narrative exposure therapy: A short-term treatment for traumatic stress disorders* (2nd rev. and expanded ed.). Hogrefe Publishing

Small Scale Research Project (SSRP)

Assessing the use of the Transtheoretical Model to Manage Referrals in Mental Health Services

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The authors report no conflict of interest.

Ethics approval statement:

Ethical approval was sought from the trust to complete the study.

Patient consent statement:

Patient's consent to their use of data when accessing the service, no extra patient information was used in this paper.

Permission to reproduce material from other sources:

No copyright materials were used in this paper.

Clinical trial registration:

Not Applicable.

ORCid:

https://orcid.org/0000-0003-3926-5682

Abstract

Background: The transtheoretical model (TTM) has been applied in physical health settings. However, research into its applicability to psychotherapy is mixed. The TTM is applied through The University of Rhode Island Change Assessment (URICA). Investigating the utility of the URICA is needed to improve patient care and outcomes.

Aims: To assess whether the URICA scores relate to 1) patient outcomes; 2) patient attendance; 3) practitioner ratings of patient readiness, appropriateness, insight, motivation, and potential for improvement; 4) explore practitioner's perspectives of the URICA.

Method: Correlational methods were used to assess the relationship between the URICA and therapeutic outcome, attendance, and practitioner rated areas. Conventional content analysis was used to analyse practitioner qualitative data.

Results: The URICA did not correlate with either therapeutic outcome or attendance. A significant negative correlation was found between the URICA, and practitioner rated appropriateness of the referral. As lower URICA scores indicating people being less ready to change were deemed a more appropriate referral by practitioners. Qualitative categories included: 1) Positive Views; 2) Negative Views; 3) Ambivalence; 4) Changes to Measure and Process.

Conclusions: The URICA does not explain a patient's outcome or attendance. Practitioners noted assessing the stage of change to be potentially helpful, however, they hold negative views of the measure. The URICA may not be appropriate to use in its current format in mental health services, therefore assessing stages of change verbally maybe more helpful.

Keywords: Transtheoretical Model, URICA, Therapeutic Outcome, Therapy Attendance, Motivation to Change

Introduction

The number of people accessing mental health services in the UK has been on the rise since 2016 (British Medical Association; BMA, 2022), with an estimated 2.8 million people accessing NHS secondary mental health services within England during 2020-2021 (House of Commons, 2021). Coming out of the COVID-19 pandemic, services have seen unprecedented demand with a record 4.3 million referrals made between January and December 2021 (Iacobucci, 2022). Despite investment into services and reports such as the NHS Long Term Plan (NHS, 2019) and The Five Year Forward View for Mental Health (NHS, 2014), concerns are raised by health professionals that demand for services outweighs available resources (BMA, 2022). Prior to covid, mental health services had already felt the effects of austerity (Reeves et al., 2013) with long waiting lists for psychological therapy (Galante et al., 2019). As the high demands on services increase, so will waiting lists and times for treatment (Molodynski et al., 2020), innovative ways to meet demands are needed.

Services face multiple difficulties other than just meeting public demand. One difficulty is ensuring individuals access the right part of the system (King, 2001). This is challenging between primary and secondary care services in the UK, as an issue with increasing demands and waiting lists potentially increases clinical risk, reflecting the need for necessary, and appropriate referrals (Blank et al., 2014; Wadoo et al., 2021). Another significant difficulty faced by services is treatment dropout having a detrimental impact on both services and patients (Barret et al., 2009; Karekla et al., 2019; Wierzbicki & Pekarik, 1993). One potential way to lessen the demand on services is to identify those who are most ready for therapy and less likely to drop out, which could be done by assessing a person's readiness to change.

Readiness to change is conceptualised within the Transtheoretical Model (TTM; DiClemente & Prochaska, 1982). The TTM posits that when people are questioning changing their behaviour, they go through a six-stage process (Table 28); however, this does not necessarily progress in a linear manner (Prochaska et al., 2015).

Table 28

Stages of Change (Prochaska et al., 2015 p.98)

Stages of Change	Description
Precontemplation *	No intention to take action within the next 6 months
Contemplation *	Intends to take action within the next 6 months
Preparation *	Intends to take action within the next 30 days and has taken some behavioural steps in this direction
Action *	Changed overt behaviour for less than 6 months
Maintenance	Changed overt behaviour for more than 6 months
Termination	No temptation to relapse and 100% confidence

Note: * Denotes areas assessed in the URICA (McConnaughy et al., 1983)

Readiness to change has been shown to be a predictor of treatment outcome in a range of physical health settings (Dozois et al., 2004; Pinto et al., 2007). Norcross et al. (2011) conducted a meta-analysis of the TTM (DiClemente & Prochaska, 1982) and psychotherapy and concluded readiness to change predicts better treatment outcomes and attendance; however, they did note serious methodological issues in the psychotherapy samples. Norcross et al.'s (2011) study looked at psychotherapy for a range of conditions such as substance misuse as opposed to specifically being related to mental health, as only 10 out of 39 studies focused on conditions such as anxiety. It is unclear how Norcross et al. (2011) came to their conclusion that the TTM is related to therapeutic drop-out. Given these critiques further research is needed into the applicability of the TTM to psychotherapy, as the existing research shows the applicability is mixed with authors calling for more research (Dozois et al., 2004; Norcross et al., 2011; Pinto et al., 2007). The TTM is only one predictor of treatment outcome, other predictors which contribute to the successful outcome of therapy are therapeutic alliance (Falkenström et al., 2013) and therapist competence (Branson et al., 2015), whereas initial levels of distress and co-morbidity lessen the effectiveness of therapy (Amati et al., 2018). Further research into treatment attendance comes from Odenwald and Semrau (2013), who found trauma moderated the level of attendance in an alcohol treatment programme. As those with higher levels of trauma were more likely to drop out of treatment, the authors concluded that readiness to change is not relevant for those who have experienced

multiple traumas**.** As the TTM is only one predictor of therapeutic outcome and attendance with other factors also contributing to successful therapeutic outcome and attendance investigating the relevance of the TTM to psychotherapy is needed. One way to measure readiness to change is through The University of Rhode Island Change Assessment (URICA; DiClemente & Hughes, 1990).

The URICA (McConnaughy et al., 1983) is a self-report questionnaire assessing a person's stage of change. While the TTM (DiClemente & Prochaska, 1982) posits people go through six stages of change, the URICA assesses four subscales (Table 1). In therapeutic settings, research shows greater resistance to change, indicated by lower scores on the measure, correlates with poorer treatment outcomes and adherence to pharmacology (Pinto et al., 2007). It has been shown across a wide range of healthcare services that people who score lower on the measure are more likely to disengage from therapy (Odenwald & Semrau, 2013; Tambling & Ketring, 2014), having poorer treatment outcomes (Pantalon et al., 2002; Pinto et al., 2007). There is evidence of patients who scored lower in the contemplation stage and presenting with high levels of distress were more likely to drop out of therapy (Derisley & Reynolds, 2000). While the concept of the TTM is assessed by the URICA most of the existing research has focused on substance use and eating disorders (Krampe et al., 2017; Norcross et al., 2011), with little attention paid to psychotherapy (Dozois et al., 2004; Krampe et al., 2017; Mander et al., 2012; Norcross et al., 2011). When the URICA has been used in psychotherapy Dozois et al., (2004) found scores on the measure correlated to drop out, but highlighted issues with the measure's psychometric properties concluding they limit its use and their findings.

The URICA (McConnaughy et al., 1983) is used in some secondary care mental health services to help processing referrals. As to date the research is mixed into whether the URICA is suitable for people accessing psychotherapy in mental health services (Dozois et al., 2004; Norcross et al., 2011; Pinto et al., 2007; Tambling & Ketring, 2014) bringing into question the suitability of using it, as for screening to be effective the measure used needs to be reliable (Anjara et al., 2020). If too much emphasis is placed on the URICA as a screening tool and it is found to have little

impact on the outcome and attendance of therapy, it could limit people's access to support.

Aims

The relationship between the URICA, patient outcomes and attendance, and practitioner perspectives will be investigated in a secondary care psychology service. Investigating the URICA helps understand how pertinent readiness to change is in a person's recovery and attendance, and if it is useful for managing referrals into mental health services. If the measure is found to relate to outcomes and attendance, it can help streamline the process of referral to assessment, helping to identify patients who are more or less likely to engage in services, and that therapy is tailored to the appropriate stage of change.

The aims are:

1. To assess whether URICA pre-therapy scores relate to therapy outcomes.
2. To assess whether URICA pre-therapy scores relate to patient attendance.
3. To assess if the URICA pre-therapy scores relate to practitioner ratings of client readiness, appropriateness, insight, motivation, and potential for improvement from the assessment form.
4. To explore practitioners' perspectives of the URICA.

Method

Setting

The data was provided by a UK secondary care psychology service providing therapy to adults aged 16+ with complex mental health needs. The service is staffed by Clinical and Counselling Psychologists. As part of the referral process patients are asked to complete a URICA (McConnaughy et al., 1983) a Clinical Outcomes in Routine Evaluation Outcome Measure (CORE-OM; Evans et al., 2000), and a form collecting demographic information and a patient's own explanation of difficulties which is reviewed in a referral meeting.

The service introduced the URICA (McConnaughy et al., 1983) in 2018, the 249 patients who accessed the service between July 2018-June 2021 had their data examined.

Measures

Assessment form

The assessment form provides data where the assessor rates the patient's insight, readiness, potential for improvement, motivation, and appropriateness for therapy at the assessment on a scale of 1 (Not appropriate/Poor) – 4 (Very appropriate/Good).

URICA

The URICA (McConnaughy et al., 1983) is completed prior to the assessment at the service. The URICA was developed to measure a person's stage of change in psychotherapy and is a 32 item self-report questionnaire asking respondents to rate their "problem" on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measure includes four subscales (Table 28). The means of each subscale are calculated and subtracted from the precontemplation subscale. This then gives a numerical score with a higher score reflecting a higher stage of change (Table 29). An example item is "I have a problem and I really think I should work on it.". The measure is internally consistent with good concurrent and predictive validity (DiClemente & Hughes, 1990; Pantalon & Swanson, 2003).

Table 29
URICA Scoring Categories (McConnaughy et al., 1983)

Category	Score
Precontemplation	0-8
Contemplation	8-11
Preparation or Action	11-14

CORE-10

The CORE-10 (Barkham et al., 2013) is completed every four sessions in the service and was used in analysis due to having more complete sets of data. It is a 10-item self-report questionnaire asking patients to respond on a 5-point scale from 0 (Not at all) to 4 (Most or all the time) of how often they have experienced difficulties over the previous week. The CORE-10 measures psychological distress and contains six problem items, three functioning items, and one risk item, an example item is “I have felt unhappy”. Scores can either be summed to gather a total score or a mean score can be calculated. Higher scores on the measure reflect greater difficulties (Table 30). The CORE-10 has been shown to have good internal reliability, sensitivity, and specificity (Barkham et al., 2013).

Table 30
CORE-10 Scoring Categories (Barkham et al., 2013)

Category	Score
Not Clinically Significant	0-10
Clinically Significant	11+
Mild Psychological Distress	11-14
Moderate Psychological Distress	15-19
Moderate-to-severe Psychological Distress	20-24
Severe Psychological Distress	25+

Practitioners Perspectives

The researcher constructed a questionnaire assessing practitioners’ beliefs of the URICA (McConnaughy et al., 1983; Appendix P). Qualitative and quantitative data was created using open and closed questions.

Procedure

Following obtaining consent from the service manager, an application form providing an overview of the study was sent to the Trust’s Research and Development team and approved. All the data bar the practitioner’s perspectives were already collected and stored on an electronic database and transferred into an SPSS file for analysis. All data was handled in accordance with data protection rules.

Practitioners were invited to partake on a voluntary basis via a team meeting. Practitioners had the option to complete the questionnaire electronically via e-mail or physically. Practitioners were told in the meeting and by mail that taking part was voluntary and they could withdraw at any time, they were prompted to create pseudonyms to ensure confidentiality. If a practitioner completed a questionnaire implied consent was assumed. In total five out of a possible eleven practitioners completed the questionnaire and all returned their forms by e-mail to the researcher which was stored on an encrypted and password protected device.

Analysis

Therapeutic Outcome

To assess the relationship between therapeutic outcome and the person's stage of change, a Pearson's r correlation was used. Pearson's r was used as both sets of variables were independent, were at least interval or ratio, there were no outliers, and data was normally distributed (Clark-Carter, 2010). The researcher checked the assumption of normality by visually scanning the box, scatter, stem and leaf, and q-q plots (Field, 2009). The Shapiro-Wilk test is the recommend test of normality and was also used and gave a non-significant result indicating no issues (Peat & Barton, 2005; Thode, 2002); skewness and kurtosis values both fell within the recommended +1 and -1 (Hair et al., 2017). To conduct the correlation post therapy CORE-10 (Barkham et al., 2013) change scores were calculated (discharge score minus assessment score) and analysed with the pre therapy URICA (McConnaughy et al., 1983) raw scores. There were high levels of missing data, meaning only 36 sets were used in analysis.

Therapy Attendance

To assess the relationship between therapy attendance and the person's stage of change, a Kendall's Tau-b correlation was used. Kendall's Tau-b was used as the variables were at least ordinal, the data was not normally distributed, and Kendall's

Tau provides a better estimation of the value from the population sampled than Spearman's rho (Clark-Carter, 2010; Howell, 2007). The visual checks for normality recommended by (Field, 2009) were conducted showing some skew, and two outliers were identified but not removed as the values were not entered in error and reflected real world data. The Shapiro-Wilk was also used, and the percentage of sessions attended gave a significant result indicating issues (Peat & Barton, 2005; Thode, 2002). Skewness and kurtosis values were greater than +1 and -1 for the percentage of sessions attended again indicating issues (Hair et al., 2017). To conduct the correlation the percentage of the sessions attended per patient was calculated and analysed with the pre therapy URICA (McConnaughy et al., 1983) raw scores. There were high levels of missing data, meaning only 48 sets were used in analysis.

Practitioner Rated Areas and the URICA

To assess if the URICA (McConnaughy et al., 1983) pre-therapy scores relate to practitioner ratings of client readiness, appropriateness, insight, motivation, and potential for improvement a Kendall's Tau-b correlation was used. Kendall's Tau-b was used as the assumptions for Pearson's r could not be met, to account for the tied ranks between practitioner's ratings, practitioner perception scores were ordinal, the URICA raw scores were continuous, and Kendall's Tau provides a better estimation of the value from the population sampled than Spearman's rho (Clark-Carter, 2010; Howell, 2007). To conduct the correlation the practitioner's rated scores from the assessment form's scales were contrasted against the URICA (McConnaughy et al., 1983) pre therapy raw scores.

Content analysis

Conventional content analysis (CCA) was used to analyse the practitioner's feedback of the URICA (McConnaughy et al., 1983). Five practitioners returned the feedback questionnaire with written comments. Given the feedback received was the brief view of a few practitioners, content analysis (CA) or thematic analysis (TA) were appropriate, as either approach is suitable for a lower level of interpretation (Vasimoradi et al., 2013). As the practitioner's feedback questionnaire had yes/no

answers giving quantitative results, and the little amount of data gained, CCA was the most appropriate analysis to use. CA is a term used for many different strategies to explore and analyse large amounts of text, systematically code and categorise text to find trends and patterns of the words used including the frequency, relationship, and structures of communication (Mayring, 2000; Pope *et al*., 2006; Powers & Knapp, 2006; Gbrich, 2007; Vaismoradi et al., 2013). CCA was used due to it being recommended when existing research is limited (Hsieh & Shannon, 2005; Leung & Chung, 2017). As brief written accounts from the practitioners were collected, with the main researcher not able to find any existing literature on mental health practitioner's perspectives of the URICA (McConnaughy et al., 1983) CCA with an inductive approach seemed appropriate (Elo & Kyngäs, 2008). CCA also seemed appropriate due to the researcher's reflexivity, to limit their bias, and let the categories come from the data to avoid predefining categories (Kondracki & Wellman, 2002; Hsieh & Shannon, 2005). Reflexivity was key as before starting the analysis, the researcher was part of the service where the measure was being evaluated and had used it in practice, informing their views on the measure. The staff at the service openly discussed their negative views of the measure, adding to the researcher's cynicism. With this in mind when creating the questionnaire, the research team asked for respondent's views and their positive and negative beliefs about the measure. When the main researcher was analysing the data, being aware of the negative bias was helpful as they specifically looked for information to contradict their view to ensure a balanced analysis. Given the researcher's preconceptions regarding the measure and the questionnaire being created specifically to evaluate practitioner's beliefs of the measure, added to the rationale to conduct an inductive analysis. This was an attempt to limit the researcher's bias as the categories were derived from the data. A critical realist approach was used as the study adopted a mixed method approach. Critical realism was born out of the frustrations with positivist and constructivist approaches (Denzin & Lincoln, 2011). Critical realism takes aspects of both approaches and combines them to make a philosophy of science which gives a robust account of ontology and epistemology (Brown et al., 2003). One of critical realism's defining tenants is that ontology (what is real), is not reducible to epistemology (our knowledge of reality), as human knowledge only captures a limited part of reality (Fletcher, 2017). Critical realism argues that research methods should be informed by the area being researched

(Pratschke, 2003), allowing for qualitative and quantitative approaches to be blended giving flexibility to posit how and why the phenomenon exists (Leung & Chung 2019; Maxwell & Mittapalli 2010). Phases followed to conduct the CCA are outlined in Table 31.

Table 31

Phases of CA/CCA (Elo & Kyngäs, 2008; Erlingsson & Brysiewicz et al., 2017)

Step	Description
1) Familiarise	Read and re-read the data while noting down initial impressions.
2) Condense Text into Meaning Units	With the research question in mind divide text into meaning units. Ensure condensed text still conveys the essential message.
3) Create Codes	Codes are descriptive labels for condensed meaning units and help researchers reflect on the data. At this stage there is limited interpretation; however, codes identify connections between meaning units and can have some initial reactions to the text.
4) Develop Categories and Themes	Sort codes into categories that answer the questions who, what, when, or where? Compare codes to see which belong together and therefore form a category. Themes are the highest level of abstraction and express the underlying (latent) content and come from grouping two or more categories. Analysis does not always need to include themes as they come from data that is rich with latent meaning. Themes answer questions such as why, how, in what way or by what means.
5) Report	Report analysis and results via models, conceptual systems/map, and/or categories, and/or a story line, and/or narratively.

Results

Descriptive Statistics

Descriptive statistics are shown in Table 32. 60 patients were included in the analysis; however, due to high levels of missing data the total sets varied for every test. The sample consisted of 38 females (63%) and 22 males (37%) with a mean age of 39 years old. Most people (73%) entered the service in the contemplation stage. Using the median to account for outliers gives a patient attendance level of 83%. Looking at the CORE-10 (Barkham et al., 2013) on average people enter and leave the service with severe psychological distress (Barkham et al., 2013).

Table 32
Descriptive Statistics

	Age	Gender	Sessions Attended (%)	Core 10 Assessment Score	Core Post Therapy Score	URICA Category
N	60	60	52	43	36	60
Mean	39.03	1.63	69.67	25.63	23	2.133
Median	38	2	83.33	26	14.081	2
Mode	18[a]	2	.00[a]	24[a]	13	2
Std. Deviation	12.696	.486	30.55	6.176	13.0[a]	.503
Range	43	1	100	28	6.24	2
Minimum	1	1	0	8	1	1
Maximum	2	2	100	36	30	3

Note: [a]=Multiple modes exist smallest value shown

Quantitative Results

Therapeutic Outcome

The relationship between therapeutic outcome and a person's stage of change was assessed (Table 33). A Pearson correlation showed that the two were not correlated and not significantly related, r = -.129, p = .452, N=36.

Table 33
Correlation of Therapeutic Outcome and Stage of Change

		URICA
Therapeutic Outcome	Pearson Correlation	-.129
	Sig. (2-tailed)	.452
	N	36

Therapy Attendance

The relationship between therapy attendance and a person's stage of change was assessed (Table 34). A Kendall's tau-b correlation showed the two were not correlated and not significantly related, τ_b= -.027, p = .789, N=48.

Table 34
Correlation of Therapeutic Attendance and Stage of Change

		URICA
Therapeutic Attendance	Correlation Coefficient	-.027
	Sig. (2-tailed)	.789
	N	48

Practitioner Rated Areas and the URICA

The results of the correlation between practitioner rated areas and the stage of change is provided in a correlation matrix below.

Table 35
Kendall's Tau Correlation Matrix

Variable	N	1	2	3	4	5	6
1 Appropriateness	60	-					
2 Psychological Insight	60	.444**	-				
3 Readiness for Therapy	60	.473**	.585**	-			
4 Potential for Improvement	60	.436**	.418**	.548**	-		
5 User's Motivation	60	.213	.450**	.383**	.305*	-	
6 URICA Score	60	-.318**	-.037	-.096	-.169	-.039	-

Note= * p<.05 **p<.01, URICA is patient rated, all other areas are rated by the practitioner

The person's stage of change was contrasted against practitioner rated appropriateness, insight, readiness, potential for improvement, and motivation using a Kendall's tau-b correlation. The relationship between practitioner rated appropriateness and a person's stage of change were negatively correlated and significantly related, τ_b= -.318, p = .002, N=60. As the URICA (McConnaughy et al., 1983) and appropriateness of referral hold a negative correlation, practitioners deemed the referral more appropriate the lower the stage of change. Most of the practitioner rated areas held significant relationships with each other and were positively correlated, using guidance from Botsch (2011), they all had a strong relationship.

Qualitative Results

The findings from the CCA are presented below, four categories emerged from the data: 1) Positive Views; 2) Negative Views; 3) Ambivalence; 4) Changes to Measure and Process. Table 36 provides an example of the process of analysis.

Table 36
Example of Analysis Process

Meaning Unit	Clients have commented to me that they didn't really understand the questions
Condensed Meaning Unit	Clients commented they didn't understand questions
Code	Confusing
Category	Negative Views
Theme	N.A.

An overview of the categories with brief description and codes that make up the categories are provided in Table 37. Table 38 details the frequency of codes.

Table 37

Categories with Codes and Brief Explanation

Category	Explanation of Category	Codes
Positive Views	Practitioner's perspectives of what was good about the URICA	Helpful, Prepares Patient, Good Principle
Negative Views	Practitioner's perspectives of what was bad about the URICA	Redundant, Confusing, Burden, Unrelatable, Difficult, Scepticism, Strange, Off Putting, Invalid, Incomplete, Repetitive
Ambivalence	Practitioner's showing mixed views and hesitance to express strong good or bad views about the URICA	Limited Use, Potentially Helpful, Unsure, Ambivalence
Changes to Measure and Process	Practitioner's suggestions to either amend the URICA or how it is used in the service	Remove It, Change It, Shorten It, Discuss at Referral, No Changes to Process, Practical Barriers

Table 38

Frequency of Codes

Code	Frequency
Redundant	10
Helpful	9
Burden	8
Confusing	5
Potentially Helpful	3
Prepares Patient	3
Difficult	3
Limited Use	3
Unrelatable	2
Clinical Judgement	2
Remove It	2
Change It	2
Shorten It	2
Scepticism	2
Strange	1
Unsure	1
Good Principle	1
Assess Before Referral	1
Ambivalence	1
Off Putting	1
Invalid	1
Incomplete	1
Repetitive	1
Discuss at Referral	1
No Changes to Process	1
Practical Areas	1

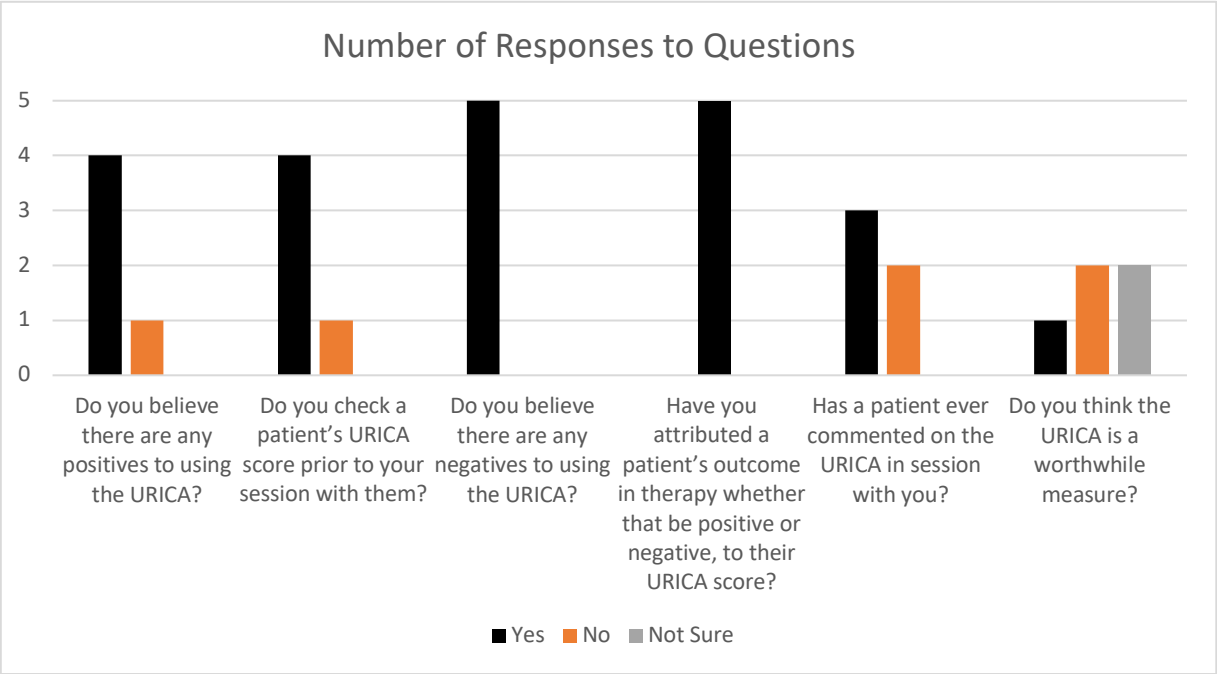
Positive Views

Positive views contain the second most frequent code that was helpful. An example of the URICA (McConnaughy et al., 1983) being helpful comes from a practitioner stating it "*provides clinicians with an indication of a client's readiness for therapy"* (practitioner 2; Pr 2). Practitioners saw the URICA as a helpful attempt to measure a person's readiness for change as it "*reflects an attempt to measure motivation"* (Pr 3), with one commenting it lets them tailor their approach "*Knowing if someone is very fixed about the reasons for their difficulties can inform approach"* (Pr 4). The URICA was seen to prepare the patient's expectations "*implicitly communicates the expectations of therapy to the client"* (Pr 2), with another adding *it "Might help a potential patient to understand the types of questions that clinical psychologists are interested in"* (Pr 4). Another added "*It does encourage*

clients to think about their difficulties and what they want to change/how they want to change/how ready they are" (Pr 5). This category captures practitioner's value of assessing motivation prior to therapy and giving patient's an idea of what to expect, while helping practitioners tailor their approach. Figure 22 reflects the majority of practitioner's believe there are positives in using the URICA and the majority check it prior to a patient's first session. The same practitioner who did not believe there were any positives of using the URICA did not check it prior to a patient's first session.

Figure 22

Bar Chart with Number of Responses in Practitioner Questionnaire



Negative Views

Negative views contained the most codes and three of the top four most frequent codes. The most frequent code was redundant, in third was burden, with confusing coming fourth. One practitioner repeatedly commented on the URICA (McConnaughy et al., 1983) being redundant as *"I assess a client's motivation myself in the session"* (Pr 1), with another supporting this view "*this can usually be established at assessment, without the URICA"* (Pr 4). Multiple practitioners commented on the length of the URICA being "long" (Pr 4; 5) giving burden to colleagues "*extra admin to score/send out"* (Pr 1) and patients "*it's a use of patient's time"* (Pr 3). Practitioners labelled the URICA confusing and hypothesised patients may find the measure confusing as one wrote "*I am not sure whether it is well*

understood by clients" (Pr 5). Three practitioners (Pr 1, Pr 4, Pr 5) added patients have commented in session "*people have commented that it doesn't really apply to them"* (Pr 5). The other less frequent codes captured practitioner's problems with the questions being "*repetitive*" (Pr 4) with the same practitioner being sceptical of its use in service "*other measures might be more clinically useful than the URICA?"*. All practitioners sampled believed there were negatives to using the URICA (Figure 22). This may explain the belief of the measure as redundant, as no practitioner's attributed the outcome of therapy to it (Figure 22). However, this could mean practitioners attribute therapeutic outcomes to factors other than the stage of change, as articulated by practitioner four "*It is certainly not the whole picture."*. Regarding Figure 22, three practitioners reported patients commented on the URICA to them; however, when asked to elaborate, only negative feedback was given with confusing, difficult, unrelatable, and repetitive, mentioned.

Ambivalence

Ambivalence is captured by Figure 22 and practitioner 4 stating *"There are advantages and disadvantages"* (Pr 4) and hesitancy to strongly support or critique the URICA (McConnaughy et al., 1983). This category contains the codes limited use, potentially helpful, unsure, and ambivalence; however, codes in this category were not as frequent compared to the other categories. Some practitioners were generally tentative about the measure and the validity of the results as both Practitioners 4 and 5 labelled it "*potentially useful*". Another practitioner was unsure and questioned the validity of its results "*but I'm not sure the URICA provides a useful prediction"* (Pr 3). The use of the URICA was called into question with one practitioner saying, "*it may be useful initially at the referral" (Pr 1),* and another reflecting they would refer to it "*when people DNA their assessments or drop out of the service"* (Pr 5).

Changes to Measure and Process

The changes to measure and process category had its own question (Appendix P-Number 8); however, little data was generated. The category consists of six codes: remove it; change it; shorten it; discuss at referral; no change to process; practical

barriers. Two practitioners (1 & 3) called to remove the URICA (McConnaughy et al., 1983) with practitioner 1 stating *"Get rid of it!",* whereas two other practitioners suggested shortening it (Pr 5), and another recommending changing the format of the answers (Pr 4). Practitioner 2 stated the measure could be *"explicitly discussed in referral meetings"* perhaps suggesting more attention could be paid to the URICA at referral. There was the suggestion to assess the practical barriers a person may have to support "*there could be values in assessed practical readiness for therapy. As ideas maybe things like, ability to have time off work, access to childcare, access to internet/transport."* (Pr 3).

Discussion

In summary, as the URICA (McConnaughy et al.,1983) held non-significant negative correlations with therapeutic outcome and attendance, a person's stage of change was found not to be associated with patient attendance and therapy outcome, potentially suggesting other factors are more important. The URICA and practitioner rated appropriateness of referral held a significant negative correlation, suggesting people who were less ready to change were deemed more appropriate. The qualitative results emerged with four categories: positive views; negative views; ambivalence; changes to measure and process.

While the TTM (DiClemente & Prochaska, 1982) is applicable to physical health settings (Dozois et al., 2004; Pinto et al., 2007), the findings from the current study add evidence to the literature, suggesting that it may be less applicable to psychotherapy (Dozois et al., 2004), as the URICA (McConnaughy et al., 1983) does not correlate with attendance or outcome contradicting existing literature (Norcross et al., 2011; Pantalon et al., 2002; Pinto et al., 2007). Dozois et al's (2004) and Tambling and Ketring's (2014) findings that the URICA had poor psychometric properties may help explain the findings from this study. One area where the study agreed with existing literature was finding that most people enter services outside of the action phase, supporting Norcross et al (2011). The findings from the current study suggest that therapeutic outcome and attendance may be better explained by factors other than readiness to change as assessed by the URICA.

Factors that contribute to therapy attendance and outcome, such as therapeutic alliance and therapist competence, may help explain why a person regularly attends therapy and has a positive outcome over a person's assumed readiness to change (Branson et al., 2015; Falkenström et al., 2013). The findings from Odenwald and Semrau (2013) may help explain the lack of correlation with attendance. Many people who access the service have experienced some degree of trauma, potentially explaining attrition better than readiness to change. As the URICA (McConnaughy et al.,1983) was not associated with the outcome of therapy, there is potential that a person's initial level of distress and co-morbidity may explain negative outcomes, more so than a person's level of motivation (Amati et al. 2018). Despite the results being non-significant, ways in which motivation may be interlinked with a patient's initial level of distress and co-morbidity comes from Bachelor et al.'s (2007) suggestion that patients who experience more difficulties with their mental health may find it harder to engage in therapy and build a relationship with a therapist.

Contextually as the service is a secondary mental health service people who access it have severe and enduring mental health conditions, and most people in the study entered with severe psychological distress as assessed by the CORE-10 (Barkham et al., 2013). The research from Amati et al. (2018), Bachelor et al. (2007), and Odenwald and Semrau (2013) reflect the added complexities that trauma, co-morbidity, and initial level of distress has on therapeutic outcome and engagement as opposed to readiness to change. This may reflect the complex interaction of multiple variables impacting a patient's outcome and attendance of therapy as opposed to readiness to change for patients who access secondary care mental health services. The URICA was used in the service to help gauge how appropriate a referral was and the findings of the current study and research from Amati et al. (2018), Bachelor et al. (2007), and Odenwald and Semrau (2013), may reflect the multitude of factors that influence therapy. Therefore, the URICA may not be the best tool to assess readiness to change and the appropriateness of referrals in secondary care services.

Potential explanations for finding people who were less ready to change more appropriate, include the possibility that psychologists feel able to work with people

lacking motivation. This may be explained by practitioners having experience of working with patients with low levels of motivation and ambivalence about change (Ryan et al., 2011). As most patients entered the service at the contemplation stage, motivational interviewing and cognitive behavioural therapy are recommended to help move a person through the stages of change (Petrocelli, 2002; Prochaska & DiClemente, 1983), which psychologists may feel comfortable to deliver. Another potential explanation comes from Searles (1986) who found psychotherapists have the desire to alleviate suffering, this may mean a person in a lower stage of change is deemed to be 'suffering' more, and thus a more appropriate referral. The final potential explanation comes from Pantalon and Swanson (2003) as they found less motivated people attended more regularly. If this was what practitioners saw in their practice it would explain why they believe a person in a lower stage of change would be more appropriate. As therapy places a high level of demand on an individual, it maybe that even a small amount of motivation is enough to deem a person appropriate to access support. Interestingly, the URICA (McConnaughy et al., 1983) and practitioner rated readiness did not correlate. This may suggest when psychologists think about how ready a person is for therapy, more factors than just the stage of change are considered, and that patients and practitioners may consider readiness differently. This may be explained by the qualitative findings as the validity of responses gained by the URICA was questioned by practitioners.

Focusing on the qualitative results, "positive views" captured practitioner's beliefs of measuring a person's readiness to change as helpful, and a patient completing the URICA (McConnaughy et al., 1983) helps to prepare for therapy. Most practitioners believed there were positives to using the URICA and checked the score prior to a patient starting therapy. Despite the quantitative findings suggesting the URICA may not be the best tool to use in the service, practitioners find value in assessing readiness to change and there are different ways this can be done. All practitioners believed there were negatives to the URICA and did not attribute the outcome of therapy to it, potentially explained by practitioner's believing other factors such as their competence and the relationship built with the patient are more important to regular attendance and outcome (Branson et al., 2015; Falkenström et al., 2013). The "negative view" category contained the most codes and three of the most frequent codes. There was a question of the measures redundancy with two

practitioners' saying they assess readiness to change on their own and given the findings of this study and existing research (Doizois et al., 2004; Tambling and Ketring's, 2014). Practitioners rating readiness to change their way as opposed to using the URICA may be wise. Feedback provided by practitioners on the URICA commented on the length and potential burden it placed on a patient. The "ambivalence" category contained the more hesitant comments made by practitioners and questioned the validity of the URICA, but again supported the belief that assessing readiness to change maybe potentially helpful. This supports that assessing readiness to change seems important to practitioners; however, the URICA may not be the best way to do it. The final category "change to measure and process" gained mixed responses. Some practitioners wanted to remove the URICA, while others made recommendations to make it shorter, or change the format of answers. There was the recommendation to add measures that assess areas other than readiness to change and assess the practical barriers a person faces to access services.

Recommendations

Given this study's findings, one recommendation that agrees with Doizios et al. (2004) is that the URICA (McConnaughy et al., 1983) may not be suitable to be used in its current format. Therefore, a recommendation for the service is to review the use of the URICA and consider removal or alternatives. Despite the critique of Norcross et al's meta-analysis (2011), practical recommendations were suggested and seem appropriate for the service to consider if the service wants to continue to want to measure readiness to change. To assess the stages of change instead of using the URICA a practitioner could ask the patient questions about a specific problem (Table 39).

Table 39

Norcross et al's (2011) Questions to Assess Stage of Change

Question	Stage of Change Assessed
Would you say you are not ready to change in the next 6 months?	Precontemplation
Are you thinking about changing in the next 6 months?	Contemplation
Are you thinking about changing in the next month?	Preparation
Have you already made some changes/progress?	Action

A further recommendation to the service is to reduce the number of areas the practitioners score on the assessment form. As the practitioner rated areas generally correlated with each other, cutting out questions and retaining one assessing appropriateness would be beneficial. As the dataset inherited by the researcher had lots of missing data, the service could consider implementing practical methods to try and improve data quality and collection of outcome measures.

Strengths & Limitations

A strength of this study is it has added research into the applicability of the URICA (McConnaughy et al., 1983) in secondary care mental health services in the UK. The amount of missing data impacted the depth of the quantitative analysis resulting in some hesitancy needed when interpreting the results and conclusions of the study. As small sample sizes can cause issues with internal and external validity. It cannot be said the qualitative data from the practitioners represented the whole service due to the small sample size and lack of depth. There is the potential the small sample gives rise to self-selection bias. As the category with the most codes were negative views, there is the potential the people who took part in the study wanted to express their strong opinions, leading to a biased set of results. Reflexivity was key for the author to limit bias; however, gaining a larger sample size would have helped. Critiquing qualitative data collection, practitioners had the option to return questionnaires electronically or physically, possibly limiting responses. While all practitioners returned their forms electronically, this waived their right to anonymity as they were mailed to the researcher. The option to complete electronically was an attempt to save time; however, the researcher could have run

either a focus group to collect data from multiple people at once or individual interviews. Using interviews or focus groups with more people could have allowed for an in-depth analysis and instead of using CCA, thematic analysis could have been used. The final critique comes from not collecting patient feedback. A few had left written comments on the URICA (McConnaughy et al., 1983) and the use of focus groups or interviews could have been used to add more depth to the qualitive element of the study, potentially giving depth to some of the practitioner's hypothesises of patient's struggles.

Future Research

Given the issues with the psychometric properties (Doizois et al., 2003; Tambling & Ketring., 2014) of the URICA (McConnaughy et al., 1983) and critiques made by practitioners in this study, there is a need for research into possible revisions, or adaptations of the URICA specific to mental health populations. Questions where the URICA asks about the "problem" could be adapted to be clearer and say, "the problem with your mental health". The vast amount of literature on the URICA has focused on physical health, and addictions, and the existing research with psychotherapy has had methodological issues (Doizois et al., 2003; Norcross et al., 2011). Therefore, future research with the URICA and psychotherapy should focus on mental health conditions. Future research could also focus on other measures to assess motivation to change in mental health populations such as the shorter version of the URICA, the URICA-S (Mander et al., 2012), or the Readiness for Therapy Questionnaire (RTQ; Ghomi et al., 2020).

Conclusion

To conclude, a patient's stage of change does not correlate with therapeutic outcome or attendance in this service, and practitioners deem a person more appropriate when they are less ready for therapy as assessed by the URICA (McConnaughy et al., 1983). Practitioners hold negative views of the URICA, but also see the potential in assessing readiness to change as a concept. The practical recommendations for the service are to review the use of the URICA, as it may not

be the best tool to use with secondary care mental health populations and assessing a person's stage of change verbally may be more suitable.

SSRP Appendices

Appendix P: Practitioner Questionnaire

Practitioner Perspectives Questionnaire

Participant Number (please keep a copy of this number, so if you wish to withdraw your data you are able to do so):

In general, what are your thoughts on the URICA?
……..

Do you check a patient's URICA score prior to your session with them? Yes/No
If no, why not?.....

Do you think the URICA is a worthwhile measure? Yes/No/Not Sure
Please explain answer……..

Do you believe there are any positives to using the URICA? Yes/No
Please explain answer and list positives……

Do you believe there are any negatives to using the URICA? Yes/No
Please explain answer and list negatives……

Have you attributed a patient's outcome in therapy whether that be positive or negative, to their URICA score? Yes/No
Please can you explain your answer……..

Has a patient ever commented on the URICA in session with you? Yes/No
If so, please can you explain……..

If you could make a change to the URICA, what would it be?
……..

If you could make any change to the questionnaires used as part of the screening process what would they be?
……

Appendix Q: SPSS Outputs for Correlations

SPSS Output Therapeutic Outcome

Correlations

		Core 10 Change post-ass or pre	URICA assess or pre raw score
Core 10 Change post-ass or pre	Pearson Correlation	1	-.129
	Sig. (2-tailed)		.452
	N	36	36
URICA assess or pre raw score	Pearson Correlation	-.129	1
	Sig. (2-tailed)	.452	
	N	36	60

SPSS Output Therapy Attendance

Correlations

		URICA assess or pre raw score	% attended
Kendall's tau_b	Correlation Coefficient	1.000	-.027
	Sig. (2-tailed)	.	.789
		60	48
	Correlation Coefficient	-.027	1.000
	Sig. (2-tailed)	.789	.
		48	48

Kendall's Tau Correlation Matrix (N=60)

Correlations

			Appropriateness of referral	Psychological Mindedness/ Insight	Readiness For Therapy	Potential For Improvement	User's Motivation	URICA assessor pre raw score
Kendall's tau_b	Appropriateness of referral	Correlation Coefficient	1.000	.444**	.473**	.436**	.213	-.318**
		Sig. (2-tailed)	.	<.001	<.001	<.001	.080	.002
		N	60	60	60	60	60	60
	Psychological Mindedness/Insight	Correlation Coefficient	.444**	1.000	.585**	.418**	.450**	-.037
		Sig. (2-tailed)	<.001	.	<.001	<.001	<.001	.715
		N	60	60	60	60	60	60
	Readiness For Therapy	Correlation Coefficient	.473**	.585**	1.000	.548**	.383**	-.096
		Sig. (2-tailed)	<.001	<.001	.	<.001	.001	.349
		N	60	60	60	60	60	60
	Potential For Improvement	Correlation Coefficient	.436**	.418**	.548**	1.000	.305*	-.169
		Sig. (2-tailed)	<.001	<.001	<.001	.	.011	.103
		N	60	60	60	60	60	60
	User's Motivation	Correlation Coefficient	.213	.450**	.383**	.305*	1.000	-.039
		Sig. (2-tailed)	.080	<.001	.001	.011	.	.706
		N	60	60	60	60	60	60
	URICA assess or pre raw score	Correlation Coefficient	-.318**	-.037	-.096	-.169	-.039	1.000
		Sig. (2-tailed)	.002	.715	.349	.103	.706	.
		N	60	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note: URICA is patient rated, all other areas are rated by the practitioner

SSRP References

Amati, F., Banks, C., Greenfield, G., & Green, J. (2018). Predictors of outcomes for patients with common mental health disorders receiving psychological therapies in community settings: a systematic review, *Journal of Public Health*, *40*(3), 375–e387. https://doi.org/10.1093/pubmed/fdx168

Anjara, S.G., Bonetto, C., & Van Bortel, T et al. (2020). Using the GHQ-12 to screen for mental health problems among primary care patients: Psychometrics and practical considerations. *International Jounral Mental Health System, 14(*62). https://doi.org/10.1186/s13033-020-00397-0

Bachelor, A., Laverdière, O., Gamache, D., & Bordeleau, V. (2007). Clients' collaboration in therapy: Self-perceptions and relationships with client psychological functioning, interpersonal relations, and motivation. *Psychotherapy: Theory, Research, Practice, Training*, *44*(2), 175. https://doi.org/10.1037/0033-3204.44.2.175

Barrett, M. S., Chua, W. J., Crits-Christoph, P., Gibbons, M. B., & Thompson, D. (2008). Early withdrawal from mental health treatment: Implications for psychotherapy practice. *Psychotherapy, 45*(2), 247-267. https://doi.org/10.1037/0033-3204.45.2.247

Barkham, M., Bewick, B., Mullin, T., Gilbody, S., Connell, J., Cahill, J., Evans, C. (2013). The CORE-10: A short measure of psychological distress for routine use in the psychological therapies. *Counselling and Psychotherapy Research, 13*(1), 3-13. https://doi.org/10.1080/14733145.2012.729069

Blank, L., Baxter, S., Woods, H. B., Goyder, E., Lee, A., Payne, N., & Rimmer, M. (2014). Referral interventions from primary to specialist care: A systematic review of international evidence. *The British Journal of General Practice: The Journal of The Royal College of General Practitioners*, *64*(629), e765–e774. https://doi.org/10.3399/bjgp14X682837

Botsch, R. (2011). *Chapter 12. Significance and Measures of Association***.** http://polisci.usca.edu/apls301/Text/Chapter%2012.%20Significance%20and%20Measures%20of%20Association.htm

Branson, A., Shafran, R., & Myles, P. (2015). Investigating the relationship between competence and patient outcome with CBT. *Behaviour Research and Therapy*, *68*, 19-26. https://doi.org/10.1016/j.brat.2015.03.002

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021) One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328-352, https://doi.org/10.1080/14780887.2020.1769238

British Medical Association. (2022). *Measuring progress: Commitments to support and expand the mental health workforce in England.* https://www.bma.org.uk/media/2405/bma-measuring-progress-of-commitments-for-mental-health-workforce-jan-2020.pdf

Brown, A., Fleetwood, S., & Roberts, J. M. (2003). The marriage of critical realism and Marxism: Happy, unhappy or on the rocks? In A. Brown, S. Fleetwood, & J. M. Roberts (Eds.), *Critical realism and Marxism* (pp. 1–22). Routledge. https://doi.org/10.4324/9780203299227-1

Clark-Carter. (2010). *Quantitative psychological research: The complete student's companion* (3rd ed.). Psychology Press.

Connell, J., & Barkham, M. (2007). *CORE-10 User Manual, Version 1.1*, Core Systems Trust & Core Information Management Systems Ltd.

Denzin, N. K., & Lincoln, Y. S. (2011). *The Sage handbook of qualitative research*. Thousand Oaks: Sage.

Derisley, J., & Reynolds, S. (2000). The transtheoretical stages of change as a predictor of premature termination, attendance and alliance in psychotherapy. *British Journal of Clinical Psychology*, *39*(4), 371–382. https://doi.org/10.1348/014466500163374

DiClemente, C. C., & Hughes, S. O. (1990). Stages of change profiles in outpatient alcoholism treatment. *Journal of Substance Abuse, 2*(2), 217–235. https://doi.org/10.1016/s0899-3289(05)80057-4

DiClemente, C. C., & Prochaska, J. O. (1982). Self-change and therapy change of smoking behavior. A comparison of processes of change in cessation and maintenance. *Addictive Behavior*, *7*(2), 133–142. https://doi.org/10.1016/0306-4603(82)90038-7

Dozois, D. J. A., Westra, H. A., Collins, K. A., Fung, T. S., & Garry, J. K. F. (2004). Stages of change in anxiety: Psychometric properties of the University of Rhode Island

Change Assessment (URICA) scale. *Behaviour Research and Therapy, 42*(6), 711–729. https://doi.org/10.1016/s0005-7967(03)00193-1

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing, 62(1),* 107–115.https://do.org:10.1111/j.1365-2648.2007.04569

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, *7*(3), 93–99. https://doi.org/10.1016/j.afjem.2017.08.001

Evans, C., Mellor-Clark, J., Margison, F., Barkham, M., Audin, K., Connell, J., & McGrath, G. (2000). CORE: Clinical Outcomes in Routine Evaluation. *Journal of Mental Health, 9*(3), 247–255. https://doi.org/10.1080/713680250

Falkenström, F., Granström, F., & Holmqvist, R. (2013). Therapeutic alliance predicts symptomatic improvement session by session. *Journal of Counseling Psychology*, *60*(3), 317-328. https://doi.org/10.1037/a0032258

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed). Sage Publications.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: Methodology meets method. *International Journal of social Research Methodology*, *20*(2), 181-194. https://doi.org/10.1080/13645579.2016.1144401

Galante, J. R., Humphreys, R., & Molodynski, A. (2019). Out-of-area placements in acute mental health care: The outcomes. *Progress in Neurology and Psychiatry*, 23(1), 28–30. https://doi.org/10.1002/pnp.528

Gbrich, C. (2007). *Qualitative Data Analysis: An Introduction* (1st edn). Sage Publications.

Ghomi, M., Wrightman, M., Ghaemian, A., Grey, N., Pickup, T., & Richardson, T. (2021). Development and validation of the Readiness for Therapy Questionnaire (RTQ). *Behavioural and Cognitive Psychotherapy*, *49*(4), 413-425. https://doi.org/10.1017/S1352465820000764

Hair, Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (Second edition). Sage.

Hatfield, D. R., & Ogles, B. M. (2004). The Use of Outcome Measures by Psychologists in Clinical Practice. *Professional Psychology: Research and Practice*, *35*(5), 485-491. https://doi.org/10.1037/0735-7028.35.5.485

House of Commons. (2021). *Mental Health Statistics (England).* https://researchbriefings.files.parliament.uk/documents/SN06988/SN06988.pdf

Howell, D. C. (2007). *Statistical methods for psychology* (6th ed.). Thomson/Wadsworth

Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research, 15(*9), 1277–1288. doi:10.1177/1049732305276687

Iacobucci, G. (2022). England saw record 4.3 million referrals to mental health services in 2021, *British Medical Journal*, 376, https://doi.org/10.1136/bmj.o672

Johansson, H., & Eklund, M. (2006). Helping alliance and early dropout from psychiatric out-patient care. *Social Psychiatry and Psychiatric Epidemiology*, *41*(2), 140-147. https://doi.org/10.1007/s00127-005-0009-z

Karekla, M., Konstantinou, P., Ioannou, M., Kareklas, I., & Gloster, A. T. (2019). The phenomenon of treatment dropout, reasons and moderators in acceptance and commitment therapy and other active treatments: A meta-analytic review. *Clinical Psychology in Europe*, *1*(3), 1-36. https://doi.org/10.32872/cpe.v1i3.33058

King, C. (2001). Severe mental illness: managing the boundary of a CMHT. *Journal of Mental Health*, *10*(1), 75-86. https://doi.org/10.1080/09638230123991

Kondracki, N. L., & Wellman, N. S. (2002). Content analysis: Review of methods and their applications in nutrition education. *Journal of Nutrition Education and Behavior*, *34*, 224-230. https://doi.org/10.1016/s1499-4046(06)60097-3

Krampe, H., Salz, A.-L., Kerper, L. F., Krannich, A., Schnell, T., Wernecke, K.-D., & Spies, C. D. (2017). Readiness to change and therapy outcomes of an innovative psychotherapy program for surgical patients: Results from a randomized controlled trial. *BMC Psychiatry, 17*(1). https://doi.org/10.1186/s12888-017-1579-5

Leung, D. Y., & Chung, B. P. M. (2019). Content Analysis: Using Critical Realism to Extend Its Utility. Handbook of Research Methods in Health Social Sciences, 827–841. https://doi.org/10.1007/978-981-10-5251-4_102

Mander, J., Wittorf, A., Teufel, M., Schlarb, A., Hautzinger, M., Zipfel, S., & Sammet, I. (2012). Patients with depression, somatoform disorders, and eating disorders on the stages of change: Validation of a short version of the URICA. *Psychotherapy*, *49*(4), 519-527. https://doi.org/10.1037/a0029563

Mayring, P. (2000). Qualitative Content Analysis. *Qualitative Social Research*, *1*(20).

Maxwell, J. A., & Mittapalli, K. (2010). Realism as a Stance for Mixed Methods Research. *SAGE Handbook of Mixed Methods in Social & Behavioral Research,* 145–168. https://doi.org/10.4135/9781506335193.n6

McConnaughy, E. A., Prochaska, J. O., & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research & Practice, 20*(3), 368–375. https://doi.org/10.1037/h0090198

McLeod, J. (2000). The contribution of qualitative research to evidence-based counselling and psychotherapy. In N. Rowland & S. Gross (Eds.) *Evidence Based Counselling and Psychological Therapies* (pp.111-126). Routledge.

Miller, W. R., & Rollnick, S. (2012). *Motivational interviewing: Helping people change*. Guilford press.

Mitchell, A., & Selmes, T. (2007). Why don't patients attend their appointments? Maintaining engagement with psychiatric services. *Advances in Psychiatric Treatments, 13*(6), 423-434. https://doi.org/10.1192/apt.bp.106.003202

Molodynski, A., McLellan, A., Craig, T., & Bhugra, D. (2021). What does COVID mean for UK mental health care?. *International Journal of Social Psychiatry*, *67*(7), 823-825. https://doi/org/10.1177/0020764020932592

Myers, B., van der Westhuizen, C., Naledi, T., Stein, D. J., & Sorsdahl, K. (2016). Readiness to change is a predictor of reduced substance use involvement: findings from a randomized controlled trial of patients attending South African emergency departments. *BMC psychiatry*, *16*(1), 1-12. https://doi.org/10.1186/s12888-016-0742-8

National Health Service. (2014). *Five Year Forward View*. https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf

National Health Service. (2019). *The Long Term Plan.* https://www.longtermplan.nhs.uk/wp-content/uploads/2019/01/nhs-long-term-plan-june-2019.pdf

Norcross, J. C., Krebs, P. M., & Prochaska, J. O. (2011). Stages of change. *Journal of Clinical Psychology*, *67*(2), 143-154. https://doi.org/10.1002/jclp.20758

Odenwald, M., & Semrau, P. (2013). Dropout among patients in qualified alcohol detoxification treatment: the effect of treatment motivation is moderated by Trauma Load. *Substance Abuse Treatment, Prevention, and Policy, 8*(1). https://doi.org/10.1186/1747-597x-8-14

Pantalon, M. V., & Swanson, A. J. (2003). Use of the university of rhode island change assessment to measure motivational readiness to change in psychiatric and dually diagnosed individuals. *Psychology of Addictive Behaviors, 17*(2), 91-97. http://doi.org/10.1037/0893-164X.17.2.91

Peat, J. & Barton, B. (2005). *Medical Statistic, A guide to data analysis and critical appraisal*. Blackwell publishing Ltd.

Petrocelli, J. V. (2002). Processes and stages of change: Counseling with the transtheoretical model of change. *Journal of Counselling and Development*, *80*(1), 22–30. https://doi.org/10.1002/j.1556-6678.2002.tb00162.x

Pinto, A., Pinto, A. M., Neziroglu, F., & Yaryura-Tobias, J. A. (2007). Motivation to change as a predictor of treatment response in obsessive compulsive disorder. *Annals of Clinical Psychiatry*, *19*(2), 83-87. https://doi.org/10.1080/10401230701334747

Pope, C., Ziebland, S., & Mays, N. (2006). Analysing qualitative data. In: Pope C, Mays N (eds). *Qualitative Research in Health Care* (3rd edn). Blackwell Publishing, 63–81.

Powers, B., & Knapp, T. (2006) *Dictionary of Nursing Theory and Research* (3rd edn). Springer Publishing Company.

Pratschke, J. (2003). Realistic models? critical Realism and statistical models in the social sciences. *Philosophica,* 71(1). https://doi.org/10.21825/philosophica.82236

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, *51*(3), 390. https://doi.org/10.1037/0022-006x.51.3.390

Prochaska, J. O., Redding, C. A., & Evers, K. E. (2015). The transtheoretical model and stages of change. *Health Behavior: Theory, Research, and Practice*, *97*.

Reeves, A., Basu, S., McKee, M., Marmot, M., & Stuckler, D. (2013). Austere or not? UK coalition government budgets and health inequalities. *Journal of the Royal Society of Medicine, 106*(11), 432–436. https://doi.org/10.1177/0141076813501101

Searles, H. F. (1986). The effort to drive the other person crazy: An element in the other aetiology and psychotherapy of schizophrenia. In *Collected papers on schizophrenia and related subjects* (pp. 254– 283). Karnac.

Stavrou, S., Cape, J., & Barker, C. (2009). Decisions about referrals for psychological therapies: a matched-patient qualitative study. *British Journal of General Practice*, *59*(566), e289-e298. https://doi.org/10.3399/bjgp09x454089

Tambling, R. B., & Ketring, S. A. (2013). The R-URICA: A Confirmatory Factor Analysis and a Revision to the URICA. *Contemporary Family Therapy, 36(*1), 108–119. https://doi/org/10.1007/s10591-013-9279-x

Thode, H.C. (2002). *Testing For Normality* (1st ed.). CRC Press. https://doi.org/10.1201/9780203910894

Vaismoradi, M., Turunen, H. & Bondas, T. (2013). Qualitative descriptive study. *Nursing Health Science,* 15, 398-405. https://doi.org/10.1111/nhs.12048

Wadoo, O., Ouanes, S., Ahmed, M., Saeid, I., AlAbdulla, S. A., & AlAbdulla, M. (2021). Improving referrals from primary care to secondary mental health services through an educational intervention: experience from Qatar. *BJPsych International*, *18*(3), 70–74. https://doi.org/10.1192/bji.2021.5

Wierzbicki, M., & Pekarik, G. (1993). A meta-analysis of psychotherapy dropout. *Professional Psychology: Research and Practice, 24*(2), 190-195. https://doi.org/10.1037/0735-7028.24.2.190