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Airdrie, Jac

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**Research Portfolio Submitted in Part Fulfilment of
the requirements for the Degree of Doctorate in
Clinical Psychology Volume 1 of 2**

Jac Neirin Airdrie

University of Bath
Department of Psychology

June 2020

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Literature Review Project

Changes in PTSD Prevalence and the Moderating Role of Gender and Age in the First Two Years Following Trauma: A Meta-Analytic Study

Jac Neirin Airdrie

Ja846@bath.ac.uk

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This journal was chosen due to publishing reviews on topics which seek to advance the science and practice fields of clinical psychology.

Changes in PTSD Prevalence and the Moderating Role of Gender and Age in the First Two Years Following Trauma: A Meta-Analytic Study

Post-traumatic Stress Disorder (PTSD) in adults is a common and life impacting disorder. Understanding its natural course and factors which impact upon it is essential to inform decisions about when and for whom treatment is likely to be beneficial. We conducted a systematic review and meta-analysis of studies reporting PTSD prevalence on more than one occasion between one and twelve months following a traumatic event in samples who had not received treatment, whilst also exploring any subsequent assessments after this time. The search yielded 78 peer reviewed studies that had assessed PTSD up to two years following trauma. When pooling reported prevalence and change in prevalence over time, it was found that just over a quarter of individuals presented with PTSD at one month. Prevalence reduced by a third between one and three months, however after this point no further significant reduction was evident. Further, in exploring the impact of age and gender on prevalence change, it was found that while a higher percentage of females in a sample was associated with higher PTSD at one month, a higher percentage of females was also associated with larger reductions in prevalence over time. We found no evidence that age was implicated in the course of PTSD however did identify a lack of studies on PTSD in older adults (>60 years). The current findings have implications for timing of assessment and treatment initiation following trauma.

Changes in PTSD Prevalence and the Moderating Role of Gender and Age in the First Two Years Following Trauma: A Meta-Analytic Study

Most individuals will be exposed to at least one traumatic event in their lifetime (Solomon & Davidson, 1997) and between 25-30% of those will develop Posttraumatic Stress Disorder (PTSD; National Institute of Health and Care Excellence [NICE], 2018). PTSD is characterised by the presence of intrusive thoughts related to the traumatic event, the avoidance of reminders of the trauma, negative alterations in cognition and mood, and hyperarousal (American Psychiatric Association, 2013) causing significant distress and impacting upon quality of life. The lifetime prevalence of PTSD, based on a large representative sample in the USA, is estimated to be around 8% (Kessler et al., 1995). PTSD can impact a number of areas of the sufferers' lives including relationships (Galovski & Lyons, 2004; Beck et al., 2009), finances and occupation (Kessler, 2000) and physical health (Scott et al., 2008), as well as impacting on family (Williamson et al., 2019). Such pressures may highlight why individuals with PTSD are also at a moderately increased risk of suicide compared to those without the disorder, even after controlling for other co-morbid psychiatric diagnoses (Krysinska & Lester, 2010; Panagioti et al., 2009). As a result, interventions to help those with PTSD are hugely important. However, the point at which one intervenes can be equally as significant. Intervening too early in certain cases has been shown to have little impact on symptoms, or even make symptoms and progression worse, as was evidenced to be the case with debriefing (Rose et al., 2002). Similarly, many of those who receive a diagnosis of PTSD will recover from the disorder without intervention (see Morina et al., 2014, for review, with estimates varying between eight and 89%), therefore intervening in these individuals may represent an inefficient use of resources. As a result of the above, understanding natural recovery patterns could be useful for identifying at what point formal support may be most suitably offered.

A recent meta-analysis of 27 studies by Hiller et al. (2016) has considered this question in the child and adolescent literature. Considering studies with a follow-up of up to a year, the authors found a 50% reduction in symptoms over the first 6 months, while there was no evidence of a significant further reduction between 6 to 12 months. In addition, three systematic reviews have examined remission rates in the adult literature. Morina et al. (2014) examined studies without specific treatment and found remission rates of between 8 and 89%. However, they considered studies with a long follow-up period (mean = 40 months), which means even in those who eventually remit, a long period of suffering is apparent. Steinert et al. (2015) also examined the longitudinal course of PTSD, however they limited their studies to a follow-up of longer than three years and for many studies it

was not clear if participants had received treatment. Further, Santiago et al. (2013) conducted a systematic review of 35 studies of PTSD prevalence over the first year following trauma, finding median prevalence rates of PTSD of 28.8%, 17.8%, 14.9% and 17.0% at one, three, six and 12 months following trauma, respectively. However, as Santiago et al., (2013) failed to use meta-analytic methods to combine studies, relying on the median prevalence of studies which does not account for the sample size of studies and therefore may not be a good estimate of pooled prevalence.

Moderators of Recovery

Equally as important as documenting the natural course of PTSD, is a consideration of the factors which may predict or moderate natural recovery from PTSD. Identifying such factors will help highlight for whom intervening is most important and has implications for the development of early screening measures following trauma.

Gender Differences in Risk of Developing PTSD

A relatively robust finding in the literature has been that females have a two-fold increase in risk of developing PTSD following a traumatic event than males (Ditlevsen & Elklit, 2012; Tolinet et al., 2006). One possible explanation for this may be differences in type of trauma females and males are exposed to; for example, there is evidence that females are more likely than males to be the victim of sexual assault or child abuse (Tolin et al., 2006). Another explanation proposed for gender risk difference in PTSD is cognitive and behavioural responses to traumatic events. Foa et al. (1999) found that females were more likely to blame themselves and believe they acted incompetently, and to use coping strategies such as wishful thinking and thought suppression than males, which are factors that correlate strongly with PTSD symptom severity (Clohessy & Ehlers, 1999).

Gender Differences in Trajectory of PTSD

While there has been much research demonstrating females are at a higher risk of developing PTSD, there is less certainty whether there is a difference in the course of PTSD between males and females. If, as discussed above, responses to traumatic events differ between males and females at a cognitive and behavioural level (Clohessy & Ehlers, 1999; Foa et al., 1999), it is possible that there will be gender differences in natural recovery rates, given that these are also factors that are important in the maintenance of PTSD (Ehlers & Clark, 2000). Indeed, there is evidence that females are more likely to develop a chronic course of the disorder in long-term studies (Breslau & Davis, 1992; Pietrzak et al., 2013). However, there are other studies finding that gender is not an important factor in predicting long-term course (Freedman et al., 1999; Galatzer-Levy et al., 2013; McLaughlin et al., 2011; Morina et al., 2014; Yin et al., 2019).

The Effect of Age During Exposure to Trauma on Onset and Trajectory of PTSD

Another important demographic characteristic that may be important in predicting long-term PTSD trajectory, is age. Indeed, there is robust evidence that being exposed to a traumatic event in childhood is associated with a greater likelihood of developing PTSD in adulthood than those who experienced their first traumatic event in adulthood (Zlotnick et al., 2009). However, in those who experience their first trauma within adulthood, it is unclear if and how the age at which they experienced that event impacts on the course of PTSD. As we age, there are factors that may make it more difficult to deal with a traumatic event, such as changes in role, decreases in social support and cognitive impairment (Aldwin et al., 1996; Cook et al., 2001). On the other hand, increased age can bring resilience and increased coping strategies (Moos et al., 2006).

The literature is inconsistent as to the effect of age on longitudinal course of PTSD. Boscarino (2008) found that younger age of exposure in adulthood was associated with an increased chance of developing PTSD, however older age was associated with delayed onset PTSD. Longitudinal studies also find mixed evidence, with some studies finding increased age as a predictor of a more chronic course of PTSD (Galatzer-Levy et al., 2013; McLaughlin et al., 2011; Pietrzak et al., 2013; Steinert et al., 2015) whilst other studies have found no such relationship (Dickstein et al., 2010; Freedman et al., 1999; Guyon et al., 2017; Pietrzak et al., 2012).

Aims and Rationale

To date, reviews of the natural course of PTSD in adulthood have focused on studies with very long-term follow-up (Morina et al., 2014; Steinert et al., 2015), or when examining the shorter term, have not used meta-analytic methods to combine results (Santiago et al., 2013). By determining the course and rate of natural recovery from PTSD, it will help highlight the point following a traumatic event when further natural recovery is unlikely and therefore highlight when intervention is warranted. Further, by exploring key moderators to the natural course of recovery, it can help highlight individual characteristics that may indicate a more chronic course of PTSD and therefore those individuals that are a priority for treatment.

Therefore, the aims of the current study were to conduct a systematic review and meta-analysis:

(1) in order to quantify PTSD prevalence over the first year following a traumatic event, whilst also exploring prevalence in the longer term when reported, and

(2) via meta-regression, to explore the influence of the proportion of the sample that were male/female, and average age on PTSD prevalence estimates and change in prevalence over this time period.

The review was conducted in collaboration with another DCLinPsy student, Peter Diamond. The moderating effects of the assessment method of PTSD (Self-report vs. Diagnostic Interview) and type of trauma (Intentional vs. Unintentional) on PTSD prevalence over time were explored separately and are presented in his thesis (Diamond unpublished DCLinPsy thesis, 2020).

Method

Pre-registration

The protocol for the conduct of this review was pre-registered on Prospero (ID: CRD42018105334).

Selection of Studies

Search Strategy

To identify papers for both elements of the meta-analysis, the terms “posttraumatic stress” or “post-traumatic stress” or “post traumatic stress” or “PTSD” combined with (and “longitudinal” or “trajectory” or “prospective” were used to search PsycNET (including psycINFO, PsycARTICLES, PsycEXTRA (to include grey literature)), PubMed and the Published International Literature on Traumatic Stress (PILOTS) databases in September 2018 (and updated in November 2019) from the year 1980. The reference lists of published reviews in related areas were also searched. No specific search terms related to age and gender were included owing to it being routine in research articles to include the average age and gender ratio of the included sample. The Cochrane library and Prospero were checked to ensure no published reviews already existed or were in progress in the area. Articles meeting the search criteria were imported into Covidence reference management software (Veritas Health Innovation, 2020).

Inclusion Criteria

Inclusion and exclusion criteria are summarised in Table 1.1. Studies were included that measured prevalence of PTSD using a standard measure (i.e. questionnaire and/or diagnostic interview) in exclusively adult samples (≥ 18 years) at more than one time point between one month and 12 months following a traumatic event. These time points included (1-month, 3-months (+/- 1 month), 6-months (+/- 1 month), 9-months (+/- 1 month) and 12-months (+/- 1 month). The definition of traumatic event included any event meeting PTSD

Criterion A of the Diagnostic and Statistical Manual of Mental Disorders (DSM) Edition IV or V. If a study reported two time points that fell into the epoch of one of the time points of interest for the current study (e.g. if a study reported PTSD prevalence at 2 and 4 months post-trauma, both timepoints would fall into the 3 months +/- 1 time point of interest for the current study), the earlier time point was used (e.g. 2 months) as long as the study also included a later time point that met our criteria.

Exclusion Criteria

Studies including participants under the age of 18 years, or with moderate to severe brain

Table 1.1

Criteria for Inclusion (PECO) and Exclusion

Inclusion Criteria	
Participants	Adults (≥ 18 years of age)
Exposure	Experienced a traumatic event defined by DSM-IV or V criteria with no treatment for PTSD
Comparison	None
Outcome	Prevalence of PTSD assessed using a standardised measure on more than one occasion between 1 month and 12 months following a traumatic event ¹
Exclusion Criteria	
	Sample includes participants < 18 years of age
	Sample includes participants with moderate to severe brain injury
	Participants experienced traumatic event before the age of 18 years
	Participants received treatment targeted at PTSD symptoms
	Unclear as to the elapsed time between traumatic event and follow up assessments
	Used DSM-III criteria to determine PTSD diagnosis
	Case studies and reviews

Notes. DSM = Diagnostic and Statistical Manual of Mental Disorders; PTSD = Post-Traumatic Stress Disorder

¹Time points of interest specified in main text.

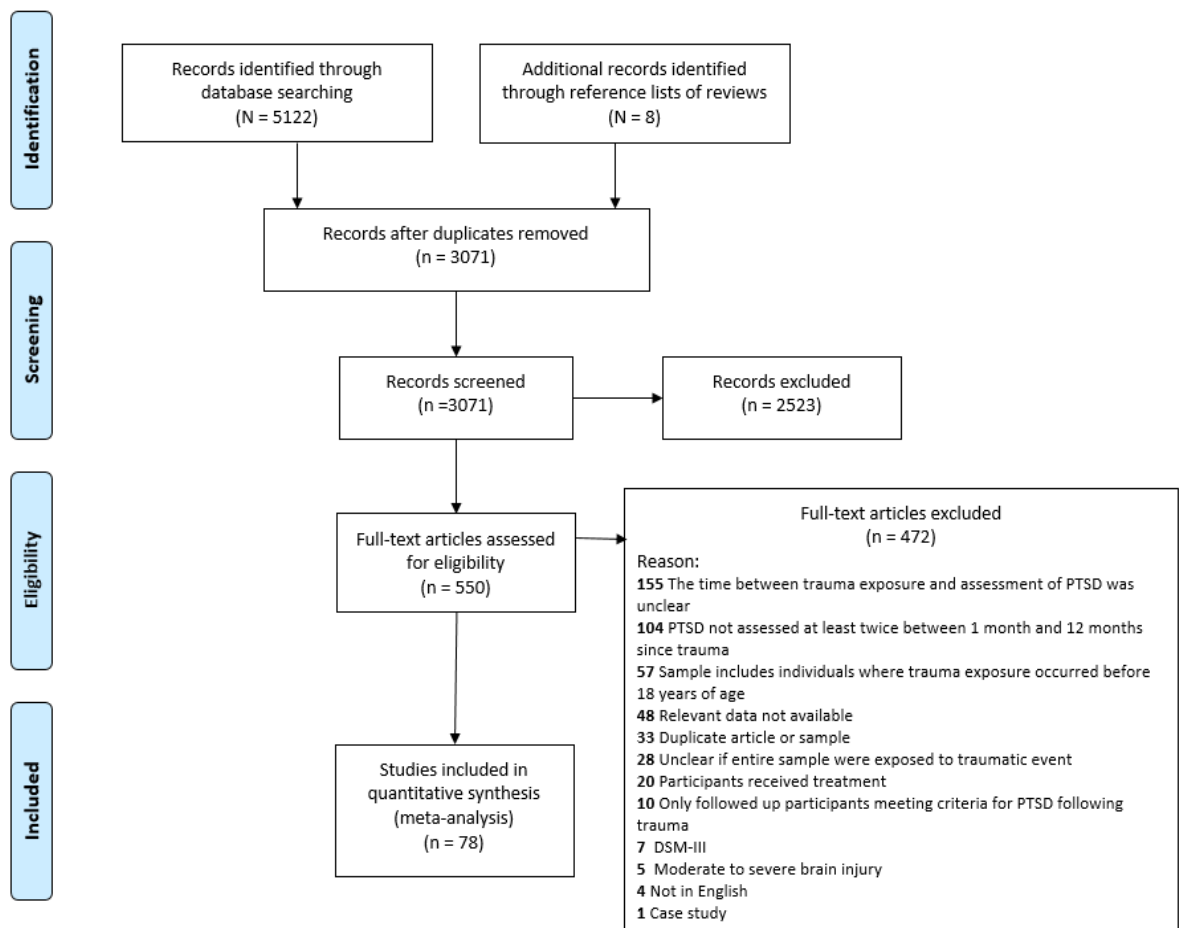
injury (see Bryant, 2011) or had experienced the traumatic event before the age of 18 years were excluded. Studies were also excluded if the sample had received an intervention targeting PTSD symptoms (although non-intervention/routine care control arms of intervention studies were included). Studies in which the elapsed time between the traumatic event and the follow-up assessments of PTSD was unclear were excluded (e.g. exposure to a war zone over a number of months, or PTSD in relation to an occupation in general with no clear date of an explicit traumatic event). Studies that used DSM-III criteria for defined

PTSD were excluded due to there being no requirement for symptoms to cause significant distress or impact on functioning which has been found to alter prevalence rates (van Ameringen et al., 2011). Case studies, reviews and articles not reported in English were also excluded. Studies that did not include demographic data on participant age and gender were still included in order to include them in the analysis of prevalence over time but were excluded from moderator analysis.

Article Screening

Prisma guidelines were followed to identify relevant articles, the process of which is summarised in Figure 1.1. Review authors JA and PD both screened the abstracts of all studies identified in the initial search (N=5122) according to the above criteria; any discrepancy, which was rare (Kappa = .87) was resolved via discussion. The main reasons for exclusion at this stage were a) PTSD not measured at more than one time point, or b) the

Figure 1.1
Prisma Flow Diagram of Screening Process



sample included participants under the age

of 18 years. JA and PD subsequently screened the full text of 50% of the remaining articles each, and then cross-checked 10% of the other's texts resulting in high agreement ($\kappa = .96$). Disagreement was resolved via discussion and any changes to criteria were retrospectively applied. For studies in which the methodology suggested relevant data were collected (and therefore the study met inclusion criteria) but the data was not reported in the study, the corresponding authors were contacted to request this.

In total, 78 peer-reviewed articles (79 independent samples) were included in the meta-analysis. 70 studies reported the percentage of the sample that were male/female, whilst 63 studies reported the mean age of the sample.

Data Extraction

Data were extracted by JA and PD (50% of studies each), with 10% of each cross-checked for accuracy (resulting in 97.7% agreement). Key study characteristics (year of publication, country of origin, sample size, average age, age range, percentage male/female and PTSD assessment method) and key outcome data were extracted including number and proportion of the sample that met PTSD criteria according to diagnostic interview or cut-off scores for each available time point.

Data Analysis Strategy

Meta-analyses were conducted (using R version 3.6.2, (R Core Team, 2019)) for pooled prevalence at each time point and change in prevalence between time points for up to two years following a traumatic event. Meta-regression was used to explore the impact of mean age of study samples and the percentage of the sample that were male on prevalence of PTSD at each time point and change in prevalence between time points. Random effects modelling with 95% confidence limits were used for all estimates (Riley et al., 2011).

Pooled Prevalence of PTSD at Each Time Point

The total sample size and number of participants with PTSD was entered into "escal" function of the "metafor" library (Viechtbauer, 2010) to calculate the pooled proportion of those with PTSD for the following time points: Time(T)1 (1-month), T2 (3-months), T3 (6-months) T4 (9-months) T5 (12-months), T6 (15-months), T7 (18-months), T9 (24-months)¹. The proportions were transformed using the Freeman-Tukey double arcsine transformation (Freeman & Tukey, 1950), which is recommended when proportions

¹ There was only a single study reporting prevalence of PTSD at T8 (21 months) so this time point was not included in the analysis

are near or include zero due to variance becoming magnified (Barendregt et al., 2013). The “rma” function was used to run meta-analysis on the transformed proportions using a random-effects model using the restricted maximum-likelihood estimator. Transformed proportions were subsequently back transformed and converted to a percentage to ease interpretation.

Change in Prevalence

Absolute prevalence estimates are misleading to interpret in relation to change over time due to different studies contributing to pooled statistics at each time point. If there is significant heterogeneity in baseline levels of PTSD in different studies then difference in prevalence across time points may not reflect true change (Hiller et al., 2016). This issue is avoided using pooled estimates of change in prevalence in each study as the change accounts for starting levels of PTSD. Risk difference: (proportion with PTSD at Tx minus proportion of PTSD at Tx-1) where Tx-1 and Tx are the earlier and later time points, respectively, was calculated as a measure of change. Where there was attrition between time points, we assumed the proportion lost to follow up was equal for those with PTSD and those without PTSD. Random effects meta-analyses were run using the “metabin” function of the “meta” library, using the Mantel-Haenzel method (Robins et al., 1986) for estimating between study heterogeneity and the restricted maximum-likelihood estimator for within study heterogeneity. This was done for change in prevalence over the following: 1-month to 3-months, 1-month to 6-months, 1-month to 12-months, 3-months to 6-months, 3-months to 12-months, 6-months to 12-months, and 12-months to 24-months.

For analyses of both pooled prevalence and change in prevalence, heterogeneity was quantified using the I^2 statistic which provides an estimate of percentage of the total observed variability that is due to true prevalence differences rather than random variation (Higgins et al., 2003).

Meta-regression

For both the meta-analysis of pooled prevalence and change in prevalence, where significant heterogeneity was identified between studies, meta-regression was used to explore the extent to which the heterogeneity could be explained by the pre-specified study characteristics of mean age of sample and percentage of the sample that were male². Meta-regression was only conducted where number of studies (k) ≥ 10 (Borenstein et al., 2011). To check the robustness of regression models, permutation tests were run on those found to be significant (Higgins & Thompson, 2004). Funnel plots were inspected for possible

² As noted earlier, trauma type (intentional vs unintentional) and whether PTSD was diagnosed using self-report or clinician interview was explored by PD (the results of which are reported in PD Doctorate of Clinical Psychology Thesis).

publication bias (i.e. preference for publication where PTSD rates were higher). In general, funnel plots were symmetrical for all point prevalence (1, 3, 6, 9 and 12-months), however there was evidence of publication bias at 24 months. For change scores, funnel plots were all symmetrical suggesting no major publication bias.

Results

Data Summary

Table 1.2 provides summary information for included studies. Studies included in each meta-analysis of point prevalence and change scores are specified in their corresponding forest plot.

Table 1.2.
Study Characteristics

Author	Country	Trauma	N ¹	Male (%)	Age (m)	PTSD measure	Rater (S/DI)	Time points (months following trauma)									
								1	3	6	9	12	15	18	21	24	
ICU admission (various)																	
Aitken et al. (2014)	Australia	ICU	93	82.9	37.0	PCL-C	S	√		√							
Alfheim et al. (2019)	Norway	ICU	157	32	NR	IES-R	S	√	√	√		√					
Biennu et al. (2013)	USA	ICU	151	NR	55.0	NR	S		√	√		√					√
Capuzzo et al. (2010)	Italy	ICU	93	68.8	NR	PTSS-14	S		√	√							
Davydow et al. (2013)	USA	ICU	131	59.33	48.2	PCL-C	S		√			√					
Fumis et al. (2015)	Brazil	ICU	119	63.6	59.3	IES	DI	√	√								
Jackson et al. (2014)	USA	ICU	415	51	NR	PCL-S	S		√			√					
Langerud et al. (2018)	Norway	Traumatic Injury	63.6	55.1	118	PTSS-10	S		√			√					
Weinert & Sprenkle (2008)	USA	ICU procedures	149	52	54.0	PSS	S		√	√							
MVA only																	
Coronas et al. (2011)	Spain	MVA	119	48.7	38.8	DTS & SCID	S	√	√								
Feinberg et al. (2017)	USA	MVA	856	39.3	NR	IES-R	S	√		√		√					

Fredman et al. (2017)	USA	MVA	114	26.3	38.1	PCL-C	S	√	√		
Jones et al. (2007)	UK	MVA	115	39.7	36.8	PSS	S	√	√		
Kenardy et al. (2018)	Australia	MVA	284	37.7	49.3	CIDI-PTSD	DI			√	√
Kobayashi et al. (2019)	USA	MVA	280	50.0	38.5	CAPS	DI	√	√		√
Kuhn et al. (2006)	USA	MVA	40	40.0	38.6	PCL	S	√	√	√	
LeBlanc et al. (2016)	USA	MVA	111	25.7	38.3	PCL-C	S	√	√		
Murray et al. (2002)	UK	MVA	21	77.8	33.9	PDS	S	√		√	
Sterling et al. (2010)	Australia	MVA	154	37.0	36.9	PDS	S	√	√	√	√
Arnberg et al. (2015)	Sweden	Air crash	88	69.0	34.0	IES	S	√	√		√

Mixed (mainly MVA)

Bachar et al. (2005)	Israel	80% MVA, 10% Terror, 9% work	115	NR	NR	CAPS	DI	√	√		
Carty et al. (2006)	Australia	75.4% MVA	301	75.41	37.2 5	CAPS	DI		√	√	
Creamer et al. (2004)	Australia	74% MVA	337	75.0	36.0	CAPS	DI		√		√
Daniels et al. (2012)	Canada	86% MVA	102	30.58	38.2	CAPS	DI	√	√		
Frewen et al. (2015)	Canada	MVA	159	40.0	36.6	CAPS	DI	√	√		
Hruska et al. (2016)	USA	41% MVA	68	51.2	35.1	PCL-C	S	√	√		

Marshall, et al. (2010a)	USA	58% MVA	476	NR	33.3	PCL-C	S		√	√		
McFarlane et al. (2011)	Australia	Acute traumatic accident	37	75.0	34.0	CAPS	DI	√	√			
Mouthaan et al. (2014)	Holland	69% MVA	291	64.7	42.6	CAPS	DI	√	√			
Nickerson et al. (2014)	Australia	66% MVA	989	75.0	37.9	CAPS	DI		√	√	√	
O'Donnell et al. (2007)	Australia	75% MVA	301	75.6	37.3	CAPS-IV	DI		√	√		
Roden-Foreman et al. (2017)	USA	44% MVA	190	60.0	48.5	PC-PTSD	S		√	√	√	
Zatzick et al. (2001)	USA	65% MVA	86	65.0	NR	PCL-C	S	√			√	
Warren et al. (2015)	USA	Fall, MVA, assault	311	62.6	46.3	PCL-C & PC-PTSD	S		√	√		
Trauma Centre unspecified												
Bell et al. (2018)	USA	Trauma centre	465	64.8	NR	PCL-C	S	√	√		√	
Bryant et al. (2010)	Australia	Trauma centre	932	73.0	38.3	CAPS	S		√		√	
Chang, (2016)	USA	Trauma centre	268	62.0	45.5	PC-PTSD	S		√	√	√	
Burns												
Bosmans et al., (2015)	Holland	Burns	143	66.3	41.0	IES	S		√	√	√	√

Fidel-Kinori et al. (2016)	Spain	Burns	180	71.0	41.1	DTS	S	√	√	√	
McKibben et al. (2008)	USA	Burn	151	73.6	38.9	DTS	S	√		√	√
Falls											
Chung et al. (2009)	UK	Falls	90	14.8	83.4	PDS	S			√	√
Health											
Castilla & Vázquez (2011)	Spain	Myocardial Infarction	48	71.1	NR	PCL-5	S			√	√
Huang et al. (2016)	USA	Acute respiratory disease	605	48.0	49.0	IES-R	DI			√	√
Moulaert et al. (2017)	Holland	Myocardial infarction	120	84.0	60.0	IES-R	S			√	√
Sheldrick et al. (2006)	UK	Myocardial infarction	21	NR	NR	DTS	S	√	√		
Vranceanu et al. (2014)	USA	MSK trauma treated operatively	152	46.0	47.5	PCL-C	S	√		√	
Wintermann et al. (2015)	Germany	Critical illness	110	67.0	58.6	SCID	DI			√	√
Family Health											
Fumis et al (Family members) (2015)	Brazil	Family member ICU	119	NR	51.8	IES	DI	√	√		

Kentish-Barnes et al. (2015)	France	Death of Relative in ICU	386	NR	NR	IES-R	S	√	√	√
Petrinec & Martin (2018)	USA	Family member ICU	38	20.8	56.3	PCL-5	S	√	√	

Child health

Bevilacqua et al. (2018)	Italy	Newborn surgery (Parent)	68	50.0	NR	IES-R	S		√	√
Colville & Pierce (2012)	UK	Paediatric Intensive Care (Parent)	102	12.0	NR	SPAN	S		√	√
De Young et al. (2014)	Australia	Child burns (Parent)	116	7.5	32.9	PDS	S	√		√
Egberts et al. (2017)	Holland	Child burns (Parent)	192	50.0	43.3	IES	S	√	√	√
Garralda et al. (2009)	UK	Child Meningococcal disease (Parent)	86	40.7	38.7	IES	S		√	√
Martin-Herz et al. (2012)	USA	injury to child in MVA (Parent)	92	22.0	43.8	PCL-C	S		√	√

Pregnancy loss

Engelhard, et al. (2001)	Holland	Pregnancy loss	113	0	30.7	PSS-SR	S	√	√	
Farren et al. (2016)	UK	Miscarriage or ectopic pregnancy	69	0	33.8	PDS	S	√	√	
Horsch, et al. (2015)	UK	Stillbirth	65	0	31.9	SCID	DI		√	√

Korenromp et al. (2009)	Holland	Pregnancy termination	217	0	35	IES	S	√	√	√
Offspring Death										
Youngblut et al. (2013)	USA	Offspring death	175	29.3	33.5	IES-R	S	√	√	√
Natural Disaster										
Lies et al. (2014)	Indonesia	Earthquake	505	NR	36.0	IES-R	S		√	√
Thordardottir et al. (2019)	Iceland	Earthquake	38	44.2	NR	PSS-SR	S		√	√
Wadsworth et al. (2009)	USA	Hurricane	93	39.8	NR	UCLA PTSD	S		√	√
Wang et al. (2000)	China	Earthquake	181	46.4	39.6	Clinician interview based on DSM	DI		√	√
Witness Suicide										
Limosin et al. (2006)	France	Train Suicide (effect on Drivers)	190	100	39.0	Mini v4.4	DI		√	√
Police										
Marchand et al. (2015)	Canada	Witness event (40% shootings)	83	75.9	32.6	SCID-I	DI	√	√	√
Military										
Grieger et al. (2006)	USA	Bomb Blast	613	95.9	26.9	PCL	S	√	√	√
Physical Assault										

Freeman et al. (2013)	UK	Physical assault	106	74.53	34.4	SCID	DI	√	√	
Gandubert et al. (2016)	France	Physical assault (58%)	89	58.21	NR	PTSD-I	DI	√	√	√
Halligan et al. (2003)	UK	Assault	62	56.15	40.2	PDS	S		√	√
Marshall et al. (2006)	USA	Orofacial surgery following assault (82%)	264	90.0	34.4	PDS	S	√		√
Marshall et al. 2010b)	USA	Community Violence	294	94.0	25.1	PCL	S		√	√
Schell et al. (2004)	USA	Community Violence (resulting in sig. injury)	293	94.0	24.3	PCL	S		√	√
Sexual Assault										
Nickerson et al. (2013)	Australia	Sexual assault	126	NR	33.0	PCL	S	√	√	
Roy-Byrne et al. (2004)	USA	Sexual (55%) Physical (45%) assault	23	18.0	30.5	CAPS	DI	√	√	
Steenkamp et al. (2012)	USA	Sexual assault	119	0	33.0	PCL-C	S	√	√	

Notes. CAPS = The Clinically Administered PTSD Scale; CIDI = Composite International Diagnostic Interview; DI = Diagnostic Interview; DTS = Davidson Trauma Scale; IES-(r) = Impact of Events Scale (Revised); *M* = Mean; MINI = The mini-international neuropsychiatric interview; MVA = Motor Vehicle Accident; NR = Not Reported; PCL-(C)/(5) = PTSD Checklist (Civilian Version)/(DSM-V version); PC-PTSD = Primary Care PTSD Screen; PDS = Posttraumatic Diagnostic Scale; PSS = PTSD Symptom Scale; PTSD-I = Watson's PTSD Interview; PTSS-10 = Post-Traumatic Symptom Scale-10; S = Self; SPAN = Four item Self report screen derived from Davidson Trauma Scale; SR = Self-report; SCID = Structured Clinical Interview for DSM-IV.

¹Sample size reported at baseline

Included studies were published between 2000 and 2019 and originated from 16 countries (13 of which can be considered Western cultures³). Studies from the USA were best represented ($k = 29$) followed by Australia ($k = 13$), and the UK ($k = 10$). Studies ranged in sample size from 21 to 989, average ages ranging from 24 to 83 years (an overall average of 41 years⁴), and the percentage of males making up the sample ranging from 0 to 100 (an overall average of 53%⁴). Studies recruited participants after a variety of types of traumatic events, such as physical and sexual assault, serious health problems in self or a close family member, terrorist attack, natural disaster and pregnancy loss. Studies that followed participants after a variety of traumas⁵ (“Mixed” in table 2) were the most frequent ($k = 13$), followed by motor vehicle accidents (MVA; $k = 10$). The highest prevalence of PTSD (78%) at the first follow-up point following trauma was reported in Steenkamp et al. (2012) which followed-up females who experienced a sexual assault, whilst the smallest (2.5%) was reported in Fumis et al. (2015), which followed family members of patients admitted to ICU. The highest point prevalence at the longest time point following trauma (24 months) of the included studies was reported by Arnberg et al. (2015), who found a 41% prevalence of PTSD in participants on board an airliner that suffered engine failure resulting in an emergency landing.

All included studies used DSM-IV criteria for diagnosing PTSD with the exception of one (Petrinec & Martin, 2018) which used DSM-V criteria. Twenty-three studies determined PTSD diagnosis via diagnostic interview whilst 55 studies used self-report measures. The type of measure used by studies varied widely, with 17 measures being used in all, the most frequent being the PTSD Checklist Civilian Version (PCL-C; Weathers et al., 1992). Further, even studies using the same measure used a variety of cut-offs to indicate the likely presence of PTSD. For example, for studies using the Impact of Events Scale (Weiss & Marmar, 1997) the cut-offs used ranged between 23 (Bevilacqua et al., 2018) and 35 (Garralda et al., 2009). The number of studies (k) per analysis (including moderator analysis) ranged from $k = 2$ (15 and 18-months) to $k = 57$ (3-months) for prevalence estimates and from $k = 5$ (12 to 14-months) to $k = 27$ (1 to 3-months) for prevalence change. Time points of 1 month ($k = 43$), 3 months ($k = 57$), 6 months ($k = 39$) and 12 months ($k = 37$) were best represented. The time points 9 ($k = 7$), 24 ($k = 6$), 15 ($k = 2$), and 18 Months ($k = 2$) were less well represented.

³ With Israel, China and Indonesia being the exceptions

⁴ Not weighted according to sample size

⁵ While the best represented trauma type among this variety of trauma was still Motor Vehicle Accident for each study

Prevalence of PTSD at Each Time Point

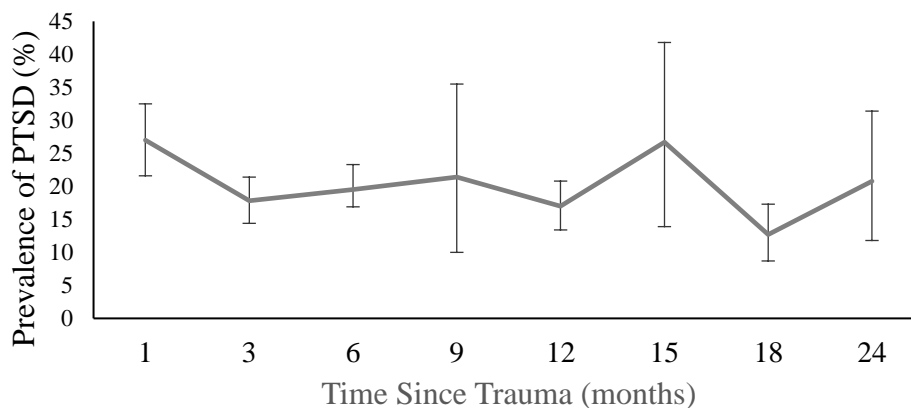
Point prevalence of PTSD at each time point is presented in Figure 1.2 and Table 1.3 (forest plots detailing the studies contributing to the summary prevalence for each time point can be found in Appendix 1.1). Prevalence of PTSD was at its highest at 1-month following trauma (27%, 95% Confidence Interval (CI) [21.6, 32.5]) and dropped to 17% (95% CI [14.4, 21.4]) at 3-months. Following this, prevalence remained relatively stable to 24-months (20.8%, 95% CI [11.8, 31.4]) with the exception of 15-months where there was an increase in prevalence to 26.7% (95% CI [13.9, 41.8]) and 18-months where there was a reduction to 12.7% (95% CI [8.7, 17.3]), however both these time points were only made up of two studies each. Significant heterogeneity was present for all time points (all $I^2 > 80\%$).

Moderator Analysis

Results from moderator analysis at each time point where $k \geq 10$ (1 month, 3 months, 6 months and 12 months) are presented in Table 1.4.

Figure 1.2

Pooled Prevalence at Each Time Point Following Trauma



Age. The mean age of the sample was significantly negatively associated with prevalence of PTSD at 1 month ($p = .01$; $R^2 = 12.6\%$ ⁶, which remained significant following permutation test) and a trend towards significance at 3-months ($p = .08$; $R^2 = 4.3\%$) such that higher mean sample age was associated with lower prevalence rates at 1-month and 3-months. This relationship was not significant for 6-months or 12-months ($ps = .27 - .45$; $R^2s < 0.5\%$).

⁶ R^2 s reported represent Pseudo R^2 values, see Raudenbush (2009) for further details of their calculation. They provide an estimate of heterogeneity explained

Table 1.3***Pooled Prevalence of PTSD at Each Time Point Following Trauma***

Month	1	3	6	9	12	15	18	24
%	27	17.8	19.5	21.4	17	26.7	12.7	20.8
CI lower	21.6	14.4	16.9	10	13.4	13.9	8.7	11.8
CI upper	32.5	21.4	23.3	35.5	20.8	41.8	17.3	31.4
<i>K</i>	43	57	39	7	37	2	2	6
<i>n</i>	6606	11125	7323	302	9116	228	236	2101

Notes. % = Pooled percentage of participants with PTSD; CI = 95% Confidence Interval; *K* = number of studies contributing to meta-analysis; *n* = Pooled number of participants contributing to meta-analysis; Month = Number of months following traumatic event

Gender. The percentage of the sample that were male was significantly negatively associated with point prevalence 1-month and 3-months ($p = .04$; $R^2 = 9.1\%$ and $p < .01$, $R^2 = 17.1\%$), and they remained significant after permutation test), such that a higher percentage of males in the sample was associated with lower prevalence rates. This relationship was not significant at 6-months and 12-months ($ps = .20 - .6$; $R^2s < 1.9\%$).

Table 1.4***Moderator Analysis of Point Prevalence***

Time point	Moderator	<i>K</i>	B_1	<i>Z</i>	I^2	R^2
T1 – 1 Month	Male	38	-0.0024*	-2.05	94.6%	9.11%
	Age	36	-0.011*	-2.47	95.15%	12.6%
T2 - 3 Months	Male	49	-0.0027**	-3.24	93.83%	17.08%
	Age	44	-0.005	-1.73	94.77%	4.31%
T3 – 6 Months	Male	35	-0.0005	0.50	88.45%	0.0%
	Age	32	-0.0025	-1.10	91.53%	0.5%
T5 – 12 months	Male	34	-0.0017	-1.30	94.82%	1.90%
	Age	25	0.0025	0.75	93.94%	0.00%

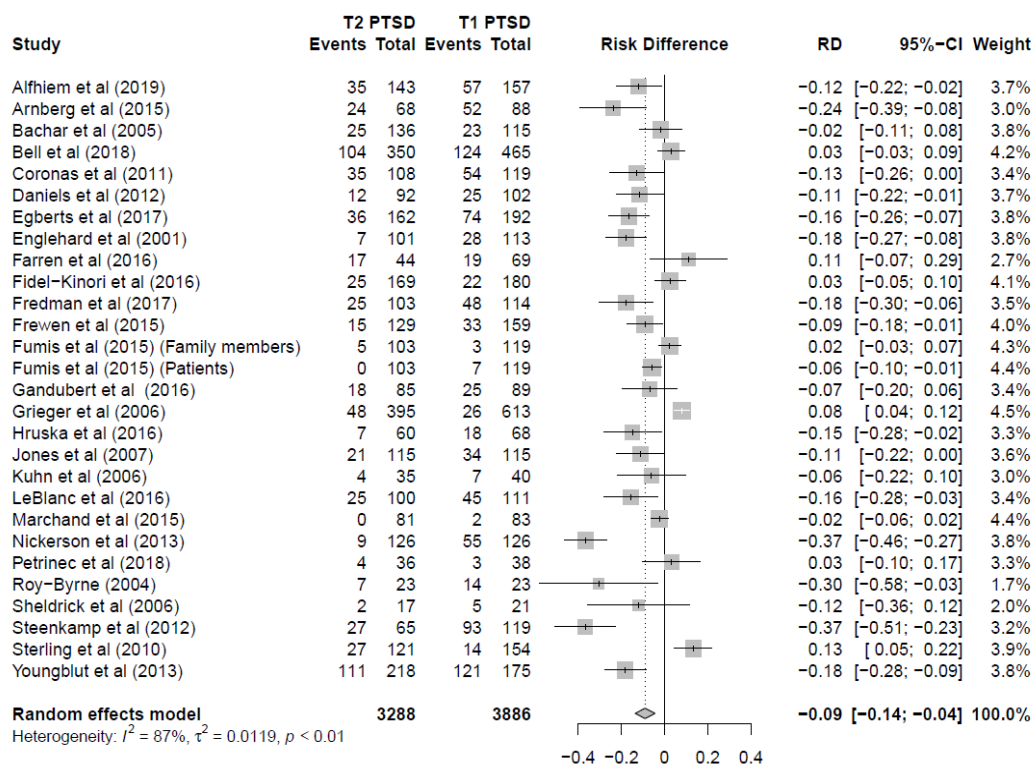
Notes. *K* = number of studies; B_1 = unstandardized Beta estimate; I^2 = estimate of unaccounted heterogeneity; R^2 = estimate of heterogeneity accounted for by moderator; T = time point
* $p < .05$; ** $p < .01$

Change in Prevalence

Forest plots showing change in prevalence at the different time points are presented in Figures 1.3 to 1.8. Risk difference showed reliable reductions (i.e., confidence interval does not include zero) in prevalence of 9% (95% CI [5%, 14%]) between 1-month and 3-months, 6% (95% CI [2%,10%]) between 1 and 6-months, 9% (95% CI [3%, 15%]) between 1 and 12-months, 2% (95%CI [1%, 4%]) between 3 and-12 months, and 2% (95% CI [.004%, 4%]) between 6-months and 12-months⁷. A non-reliable reduction (CI included zero) of 1% (95% CI [+2%, 3%]) between 3 and 6-months, whilst there was a 0% reduction (95% CI [+3%,3%]) between 12-months and 24-months.

Figure 1.3

Change in Prevalence Between One Month and Three Months

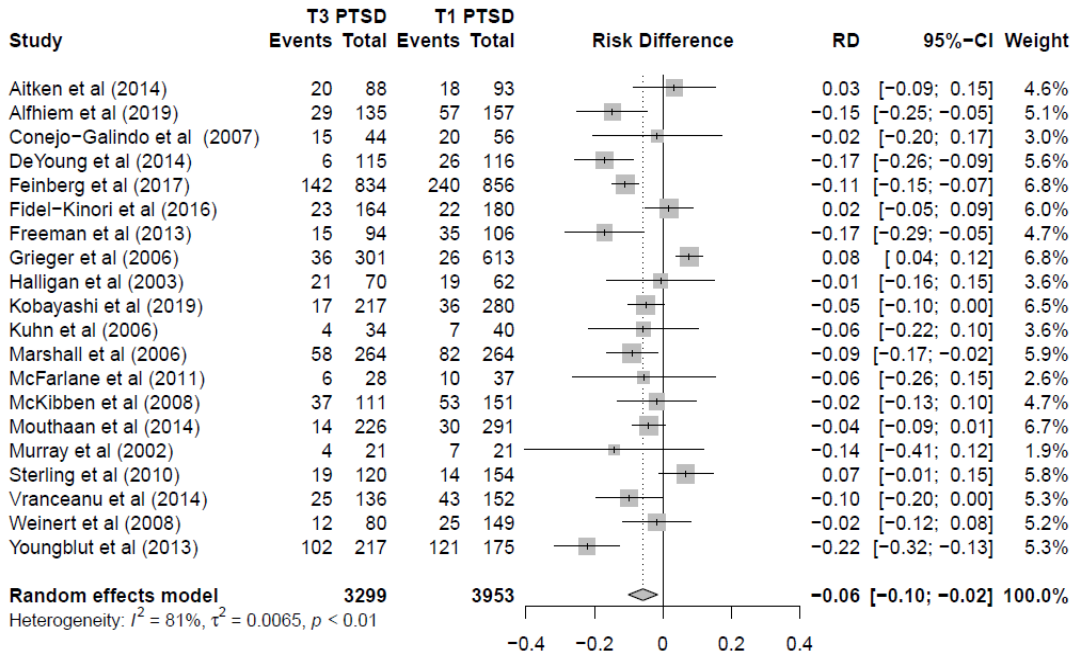


Notes. Negative risk difference denotes lower prevalence at 3-months than 1-month. T1 = One month following trauma; T2 = three months following trauma; RD = risk difference; CI = Confidence Interval; I^2 = heterogeneity; τ^2 = tau

⁷ The heterogeneity (I^2) statistic for this meta-analysis was 0% which may be due to within study variability masking between study variability (Higgins et al., 2003).

Figure 1.4

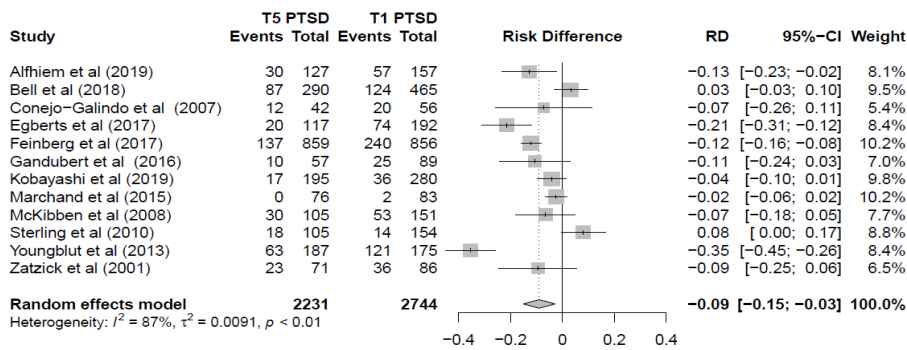
Change in Prevalence Between One Month and Six Months



Notes. Negative risk difference denotes lower prevalence at 6-months than 1-month. T1 = One month following trauma; T3 = six months following Trauma; RD = risk difference; CI = Confidence Interval; I^2 = heterogeneity; τ^2 = tau

Figure 1.5

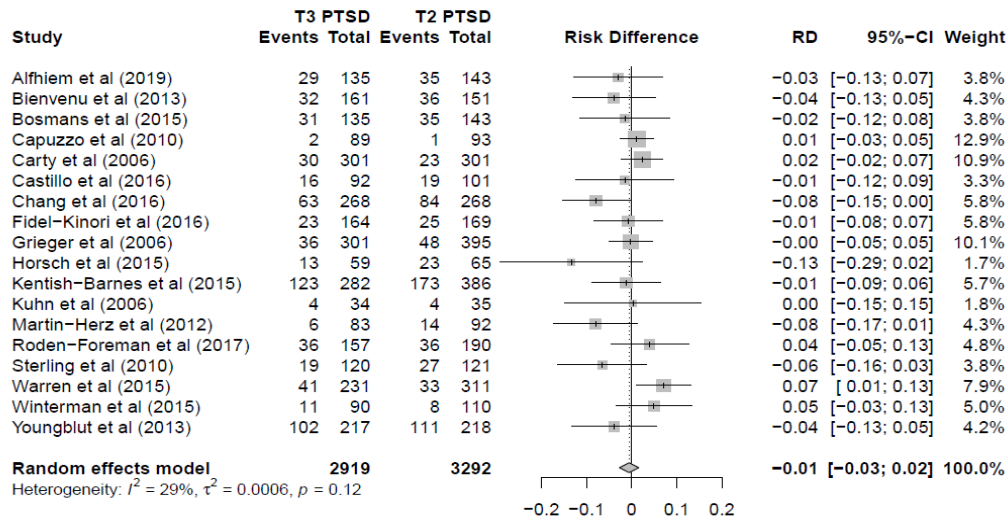
Change in Prevalence Between One Month and 12 Months



Notes. Negative risk difference denotes lower prevalence at 12-months than 1-month. T1 = One month following trauma; T5 = 12 months following Trauma; RD = risk difference; CI = Confidence Interval; I^2 = heterogeneity; τ^2 = tau

Figure 1.6

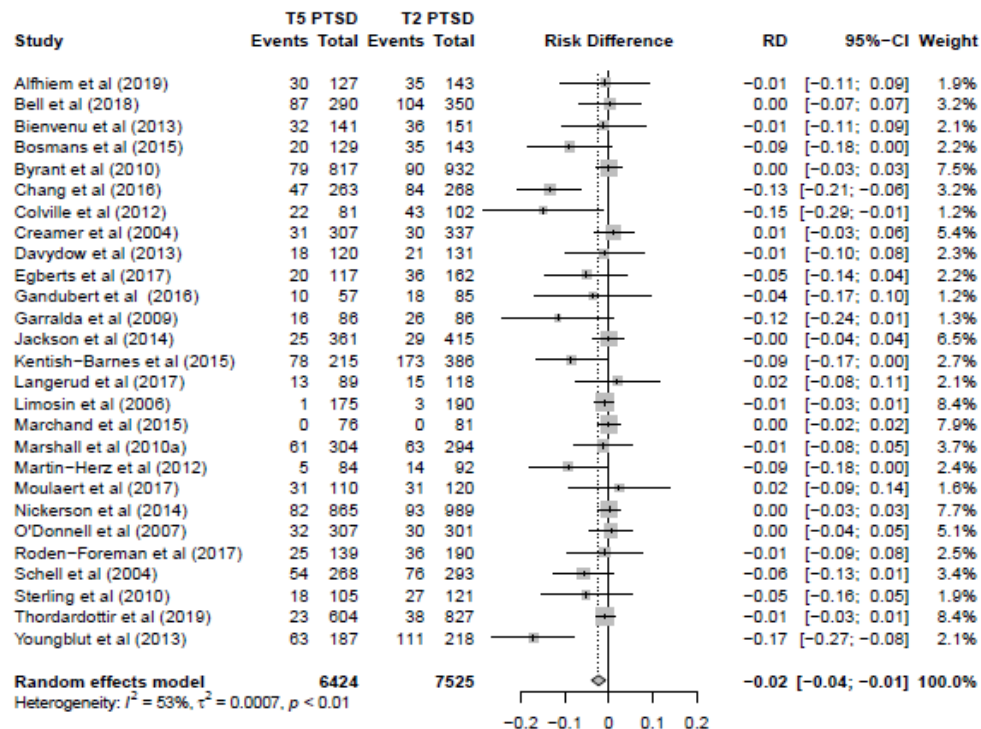
Change in Prevalence Between Three Months and Six Months



Notes. Negative risk difference denotes lower prevalence at 6-months than 3-months. T2 = three months following trauma; T3 = six months following Trauma; RD = risk difference; CI = Confidence Interval; $I^2 = heterogeneity$; $\tau^2 = tau$

Figure 1.7

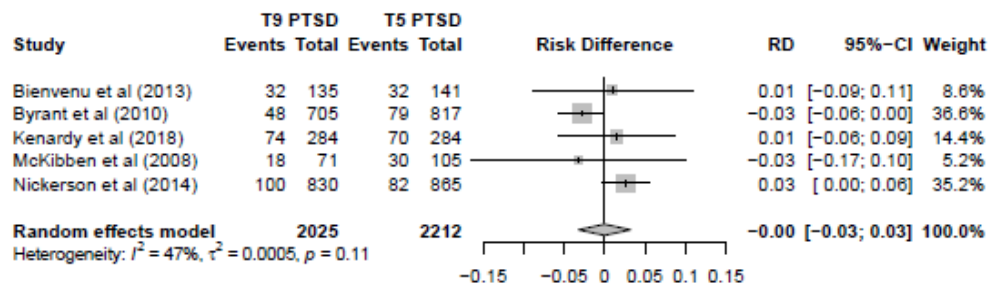
Change in Prevalence Between Three Months and 12 Months



Notes. Negative risk difference denotes lower prevalence at 12-months than 3-months. T2 = three months following trauma; T5 = 12 months following trauma; RD = risk difference; CI = Confidence Interval; $I^2 = heterogeneity$; $\tau^2 = tau$

Figure 1.8

Change in Prevalence Between 12 Months and 24 Months



Notes. Negative risk difference denotes lower prevalence at 24-months than 12-months. T5 = 12 months following trauma; T9 = 24 months following trauma; RD = risk difference; CI = Confidence Interval; I^2 = heterogeneity; τ^2 = tau

Moderator Analysis

Moderator analysis was not run on the 6-month to 12-month change due to $I^2 = 0$ suggesting that within study variance is greater than between study variance and therefore there is no heterogeneity to explain with study characteristics (Higgins et al., 2003). This left 1-month to 3-months, 1-month to 6-months, 1-months to 12-months, 3-months to 6-months and 3-months to 12-months (see Table 1.5).

Age. There was no relationship between the mean age and change in prevalence ($ps > .29$, $R^2s < 1\%$).

Gender. The percentage of the sample that was male was significantly positively associated risk difference (positive values of risk difference indicate an increase in PTSD) at 1 to 3-months ($p = .008$, $R^2 = 35.0\%$), 1 to 6-months ($p = .03$, $R^2 = 31.3\%$) and 3-months to 6-months ($p = .04$, $R^2 = 20.8\%$, although only 1 to 3 and 1 to 6-months demonstrated robustness during permutation testing), such that a higher proportion of males in the sample was associated with less reduction in prevalence rates (i.e. more chronic prevalence). Percentage male was not associated with change in PTSD prevalence between 1 and 12-months and 3 and 12-months ($ps > .23$).

Sensitivity Analysis

Results of sensitivity analysis, in exploring the effect on outliers and leave-one-out analysis (Viechtbauer & Cheung, 2010) on point prevalence and risk difference are reported in Appendix 1.2.

Table 1.5
Moderator Analysis of Change in Prevalence (Risk Difference)

Change point	Moderator	K	B_1	Z	I^2	R^2
1 month to 3 months	Male	22	.002**	2.6	78.92%	34.99%
1 month to 6 months	Age	22	.004	0.9	89.35%	0%
	Male	19	.002*	2.2	63.63%	31.29%
	Age	18	.001	.20	75%	0%
1 month to 12 months	Male	11	.001	.50	77.26%	0%
	Age	<10				
3 months to 6 months	Male	16	.001*	2.1	27.94%	20.76%
	Age	14	.002	1.1	42.6%	0%
3 months to 12 months	Male	25	.0003	1.2	0%	100%
	Age	19	.0004	.28	69.09%	0%

Notes. K = number of studies; B_1 = unstandardized Beta estimate; I^2 = estimate of unaccounted heterogeneity; R^2 = estimate of heterogeneity accounted for by moderator.

* $p < .05$, ** $p < .01$

Discussion

The aim of the current study was to quantify adult PTSD prevalence over the first year (and beyond where reported) following a traumatic event in non-treatment samples, using a meta-analytic approach. A secondary aim was to explore the role of gender and age in variation in PTSD prevalence over time via meta-regression.

In relation to the first aim, at one month after a traumatic event, approximately one quarter of participants met the threshold for PTSD diagnosis. By three months this dropped to 18%, after this, there was limited evidence of further reductions. Analysis of change in prevalence was consistent with the pattern of point prevalence. The largest reduction in prevalence came between one and three months (9%), which was equal to the drop between one and 12 months (9%). There was no evidence of a reduction between 3 and 6 months or between 12 and 24 months. This suggests most reduction occurs in the first three months. This pattern of results is consistent with a systematic review of Santiago et al. (2013) who found, using DSM-V criteria for a diagnosis of PTSD, median prevalence reduced most between one and three months (11% reduction), followed by a smaller reduction from three to six months (2.9% reduction) before increasing again between six and 12 months (2.1% increase). The results are also in line with that of Morina, et al.'s (2014) meta-analysis,

which found that where baseline measurement of PTSD was conducted after 5 months following a traumatic event (i.e. those who would have remitted before this time point would not have been included) remission was much less likely than studies with baseline assessment before 5 months. Together, findings suggest natural remission from PTSD in adults is most likely to occur within the first six months, with the largest reduction in prevalence occurring between one and three months.

In relation to the second aim, a pattern of results was found whereby the higher the proportion of males in the sample, the lower the prevalence of PTSD at one and three months following trauma, such that for every 1% increase of males in the sample there was a 0.24% and 0.26% reduction in prevalence of PTSD at one month and three months respectively. When exploring change in prevalence, it was found the higher the proportion of males in the sample, the smaller the reduction in prevalence between both one and three months and one and six months, such that for every 1% increase of males in the sample there was 0.2% and 0.15% less reduction in prevalence between one and three months and one and six months, respectively. Together, this suggests that females are more likely to meet criteria for PTSD following trauma but may also be more likely to remit than males. The relationship between males and a lower point prevalence is in line with studies that show females are at a higher risk of developing PTSD following trauma (e.g. Tolin et al., 2006). It is possible that such a relationship in our study was driven by extreme values in studies where there were no males. Indeed, the largest reported prevalence of PTSD of 78% was found in a study on sexual assault victims which included exclusively females (Steenkamp et al., 2012). However, the finding was robust following permutation tests and therefore unlikely to be influenced by a single study.

The finding that samples with a higher proportion of males is associated with a smaller reduction in PTSD prevalence over time contradicts studies finding that being female was a risk factor for a more chronic course of PTSD (Breslau et al., 1997). However, it is possible that the results of Breslau et al. (1997) could be explained by females being more likely to experience childhood traumas in that study whereas in the current study such studies where trauma occurred in childhood were excluded. The current finding is also at odds with studies that found no evidence gender is an important determinant of long-term trajectory (e.g., Galatzer-Levy et al., 2013; Morina et al., 2014).

Previous findings that females are more responsive to treatment for PTSD than males may have relevance to the current findings (Karatzias et al., 2007; Tarrier et al., 2000). Such an increased treatment effect has been hypothesised to result from an increased willingness (or perhaps familiarity resulting from implicit societal norms) in females to share their psychological difficulties (Tarrier et al., 2000). It is possible this may lead to

natural remission in a similar way that reprocessing would according to the cognitive model of PTSD (Ehlers & Clark, 2000).

Indeed, there is evidence that males are less likely to disclose their experience of emotions than females (Purves & Erwin, 2004; see also Wolfe & Kimerling, 1997), whilst Norris et al. (2001) found larger gender differences in PTSD prevalence in cultures with stronger traditional gender roles. It is possible that an increased willingness to disclose distress may contribute to both the association between the higher number of females and higher PTSD prevalence following trauma, as well as the association between a higher number of females in the sample and a larger reduction in PTSD over time found in the current study. If a lack of disclosure is an important reason for males to be less likely to meet criteria for PTSD even if they are in distress, it perhaps highlights the need to give more weight to other symptoms of PTSD when assessing males, such as hyperarousal symptoms of irritability and anger. In support of this idea, Norris et al. (2001) found that the only symptom type that was not less prevalent in males than females was irritability.

The relationship between mean age of the sample and prevalence of PTSD over time was also explored, finding that while younger age was associated with higher PTSD one month following trauma, it was not at any other time point, nor was it related to change in prevalence over time. The finding that younger age was associated with higher single point prevalence of PTSD at one month is in line with Boscarino and Adams (2009) who found that the younger the age at which individuals were exposed to a traumatic event, the higher the likelihood of developing PTSD. However, in contrast to Rona et al. (2012), who found that older age was predictive more persistent PTSD over time, we found no evidence that age related to change over time. However, Rona et al.'s (2012) sample was military personnel; in this analysis, only one military personnel study was included because in most military studies time between trauma and follow-up was unclear.

In terms of generalisability, it should be noted that in general, participants' average ages in the included studies were young to middle-aged, and only one study had an average of over 60 years (Chung et al., 2009; 83 years). Therefore, the current meta-analysis does not provide evidence either way as to how being elderly effects remission from PTSD. It is recommended that further research on long-term trajectory of PTSD following a traumatic event experienced in older age is conducted to further explore ideas of reduction of life role vs increased coping (Aldwin et al., 1996; Moos et al., 2006).

Recommendations for Research

In extracting and aggregating the data it was apparent that key study demographics were inconsistently reported and, where reported, the format they took varied considerably

between studies. This precluded the exploration of certain demographic variables (e.g. marital, employment, socio-economic status) on pooled estimates. To aid meta-analysis and therefore develop our understanding of these factors, it may help to adopt standardised methods of reporting demographics.

Further, an inclusion criterion of our study was for studies to have assessed PTSD diagnosis at least twice within one year following trauma. It appeared that the maximum follow-up time following these two time points is 24 months. Longer term follow-up studies after measuring PTSD twice within a year, will increase confidence in the current findings that there is a plateau in reduction in PTSD at around 3 months and it does not continue to reduce past the 2nd year.

Further, whilst examining reduction in prevalence over time provides some insight into the trajectory of PTSD, it does not take account of the various trajectories that can be found (e.g. delayed onset PTSD). A number of studies included in the current study used a modelling approach to categorise participants into different longitudinal trajectories (e.g., chronic, marked recovery, moderate recovery, resilient) based on chronicity of PTSD over time (e.g. O'Donnell et al., 2007; Steenkamp et al., 2012; Sterling et al., 2010) however in the current study these trajectories are merged into a single prevalence at each time point. Doing so limits the variability within the data and therefore reduces the ability to explore how specific participant characteristics predict which trajectory one is likely to fall into. While we included some discriminant trajectory studies, many of these types of study were excluded in the screening phase owing to not meeting our inclusion criteria. It may be that a meta-analysis of studies adopting such a methodology and subsequently pooling effect sizes of moderating variables' relationship with likelihood of following a certain trajectory, may be more fruitful in terms of understanding the impact of certain factors on long-term prevalence.

Clinical Implications

Recommendations following from our results are in line with that of Hiller et al. (2016)'s for child PTSD. Assessment should take place 3-6 month following a traumatic event as its more likely to identify those who will require treatment (i.e. will not recover naturally), as our results indicate that after one month up to a third of those presenting with PTSD will remit by three months, and such tendency to remit may be even higher for females. However, while logical in terms of efficiency, one needs to weigh up the cost/benefit of not assessing and treating those with extremely high symptom levels. If explicit treatment is not given in the first three months, it may be that generic psychoeducation information on the factors thought to maintain PTSD symptoms is provided

(Ehlers & Clark, 2000).

Further, given the plateau in natural remission identified in current study after three months, it highlights the importance of providing an evidenced-based treatment for individuals who present as meeting PTSD criteria and report that such symptoms have been present for over 3 months. Further watchful waiting from this point is only likely to prolong the distress of the individual.

Limitations

The strength of the current study was the inclusion of a large number of studies which explored PTSD following a variety of different traumas. It is also, to our knowledge, the first study that has meta-analysed PTSD prevalence change over time in the current time frame and explored the impact of gender and age on this change. There are however a number of limitations which limit the conclusions which can be drawn. Firstly, we assumed that any reduction in prevalence over time was a reflection of participants who had PTSD at one time point, no longer meeting criteria by the next. It is possible that prevalence at a later time point could be a combination of individuals no longer meeting criteria and others meeting criteria for the first time (i.e. delayed-onset).

Secondly, there was large heterogeneity in all meta-analyses which remained even after accounting for the moderating effects of male and age. Such heterogeneity may be explained by methodological differences between the studies not explored in the current study e.g. the way PTSD was assessed (i.e. a number of studies measured PTSD symptoms with the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997) however cut-offs used varied widely between studies). It is also likely that different types of trauma led to different prevalence estimates. A further limitation of this study is the absence of an assessment of risk of bias of the included studies. It is possible that estimates of PTSD prevalence could be affected by the quality of individual studies and there may have been differences in prevalence between high- and low-quality studies. It is also possible that the quality of the studies played a role in the high heterogeneity observed in the analyses. As a result, rather than giving weight to the specific overall prevalence statistics and amount of change reported in this study, what is more important is the pattern of results, i.e. a reduction in PTSD between 1 and 3 months and subsequent plateau in prevalence thereafter.

Further, despite covering a wide variety of traumas, the generalisability of findings is still limited owing to the inclusion criteria employed of a clearly defined time between trauma and follow-up. Studies where it is hard to determine the exact time between an initial traumatic experience and follow-up, such as military or warzones, or abusive relationship trauma were not included, therefore it is unclear if the pattern of results here would apply to

such trauma types.

Finally, we assumed that attrition was equal in those who met or did not meet PTSD criteria. It is unclear how this may have influenced estimates of reduction in prevalence. On one hand, it is possible that those who dropped out may have been more likely to meet criteria for PTSD if their symptoms impacted on their ability to continue with the study. However, on the other hand, it is possible that those who were no longer experiencing significant symptoms were more likely to drop out if there was reduced motivation as a result of perceiving the study as less relevant to their current situation. There was mixed evidence in our included studies of the impact of PTSD on drop out with Gandubert et al. (2016) finding that those with higher peritraumatic distress more likely to drop out, however, Bosmans et al. (2015) found that only age and likelihood of seeking social support predicted drop out and not PTSD, whilst Colville and Pierce (2012) found no evidence that any participant characteristic predicted drop out.

Conclusions

The current systematic review and meta-analysis of non-treatment studies reporting PTSD prevalence over the first two years following trauma found an overall prevalence rate of 27% one month following trauma. The prevalence of PTSD dropped by one third at three months whilst there was no further evidence of significant reduction in prevalence after this. While finding females were more likely to present with PTSD than males after trauma, it also found that the higher the percentage of females resulted in a larger reduction in PTSD over time. The study has implications for the timing of assessment of PTSD for those who have experienced trauma whilst also highlighting the point at which watchful waiting is no longer appropriate and only likely to prolong distress.

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Service Improvement Project

Investigating the Experience of Individuals with Comorbid Posttraumatic Stress Disorder and Substance Use Disorder Attending a Seeking Safety Group

Jac Neirin Airdrie

Ja846@bath.ac.uk

Supervisors: Dr Emma Griffith and Dr Alexandra Lievesley

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Journal of Dual Diagnosis publishes papers on issues related to the co-occurrence of mental health issues and substance use disorders including on issues such as how this effects people and their families suffering from such a comorbidity, what treatments are most helpful, and programs to implement effective services.

Investigating the Experience of Individuals with Comorbid Posttraumatic Stress Disorder and Substance Use Disorder Attending a Seeking Safety Group

There is no specific recommended treatment for the co-morbid presentation of Post-traumatic Stress Disorder (PTSD) and Substance Use Disorder (SUD). The current study evaluates the use of a Seeking Safety group to reduce the co-occurring symptoms of these disorders in clients of a substance misuse service. In addition, Qualitative Content Analysis explored participants' experience of the group and the aspects they found more and less helpful. Results were mixed with regards to a reduction in symptoms after attending the group. Service users spoke positively about the group and cited it as facilitating positive changes in their lives. Limitations are discussed, and recommendations in delivering the group are provided.

Investigating the Experience of Individuals with Comorbid Posttraumatic Stress Disorder and Substance Use Disorder Attending a Seeking Safety Group

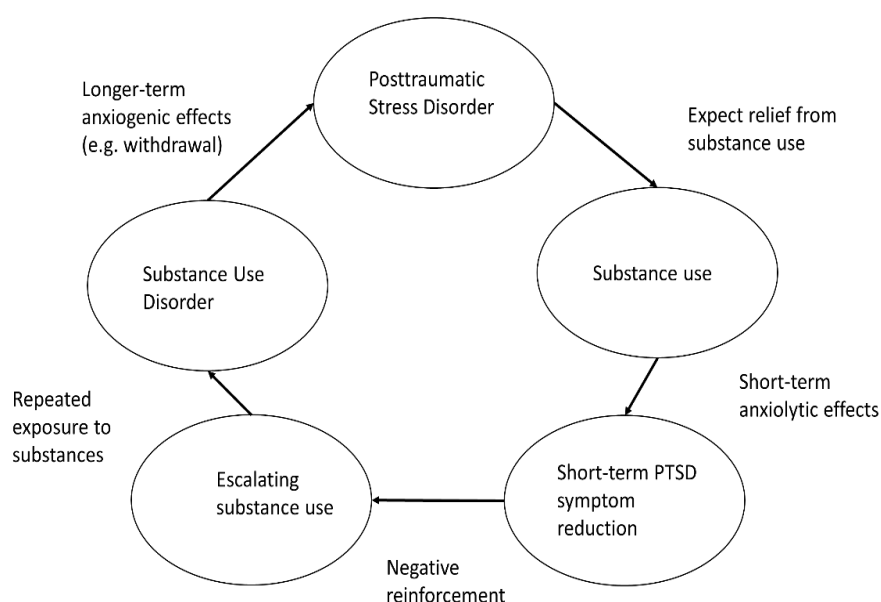
Post-traumatic Stress Disorder (PTSD) and Substance Use Disorder (SUD) have significant costs at individual and societal levels (Fineberg et al., 2013; Orford et al., 2006; Pagotto et al., 2015). While effective psychological treatments have been developed for each in isolation (see Clinical Guidelines on Drug Misuse and Dependence Update 2017 Independent Expert Working Group, 2017), when they co-occur, as is common (Kessler et al., 1995), a challenge for treatment emerges (Brown et al., 1995).

Theoretical Explanation of the Co-occurrence of PTSD and SUD

Broadly three theories have conceptualised the co-occurrence of PTSD and SUD, namely (i) self-medication, whereby substances are used to alleviate PTSD symptoms (see Khantzian, 1997), (ii) substances exacerbating PTSD symptoms via impacting the central nervous system (see Smith & Randall, 2012, for overview) and (iii) the shared vulnerability model, which suggests shared common factors contribute to the development of both (Meyer, 1986). Once their co-occurrence is established, a vicious cycle of PTSD and SUD symptoms perpetuate one another (Stewart, 1996, see Figure 2.1).

Figure 2.1.

Hypothesised Maintenance Cycle of Co-occurring PTSD and SUD



Notes. Recreated from Stewart & Conrod (2003).

Treatment

Traditionally, it was thought SUD must be treated first, with PTSD treatment beginning following a period of abstinence (Ouimette et al., 2003), reflecting the view SUD treatment equips patients with coping strategies that contribute to PTSD treatment success (Riggs & Foa, 2008). However, if SUD developed to cope with PTSD symptoms, delaying PTSD treatment may result in increased SUD relapse (Brown et al., 1996). Indeed, PTSD symptoms have been reported as worse when abstinent (Kofoed et al., 1993). Is therefore treating PTSD first the best option? Efficacious PTSD treatment involves cognitive behavioural therapy (CBT) involving exposure to avoided aspects of trauma (Ehlers & Clark, 2000). Such exposure temporarily increases distress, which could result in substance misuse (Simpson et al., 2012), impeding trauma processing and engagement (Bedard-Gilligan et al., 2018). Further, if substance use is a coping strategy, then asking individuals to refrain from this before targeting the cause of distress may leave them vulnerable. Therefore, clinicians recognise the benefit of treating the two disorders in an integrated manner (National Institute for Clinical Excellence (NICE), 2005).

Seeking Safety

One integrated treatment with emerging evidence (See Najavits (2007) for review) is *Seeking Safety* (SS; Najavits, 2002). SS is a present-focused stabilisation treatment (Herman, 1992) with foundations in CBT for substance abuse (Beck et al., 1993) and PTSD (Herman, 1992) that targets the maintenance cycle above. A meta-analysis found SS yielded moderate effect sizes for reducing PTSD and SUD symptoms (Lenz et al., 2016) compared to control treatment. However, the authors regarded their findings as preliminary and suggested more research was needed to draw conclusions.

Seeking Safety in UK Services

There is a lack of research evaluating SS in the UK and it is not currently recommended as a psychosocial treatment by UK guidelines (Clinical Guidelines on Drug Misuse and Dependence Update 2017 Independent Expert Working Group, 2017). This guidance states trauma focused treatments using exposure have been effective in reducing PTSD severity in those with comorbid SUD. It also highlights individuals may require initial stabilisation; however, it does not give a specific recommendation as to the approach to stabilisation. The National Institute for Health and Care Excellence (NICE) also highlight a gap in the literature for service delivery for individuals with co-morbid mental illness and substance misuse (NICE, 2016).

Therefore, there is lack of guidance on stabilisation treatments in the UK. As a

result, the current project seeks to evaluate use of SS as stabilisation treatment in a UK service, as well as exploring the experience of service users in order to guide improvements to its delivery (Elliott, 2008).

Consultation with Service

The author consulted with key stakeholders of a substance misuse service in the South of England which facilitates a SS group, including the primary facilitator of the SS group who consulted with relevant Service Managers, such as their Head of Service as the commissioner of the evaluation. They highlighted current policy on the treatment of these comorbid difficulties and the current lack of evidence concerning SS's application in the UK. They were eager to understand the experiences of those attending the group and their views of how it was currently operationalised, focusing on what was helpful and less helpful about it. With the aim being to implement improvements where these were identified.

Aims

The current study sought to evaluate the application of a 25-week SS group collaboratively run within a substance misuse service made up of one NHS provider and a partnership agency (henceforth referred to as *the substance misuse service*).

The aims of this study are to evaluate:

- psychological wellbeing (i.e. mood, anxiety and PTSD symptoms) before and after SS
- use of and dependence on substances before and after attending SS
- client satisfaction with SS group, including their views on what was more and less helpful about the group

Method

Design

The study used a mixed methods design. Quantitative methods in the form of self-report questionnaires routinely used by the service were used to determine whether attending the SS group impacted on mental health symptomology, substance use, and motivation and confidence to change substance use. A semi-structured (qualitative) interview was used to explore service users' experience of attending the group and the aspects they found more or less helpful.

Participants

Participants were adults (≥ 18 years of age) who self-identified as experiencing past trauma and were in contact with substance misuse services. All participants had attended at least 4 sessions of SS.

Description of the group

For a full description of SS please see Najavits (2003). The current group comprised of 25 weekly sessions. The first half of each session involved a “check-in” where participants discussed how they felt, their coping, substance use and engagement in unsafe behaviour since the last session. The second half focused on different “topics” related to cognitive, behavioural, or interpersonal domains. The rolling nature of the topics meant that new participants could join at certain points. Each session lasted 2 hours with a short break halfway through. The group was facilitated by a Clinical Psychologist (Primary Facilitator), who always remained the same, and a Drug and Alcohol Key Worker (Secondary Facilitator).

Measures

Quantitative Measures

Mental Health.

Generalised Anxiety Disorder– 7(GAD-7). A 7-item self-report measure of anxiety symptoms rated on a Likert scale of 0 (“not at all”) to 3 (“nearly everyday”). Scores of ≥ 15 indicate severe symptoms. The GAD-7 shows good sensitivity, specificity and reliability (Spitzer et al., 2006).

Patient Health Questionnaire-9(PHQ-9). A 9-item self-report measure of depression symptoms rated using the same scale as GAD-7. Scores of ≥ 20 indicate severe depression symptoms. The PHQ-9 shows good sensitivity, specificity, and reliability (Arroll et al., 2010; Kroenke et al., 2001).

Impact of Events Scale-Revised (IES-R). A 22-item self-report measure of PTSD symptoms including subcategories of intrusion, avoidance and hyperarousal. Participants rate distress caused by each symptom over the past 7 days on a Likert scale from 0 (“not at all”) to 4 (“extremely”). Scores ≥ 33 represent the best cut-off for probable PTSD (Mark Creamer, Bell, & Failla, 2003). The IES-R has good specificity, sensitivity and reliability (Creamer et al., 2003; Weiss & Marmar, 1997).

Substance Use.

Alcohol. The Alcohol Use Disorders Identification Test (AUDIT), a 10-item screening tool assessing alcohol use was used for service users who self-identified alcohol as their problem substance. Participants responded on a 5-point Likert scale (0-4). A score of ≥ 8 is considered indicative of harmful alcohol use.

Other Substances. The Severity of Dependence Scale (SDS), a 5-item measure, was used where participants self-identified other substances as their problem substance. Participants respond on a 4-point Likert scale (0-3). A score of ≥ 5 indicates likely dependence on substances (Castillo et al. 2010).

Importance/Confidence Scale. On a Likert scale (0-10) participants rated how important they deemed it was to reduce their substance use and how much confidence they had that they would be able to reduce their substance use.

Questionnaires were completed before, at the mid-point, and end of a program.

Interview Development

The interview schedule (Appendix 2.1) was developed in consultation with both supervisors. A draft of the interview schedule was sent to a person with personal experience (PPE) of mental health difficulties for feedback with wording subsequently amended to enhance readability.

Procedure

Participants were informed about the study by the group facilitators and provided with an information sheet. Participants informed the facilitators if they would like to take part and an interview was subsequently arranged. Participants provided informed consent to the interview and for their questionnaire data to be used for the study. Participants were informed the study was voluntary, they could withdraw at any time and did not have to answer questions they were not comfortable answering. Semi-structured interviews lasted between 35 and 50 minutes.

Interview questions were used flexibly, being omitted, adapted or elaborated (Taylor & Ussher, 2001) according to the individual context (e.g. if one question was already answered by a previous response, it was omitted). A method of summarising back to the participant their response was adopted akin to that used in motivational interviewing (Rollnick, 1995) to allow participants opportunity to contemplate their response which may facilitate further elaboration. At the interview's conclusion, participants were debriefed and

given opportunity to ask questions. They were also offered the opportunity to check-in with their keyworker.

Analysis

Quantitative

Due to the small sample, inferential statistics were not conducted. Descriptive statistics are presented.

Qualitative

Participants' interviews were analysed in line with Qualitative Content Analysis as described by Elo and Kyngas (2008). Analysis was carried out inductively and not driven by pre-existing theoretical interests, with coded categories being derived directly from the data (Hsieh & Shannon, 2005).

Krippendorff (2004) highlights the importance on considering the "context" in which the data are generated. As such, consideration should be given to the fact that all participants were white adults, born and raised in the UK and residing in the south of England. Most participants had experienced therapy before SS which may have influenced their choice of language. Furthermore, the author's background of a white male trainee psychologist in their 20s should be held in mind. The fact that the training course they attended has a strong focus on cognitive behavioural approaches is also relevant. The author had no in-depth knowledge of SS nor had he been involved in delivering a SS group.

During the "preparation" phase, the author transcribed all interviews, removing identifying information and became immersed in the data through a process of reading and re-reading the transcripts (Elo & Kyngas, 2008). During the "organising" phase, open-coding was used to generate semantic level headings from the data. Headings were grouped into initial descriptive level categories and then further abstracted into broader higher-level categories and subcategories (McCain, 1988). This involves considering how initial headings and subsequent categories share a sense of "belonging" to one another. Categories were subsequently named using content-characteristic words (Elo and Kyngas, 2008). During the refinement stage, it became apparent that certain subcategories related specifically to those who did not complete the group. Due to the small number of participants who did not complete, it was felt that including such subcategories could breach anonymity and therefore these categories were omitted.

Ethical Approval

Approval was granted by the University of Bath, School of Psychology Ethics Committee (Code: 18-344) and the relevant NHS Research and Development team.

Results

Seven (five male, two female) participants out of a potential 22 took part (see Table 2.1 for reasons for not taking part). Participants were aged between 29 and 50 years and included individuals who completed and did not complete the entire 25-week program. The COVID-19 lockdown brought further recruitment to a premature end.

Table 2.1
Reasons for Not Taking Part

Reason	<i>n</i> (%)
Opted out	1 (8)
No longer under caseload of the service	5 (42)
Physically unwell	1 (8)
Attended less than 4 sessions	3 (25)
Uncontactable	2 (17)

Quantitative

Descriptive statistics are presented in Table 2.2. Data were not available at the post stage for three participants for the GAD-7 and PHQ-9, four participants for the IES-R, two for the AUDIT, one for the SDS and three for the importance/confidence measure.

Table 2.2
Scores at Pre, Mid and Post Group

Measure	Pre		Mid		Post	
	<i>n</i>	M (SD)	<i>n</i>	M (SD)	<i>n</i>	M (SD)
<i>Mental Health</i>						
GAD-7	7	13.9(4.7)	7	11.9 (5.9)	4	5.5 (4.4)
PHQ-9	7	16.7 (9.2)	7	13.6 (7.1)	4	5.8 (4.6)
<i>IES-R</i>						
Intrusion	7	22.1 (6.8)	7	20.9 (9.6)	3	14.7 (8.5)
Avoidance	7	20.5 (4.4)	7	17.7 (4.5)	3	19.3 (5.0)
Hyperarousal	7	17.0 (3.9)	7	14.7 (6.9)	3	9.0 (4.0)
Total	7	59.7 (11.0)	7	53.3 (19.9)	3	43.0 (14.1)
<i>Substance Use</i>						
AUDIT	5	16.4 (16.0)	5	14.4 (14.9)	3	1.0 (1.0)
SDS	2	13.5 (7.0)	2	11.0 (5.7)	1	15 (*)
Importance	5	8.0 (4.5)	4	9.3 (1.5)	2	10.0 (0.0)
Confidence	3	4.3 (4.9)	4	6.8 (3.4)	0	-

Notes. GAD = Generalised Anxiety Disorder; PHQ = Patient Health Questionnaire; IES-R = impact of events scale – revised; AUDIT = Alcohol Use Disorder Identification Test; SDS = Severity of Dependence Scale; M = Mean; SD = Standard Deviation

The percentage of participants scoring in the severe range or above clinical cut-off for each measure at different time points are presented in Table 2.3. It is important to note that during the time of the interview all participants who completed the group⁸ reported they were abstinent from alcohol and/or substances.

Table 2.3

Percentage of Participants Scoring in the Severe Range or Above Clinical Cut-off

Measure	Pre		Mid		Post	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Mental Health</i>						
GAD-7*	7	71	7	43	4	0
PHQ-9*	7	71	7	14	4	0
IES-R total**	7	100	7	86	3	66.6
<i>Substances Use</i>						
AUDIT**	5	60	5	60	3	0
SDS**	2	100	2	100	1	100

Note. * - Severe range, **clinical cut-off; AUDIT= Alcohol Use Disorder Identification Test; GAD = Generalised Anxiety Disorder; PHQ = Patient Health Questionnaire; IES-R = Impact of Events Scale – Revised;; SDS = Severity of Dependence Scale

Qualitative

Seven overarching categories with underlying subcategories were identified (see Table 2.4).

(i) Strengthening the Foundations of the Self

All participants spoke about additions or changes they had made which they considered helpful.

Understanding of Self and the Role of Substances. Six participants described new understandings of patterns that played out in their lives.

“because I used to be like, ‘why the hell am I so anxious?’ and I used to get angry about the fact that I was anxious... this sort of gave me a better insight, you know, ‘I’m anxious because of that... what I’ve been through’”

Participants spoke about increased awareness of the role substance had in their difficulties.

⁸ *N* not reported to preserve anonymity
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“my problem with alcohol was, I would use it to run away from my life ...”

Alternative Perspectives. Most participants described attending the group as providing alternative perspectives on life or difficulties, with three participants citing quotes presented as a source of this.

“It was quotes by famous people, like Ghandi and bloody, some poets and stuff, but they were really deep and meaningful, you know, it really gave me a lot of food for thought, an alternative way of looking at things”

Four participants spoke about developing a compassionate approach to both themselves and to others.

“I have learnt to speak to myself like a friend...does that make sense? I find that the language is a lot softer, and more understanding, rather than I’m a failure”

“you learn to think they are doing the best they can at that given time”

Empowerment, Agency and Activity. Five participants reported feeling empowered to exert agency over their lives in relation to boundaries and assertiveness.

“growing up I just wasn’t really aware of what healthy boundaries are, and um, yeah, I think, seeking safety has, um, really made me think about what boundaries actually are...”

“...empowered me to realise that I can help myself, yeah, “this is in my hands”, you know, “I don’t have to be that victim”, where I thought that I had no choice, I learnt that I had choices.”

For many this increased agency led to engagement in activities they found rewarding.

“...because I used to be quite in to [9], like [] years ago, I got into it quite big time, but my mental health took a big dive ..., but, since I’ve been coming here I’ve been going back on the [], I’m not as fit as a used to be but you know, just going out for a [], just for the hell of it.”

(ii) Evocation and Management of Emotions

All participants reported how attending SS evoked emotions in session which provided opportunity to better recognise and respond in alternative ways to substances. While

⁹ Removed to protect anonymity

difficult, most reported how this gave them a positive experience of feeling emotion without becoming overwhelmed.

“Seeking Safety has made me realise that actually I can control those emotions that I was woken up with, you know, that dream last night, its not owning me, and I wouldn’t have been able to do that before Seeking Safety.”

However, one participant reported how sometimes these emotions would sometimes continue outside of the group and led to the use of substances to manage these feelings.

“Well for the first few months, all I would do after that session was straight out and score... because it brought up feelings”.

(iii) Safety and Validation Provided Relationally

Table 2.4

List of Categories and Subcategories

Category	Subcategory
(i) Strengthening the foundations of the self	Understanding of self and the role of substances A change of perspective Empowerment, agency and activity
(ii) Evocation and management of emotions	Emotions evoked in session Evoked emotions continuing outside of session Recognising and responding to emotions
(iii) Safety and Validation Provided Relationally	Facilitator as a container Group connection as a source of safety and validation Challenges to relational safety
(iv) Readiness and Commitment	Where SS fitted in path to recovery Preparedness and ability to commit
(v) Content and Delivery	Focus on the present Concrete, practical and simple Consolidation and less is more Skills of the facilitator
(vi) Seeking Safety is not an island	
(vii) Ending, Next Steps and Overall Impression	What’s next Overarching positive opinion

Whilst emotions were evoked, all participants commented about feeling safe and contained in the group environment. This helped participants share their difficulties which was met with support and validation.

Facilitator as Container. All participants commented how the primary facilitator was key in establishing safety and containment. They spoke positively about how the facilitator had clear boundaries, was consistent and gave provision at the end of the group to individually discuss difficult things that may have emerged.

“I don’t know one person who doesn’t speak highly of her, and they trusted her, but it wasn’t about being told what to do at all, it was always about empowering us to, ‘you can do this’, and potentially ‘how you can do it?’”

Group Connection as Source of Support and Validation. Participants discussed how SS provided opportunity to reconnect with others, something that some were out of practice of and had initial concerns about.

“because I got quite withdrawn from people you know, so coming here and having to deal with people, just getting used to being around people and stuff, I found it very useful on that front”.

The positive experience of reconnecting was rewarded with a further source of safety, support and validation.

“I think trauma in our society is such a taboo and it creates so much shame ... but being in that room with people that even though I didn’t know exactly what had happened to them, just knowing there were other people who had gone through this experience and are living with trauma um, I don’t want to use the word normalise, but in a way that normalisation process sort of like helped me realise that actually, you know, its not my fault and its not just me”.

Challenges to Relational Safety. Participants discussed difficulties when there was a change to the group environment such as a new member joining, someone attending under the influence of substances, or the primary facilitator being absent.

“well one of the people who did start was quite disruptive, but they only lasted one or two sessions, so that was good, actually I left one time early because of their belligerent attitude”

“I think [facilitator], was away for a week, and I think in the group, they built up such a kind of relationship with [facilitator] that I think people did find that quite difficult”

Whilst participants also reported finding it difficult when the boundaries of inside and outside the group were blurred.

“people that I met in there that I saw outside that would ask me for drugs and stuff ...then I’d see them in there and, to, it actually felt like my life was under threat”.

including in their having another type of relationship with a secondary facilitator.

“I felt that that was inappropriate because [¹⁰] was a key worker”.

(iv) Readiness and Commitment

Where SS Fitted in the Path to Recovery. For many, SS was not their first experience of therapy. Many commented previous approaches were not a good fit for them, whereas others could see the link between previous therapy and SS and build on the things learnt further with SS. Some participants reflected how they were previously not in the right frame of mind to start SS whereas others reflected that it may have been helpful if they were offered the group at an earlier point in their recovery.

“the group is set up in such a way, the support is set up in such a way, that, you need to be in a, in a good enough state to be able to get here, stay here, get something from it and come back again, and I absolutely wasn’t”.

“I moved into a dry house, I did the one [group] for depression anxiety first, then I moved into the next place and then I started seeking safety, so the timings were perfect”.

Preparedness and Ability to Commit. Five participants discussed the importance of being able to commit fully to the group before starting. They were aware of the amount of commitment required and saw this as a positive in helping them remain engaged.

“I couldn’t just do bits, I couldn’t have a little finger in here, a little finger in there, impossible, its kind of, you’re in or you’re out”.

(v) Content and Delivery

There was strong agreement amongst participants around what was more and less helpful about the content and delivery of SS.

Concrete, Practical and Simple. Six of the participants reported valuing learning that was simple, concrete and practical. Participants often struggled to name anything specific and instead emphasised the importance of time practicing skills during the session.

¹⁰ Removed to preserve anonymity

For two participants, practicing these skills meant they became embedded into their day to day life.

“now self-care has become the cornerstone of my life”.

Focus on the Present. Sessions focusing on the present was valued by five participants. Checking-in was helpful, as was grounding, which they attributed as helping them recognise emotions and how they were feeling. Participants also valued the fact that specific trauma memories were not the focus.

“I think its been helpful in the sense that all these topics are very grounding...all these are about coming back into yourself and anchoring you”

“because we weren’t delving into the past...and again, I think that’s probably smart, because you don’t want to whole group bringing up terrible memories and everyone leaves”.

Consolidation. While participants found lots of the content helpful there was also desire to focus on less new material and give more time to consolidate what they had already learnt.

“There were certain points that felt for me, that I could really reach somewhere, and then there was no way of kind of, no space to reflect on it, it would be moving on straight away”.

However, others considered certain things a better fit for certain people and therefore covering a wide range of topics was helpful.

“I would get something out of it at the beginning, some would get what they wanted at the end”.

Skill of the facilitator. Underlying the content and delivery was the skill of the primary facilitator, commented on by six participants. Participants reported how the facilitator had to flexibly find a balance between asking questions that were challenging without being overly provoking, managing time, as well as holding in mind participants’ varying learning styles.

“Somebody that can listen, somebody that can, uh, explain it in many ways, the same thing in different ways, which [facilitator] can. Gives you time to speak, doesn’t interrupt you. Write it on the white board, so it’s got a visual impact as well...I learn more that way”

(vi) Seeking Safety is Not an Island.

Despite participants attributing SS as contributing to many positive changes, all participants reported other sources of support that were key in making change. Whether this be previous therapy, a change in social circumstances or the support of the substance misuse service and other services more widely, participants highlighted it was a collection of inputs, rather than SS in isolation, that enabled change.

“rather than just down to Seeking Safety, I think that’s down to the overall effect of coming to [the substance misuse service]. It’s given me an opportunity to put more of a positive spin on my life...”

(vii) Ending: Next Steps and Overall Impression.

Next Steps. Whilst praising the way the ending was marked, two participants noted a sense of something missing without SS.

“I’m quite sorry it’s come to an end just because of that, it’s left a bit of a hole”.

One of the aims of SS is to provide stabilisation for later trauma work, however, at the time of the interview only one participant was undergoing specific therapy for trauma, however three reported SS was helpful in preparing them for such work.

“I know that I needed those tools, I didn’t appreciate it before I started Seeking Safety because I thought, you know, “quick fix”, have the therapy, I’m going to be absolutely fine, then I learnt, no, actually it doesn’t work that way”

Overarching Positive Impression. All participants expressed an overall positive view of SS and were grateful to have taken part, reflecting on how much their lives had changed.

“It was really positive for me, it was the first real turning point to getting my life back, and I feel like I’ve got my life back now”.

Discussion

This evaluation considered psychological wellbeing and substance use in seven participants with comorbid SUD and PTSD before, during and after a SS group; with participants taking part in a semi-structured interview about their experience of attending the group with the aim of informing changes that may benefit the delivery of the group.

Quantitative

Participants demonstrated a reduction in anxiety and depression symptoms over the

course of the group; with 71% scoring in the severe range for symptoms before the group whilst 0% did so by the end. Results are in line with other studies finding a reduction in depression and anxiety symptoms following SS (Najavits et al., 2005; Tripodi et al., 2017).

There was more limited evidence of reduction in PTSD symptoms, with two of the three participants scoring above the clinical cut-off for PTSD at the end of the group. It perhaps makes sense that reduction in PTSD symptoms in the current study were not as pronounced as for depression and anxiety given there is a deliberate lack of focus on trauma in SS and focus on trauma is central to effective treatment of PTSD (Ehlers & Clark, 2000). However, the results are in contrast to a meta-analysis finding modest reductions in PTSD symptoms following SS compared to comparison treatments (Lenz et al., 2016).

It is difficult to draw inferences about the impact of SS on alcohol or substance use. The percentage of individuals scoring in the range of problematic alcohol use reduced from 60% at the start to 0%, however, two participants' data were not available at the end so it is not clear if they would still have scored in the problematic range. In regard to substances, the participant who completed the SDS before and after the group remained above clinical cut-off. It is important to note, however, that inspection of the wording for both the AUDIT and SDS revealed participants were asked to report on substance use over a period of time that would have included the weeks prior to the start of the group even when being asked about substance use at the end of the group¹¹, therefore it cannot be used as a valid indicator of change. However, all participants who completed the entire 25-week program verbally indicated they were abstinent at the time of the interview, providing some evidence of a reduction in substance use.

Qualitative

Participants touched on a number of concepts concerning their experiences of SS and aspects that were more or less helpful. Participants had an overwhelmingly positive opinion of SS, and many reported huge changes they had made to their lives. Participants described having a better understanding of themselves and the interaction between substance use and mental health. The clinical management of substances guidelines highlight “meaningful activities” (e.g. jobs, volunteering and mentoring) as important to promote (Clinical Guidelines on Drug Misuse and Dependence, 2017), and participants discussed how SS helped them engage in these. Participants valued the teaching of concrete, practical and simple skills, highlighting grounding as particularly helpful. Strengths of the group included the good therapeutic alliance and connection to other group members creating a

¹¹ The SDS using the wording “before the start of treatment”, while in the AUDIT the items refer to alcohol use in “the previous year”.

safe environment in which difficulties could be explored. However, participants spoke how group dynamics were impacted when the primary facilitator was absent, or if they had another professional relationship with a secondary facilitator (i.e. keyworker). New members entering the group was also seen as disruptive at times.

Participants had helpful suggestions about other aspects of the group, commenting on the amount of information provided and wanting more time for consolidation of previous material, however others recognised covering a broad range of topics meant it was more likely all attendees would find something that was helpful. Clarity could also be useful concerning the next steps following the end of the group. NICE guidance on the management of individuals with mental illness and substance use suggests that service users should be involved in their care planning (NICE, 2016), therefore greater information concerning this area could be helpful in considering SS within this process.

Further consideration of the point at which people enter the group could be useful, with some participants describing needing to be stable before starting whereas others noted what they had learnt may have been helpful earlier in their recovery. This may suggest offering SS at multiple points during an individual treatment journey may be helpful.

Participants also highlighted that it was a combination of different inputs rather than SS being solely responsible for positive changes. Whilst this suggests the impact of SS alone cannot be considered as part of this evaluation, it would appear to reflect good practice in line with the NICE guidance which recommends a multifaceted treatment approach to comorbid substance use and mental health difficulties (NICE, 2016).

It is also worth highlighting that individuals who attended the group, although not assessed explicitly, were likely experiencing “complex PTSD” as opposed to single incident. Individuals with “complex PTSD” may have experienced enduring interpersonal trauma (World Health Organization (WHO), 2018). Given this, a real strength that emerged from participants’ responses during the interview was participants’ sense of safety in the presence of the facilitators and other group members. Individuals with a diagnosis of complex PTSD often find it difficult to trust other people and feel close in relationships (WHO, 2018) and therefore safety in the context of a therapeutic relationship is a key component of treatment. Therefore, it may have that SS has potential value as an approach to treatment of complex PTSD.

Recommendations

The results of this study suggest the following recommendations, presented in Table 2.5.

Limitations

The small sample of seven of a potential 22 participants attendees, is the biggest limitation. This suggests the qualitative categories generated may not be representative of all group members. Further, the small number of participants who did not complete the group may represent selection bias in that those who are in a better place in their recovery may be more able to engage in providing feedback. Given this and the confounding of the wider support of substance misuse services, we cannot draw strong conclusions as to the success of SS alone in reducing mental health symptoms and substance misuse. Relatedly, the current study did not use reliable change or clinically significant change statistics to measure change in mental health symptomology. Using such an analysis method could have helped identify the number of attendees who obtained a reliable reduction in symptoms not explainable by chance alone from before to after attending SS. Further research in UK studies should seek to explore the effectiveness of SS in reducing these symptoms with a larger number of individuals.

Service feedback

A report of the evaluation of the group was sent to the primary facilitator and the commissioner of the SIP. Feedback from the primary facilitator suggests they found it helpful and planned to implement a number of recommendations of the SIP (see Table 2.6). The commissioner of the SIP emphasised that having an appropriately skilled and qualified primary facilitator will be essential to continue, whilst also viewing the role of the whole treatment system in facilitating recovery, rather than a single stand-alone treatment, as important. Further, a meeting is planned to present the results and recommendations to the wider service.

Conclusions

This study has shown very preliminary support for SS as an acceptable approach to treating individuals with substance misuse and PTSD. Participants spoke positively about the group and cited it, along with a combination of other factors in parallel, as a key reason for positive changes they had made in their lives.

Table 2.5

Recommendations for the Delivery of Seeking Safety

Facilitators and co-facilitators

Participants highlighted the importance of the primary facilitator and the need for someone who has sufficient awareness of boundaries and the different needs of all attendees. The group is one that relies not just on the presentation of information but the flexible holding in mind of the emotions and learning styles of multiple people at one time. It is key that the primary facilitator of this group is someone who holds these skills and provides consistency over the course of the group.

Revisiting the group co-facilitator's role could be useful. The evaluation suggests that, if possible, co-facilitators that do not have a relationship with attendees in another capacity (e.g. keyworker) could be useful. Availability of such individuals may be limited, therefore if not possible, discussion concerning this in relation to boundaries may be help.

It is also recommended that maintaining the protected time at the end of the group for the primary facilitator to respond to concerns that emerged during the course of the group is important. All participants valued this, however at times felt the facilitator had limited time at the end of the group.

Beginning and ending the group

The results suggest that reviewing the points at which individuals can begin the group would be useful, with new members joining at the midpoint was at times viewed as disruptive. However, the length of the group may mean having multiple entry points is important and that greater support for both the group and the individual joining it could facilitate this process.

The service should consider offering further support and follow-up to individuals who drop out of the group prematurely, perhaps highlighting this and clarifying the process related to this at (including support available and where the group can be re-accessed) the start of the group and/or during the assessment. It is possible as part of this process offering a follow up appointment as standard could be useful to consider.

A further recommendation is considering a process to ensure feedback from individuals who do not complete the group is regularly requested so this can feed into the cycle of reviewing the group.

SS is suggested as a stabilisation treatment for later trauma work. Only one participant that completed the SS group included in this evaluation had gone on to complete trauma work at the time of the interview, with some having a sense of where they were on the waiting list for this and others not clear what came next. It is therefore suggested the

clinical service consider this, especially in relation to mapping a clear treatment pathway for what follows the SS group in relation to options for completing later trauma work.

Participants also talked about how a hole had been left by the group ending. It may be worth considering a more gradual ending to the group (i.e. a gradual reduction in frequency of the sessions) or a session specifically focusing on scheduling activity for the day and time the group used to take place.

Things to continue

There were many aspects that participants valued and saw as key to the positive changes they were making, including: understanding the relationship between substances and emotions, grounding, keeping things simple and practical, being clear about not discussing trauma, what they feel comfortable disclosing, the use of meaningful quotes, finding opportunities to engage in meaningful activity, building assertiveness and awareness of boundaries and a compassionate approach to difficulties. It will be important that these aspects are retained. It is also important to encourage participants make use of the wider support of substance misuse services (e.g. other groups and activities).

Outcome monitoring

NICE guidelines (2016) emphasise the importance of using measures to document change. The evaluation suggests that the wording for the Severity of Dependency Scale (SDS) and Alcohol Use Disorders Identification Test (AUDIT), related to how participants viewed their substance use “in the week before treatment” and the “last year”, is applicable to the pre assessment rather than post treatment. It is recommended that consideration be given to this to ensure the measures used are suitable to measure change over time.

There was a smaller sample size in terms of quantitative data than anticipated, related to missing data, especially post group measures. It is recommended that the process for the completion of measures is reviewed e.g. planning in dedicated time to complete the questionnaires at the end of the group.

Table 2.6

Response of Primary Facilitator

“Thank you for conducting this in-depth and considered SIP. There are a number of recommendations that will really help us to ensure that clients get the best possible experience from SS including ensuring consistent group facilitation, being explicit around the limitations and benefits of the dual roles of co-facilitators, maintaining an emphasis on compassion and developing interests and lives worth living outside of services and

allowing more time to planning next steps (therapy or other) for clients when the group ends. On a practical level we will look for ways to offer repetition and practice of core modules, and update measures to ensure we effectively collect substance use change over time”

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Main Research Project

The Impact of Maternal Attachment Style on the Efficacy of an Immersive Virtual Reality Environment for Increasing Parental Empathy

Trainee Name: Jac Neirin Airdrie

Ja846@bath.ac.uk

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Internal Supervisor: Professor Catherine Hamilton-Giachritsis

Collaborators: Dr Karin Petrini¹, Crescent Jicol¹, Dr Domna Banakou², Professor Mel Slater²

¹University of Bath

²University of Barcelona

Proposed Journal for Publication: Journal of Clinical Child and Adolescent Psychology

This journal was chosen because it publishes articles exploring factors involved in the development and maintenance of child and adolescent psychological difficulties as well as the development and evaluation of assessment and intervention techniques to use with these populations. The journal accepts manuscripts of up to 11,000 words including all tables and references (current study word count including tables and references = 9,811)

The Impact of Maternal Attachment Style on the Efficacy of an Immersive Virtual Reality Environment for Increasing Parental Empathy

Objective: A previous proof of concept study using Spanish mothers demonstrated that parental empathy, a factor implicated in risk of child maltreatment, could be increased using an Immersive Virtual Reality Environment (IVR) to embody mothers in a virtual child avatar and interact with a Positive and Negative virtual mother. However, this study did not consider whether parental attachment style, another factor implicated in maltreatment, affected the impact of the IVR on change in empathy. Further, in that study, another risk factor for maltreatment (oppressing power and independence) increased, which requires further investigation.

Method: Nineteen British mothers (*M age* = 35.5, range = 22 – 44) without parenting difficulties were exposed to the same IVR environment as described above but adapted to English.

Results: Mothers' scores for empathy did not change from before to after the exposure and this did not relate to maternal attachment styles of anxiety or avoidance. There was a significant increase in indorsement of effective parenting styles and there was some evidence this was negatively related to insecure attachment. The previous finding of an increase in risk for oppressing power and independence was not replicated. Thematic Analysis of participants' experience of the VR suggested it evoked congruent cognitive and emotional responses and led to perspective-taking. It also highlighted areas of development for the VR paradigm.

Conclusions: A previous finding of an increase in maternal empathy was not replicated. Importantly this may suggest the findings from the previous proof of concept study could be attributable to issues with the reliability and validity of the measure used. It is also possible the findings were specific to the sample used in that study. Due to the small sample size and poor internal consistency for measures of maltreatment risk in the current study, results should be interpreted with caution. An increase in self-reported effective parenting styles provides some evidence of the potential utility of IVR in reducing child maltreatment.

The Impact of Maternal Attachment Style on the Efficacy of an Immersive Virtual Reality Environment for Increasing Parental Empathy

A significant number of children are maltreated¹² by their parents every year (Radford et al., 2013) resulting in significant costs to the children themselves (Hillberg et al., 2011) and to wider society (Gilbert et al., 2009). As a result, exploration of the factors involved in increasing risk of maltreatment, and strategies to combat this risk are crucial.

The Potential Role of Parental Attachment Style in Child Maltreatment

One factor implicated in risk of maltreating a child is the adult attachment style of the parent (Lo et al., 2017). Attachment style is a model of how one views oneself, others and relationships based on early experiences with caregivers (Bowlby, 1973). This internal-working model forms a template for current and future relationships (Hazan & Shaver, 1987). More recent conceptualisations of attachment theory have theorised that the quality of a child's early attachments influence their later ability to infer the mental and emotional states of themselves and others, as well as effectively regulate their emotions (Fonagy & Target, 2006; Meinset al., 1998). Importantly, Bowlby (1980) predicted a parent's own attachment experiences would shape one's quality of parental caregiving (caregiving behavioural system).

Defining Adult Attachment Style

Broadly, research has adopted one of two approaches for determining an individual's attachment as an adult. Interview based measures (i.e. the Adult Attachment Interview; AAI) assess individuals' narratives of their early experiences to understand their states of mind in regard to attachment behaviours. Based on an analysis of their account, they are allocated to one of four attachment categories (Freely autonomous, Dismissing, Preoccupied, or Unresolved; for a more detailed account of such an approach, see George et al., 1985). An alternative approach to measuring adult attachment is via self-report measures (e.g. Fraley et al., 2001). Importantly, self-report measures of adult attachment may not represent well one's early attachment experiences due to the potential for individuals, particularly of insecure attachment, to minimise the more difficult aspects of their relationship with a caregiver (Macbeth, 2008). Therefore, self-report measures ask about individuals' experiences in adult romantic relationships to define adult attachment. While at

¹² Child maltreatment is defined as “any acts of commission or omission by a parent or other caregiver that result in harm, potential for harm, or threat of harm to a child even if harm is not the intended result” (Gilbert et al., 2009, p.68).

times there may be close correspondence between one's early attachment and later attachment (Waters et al., 2000), there is also evidence that stressful life events can impact upon one's attachment style (Davila & Cobb, 2003), and the two approaches have not been found to correlate well (Crowell, et al., 1999). Therefore, the self-report approach may be best viewed as a measure of an individual's sense of safeness and security within relationships.

When using the latter approach, adult attachment has been defined along two dimensions: avoidance and anxiety (Hazan & Shaver, 1987). Individuals high in attachment avoidance are characterised by self-reliance and discomfort depending on others, and have a tendency to deactivate the attachment system to cope with distress (Mikulincer & Shaver, 2003). Conversely, individuals high in attachment anxiety desire closeness to others, fear rejection, and have a tendency to hyperactive the attachment system to cope with distress (Mikulincer & Shaver, 2003). Individuals low on both dimensions (secure) have a positive view of themselves and others, and a "capacity to rely trustingly on others when the occasion demands" (Bowlby, 1973, p.359).

The Relationship Between Adult Attachment and Caregiving

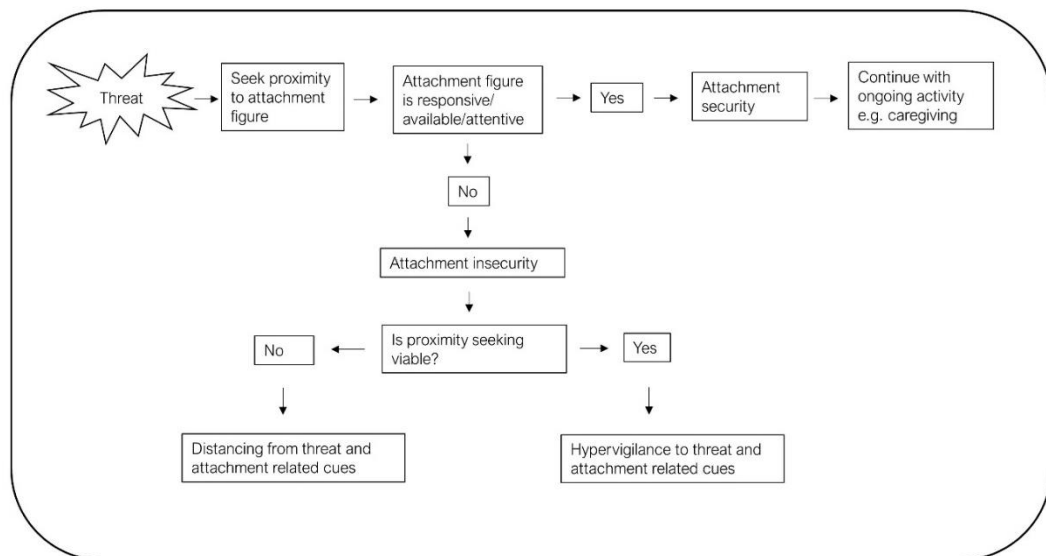
The parental attachment system and caregiving behavioural system are thought to be mutually exclusive (as one becomes activated the other becomes deactivated; Rholes et al., 2006). Therefore, if a parent's attachment system becomes activated, their own needs and strategies (which differ by style) may interfere with an ability to respond appropriately to their child's needs (Turney & Tanner, 2001). Notably, threat is thought to activate the attachment system (Mikulincer & Shaver, 2003; and see Mikulincer et al., 2002 for experimental support for this). A child displaying distress signals could be perceived as threatening (Wiesenfeld et al., 1981) and therefore activate the parent's own attachment system. Having a secure adult attachment allows one to engage in appropriate caregiving behaviours regardless of threat, whereas for insecure attachment, this is not the case (Mikulincer & Shaver, 2003) as can be seen in Figure 3.1.

Evidence that Parent Attachment Style is Related to Child Maltreatment

Evidence supports the idea that adult attachment style is related to parenting behaviours (see Jones et al., 2015, for an overview) whilst there is also evidence it can be implicated in child maltreatment. In Jones et al.'s (2015) review, six studies found a relationship between adult attachment and child maltreatment such as increased rates of insecure attachment amongst maltreating parents (59%; Cramer and Kelly (2010)) compared to the general population (42.4%; Obegi et al., 2004) and those with insecure attachment

scoring statistically significantly higher on measures of child abuse risk (Howard, 2010; Moncher, 1996; Rodrigues, 2006). Further, a meta-analysis by Lo et al. (2017) of 16 studies found parental insecure attachment was significantly related to child maltreatment (Odds Ratio of 2.93). However, rather than insecure parental attachment being a direct risk of maltreatment, it has been conceived having a secure attachment style may serve as a buffer, reducing risk (Dixon et al., 2005).

Figure 3.1
Responses to Threat as Determined by Attachment Style (figure adapted from Mikulincer & Shaver, 2003)



How Might One Reduce Risk of Child Maltreatment?

Another factor implicated in risk of child maltreatment is a lack of capacity to show empathy and/or perspective take (Perez-Albeniz & De Paul, 2003; Rodriguez & Tucker, 2011; Rodriguez, 2013; Wiehe, 1997, 2003). Empathy can be broadly broken down into its affective and cognitive aspects (although see Blair, 2005 for additional motor empathy component). Affective empathy involves the vicarious experience of emotions consistent with those of another (Bons et al., 2013), while cognitive empathy (also known as perspective-taking), is the ability to understand what another person is thinking or feeling (Blair, 2005). Given the definition of child maltreatment provided previously, it has been argued that low empathy might increase risk since recognising a child’s emotions is important to meeting a child’s needs (Hamilton-Giachritsis et al., 2018).

Importantly, adult attachment style has also been associated with empathy. For example, a secure attachment has been found to be important in developing the capacity to

perspective-take (Joireman et al., 2001) as it allows one to attend to the distress of a loved one (Mikulincer & Shaver, 2003) without your own attachment needs taking priority (Turney & Tanner, 2001). Indeed it has been demonstrated attachment insecurities interfere with ability to recognise others' distress and empathise with their experience (Adam et al., 2004) and studies have shown higher scores on both insecure attachment dimensions are related to lower empathy towards others (Britton & Fuendeling, 2005; Weiet al., 2011). Further, although no studies have explored the mediating role of empathy in the link between adult attachment and child maltreatment, Lafontaine et al. (2016) showed low empathy mediated the relationship between adult attachment and intimate partner violence. Therefore, increasing the capacity to perspective-take in individuals with insecure attachment may reduce risk of child maltreatment.

Increasing Empathy/Perspective-Taking via IVR Environments

Immersive Virtual Reality (IVR) environments have been shown to be effective in facilitating perspective-taking and empathy (Rosenberg et al., 2013). This is done by placing someone in the body of a virtual avatar which creates the illusion of body ownership (embodiment). Such techniques have demonstrated success in creating this illusion in adults embodied in that of a small child (Tajadura-Jiménez et al., 2017).

Hamilton-Giachritsis et al. (2018) applied this technique in a group of mothers not at high risk of maltreatment when exposing them to virtual positive and negative mothers. This proof of concept study was successful in increasing empathy to a child's situation and in reducing risk of child maltreatment. Therefore, this technique may be a good candidate in increasing empathy and reducing child maltreatment risk in mothers with insecure attachment. However, this study did not explore whether the extent to which an increase in empathy varied by the adult attachment style of the parent. It is possible based on Mikulincer and Shaver's (2003) model (Figure 1) above, exposure of individuals with insecure attachment to the IVR environment may evoke a threat response and hence activate their own attachment needs and therefore find it more difficult to take the perspective of a child. Therefore, a key research question is whether different attachment styles have different outcomes within this IVR experience.

Secondly, while risk of maltreatment reduced in most factors, for some participants, risk increased in the 'Oppressing Power and Independence' construct. Before this technique can be used in high risk mothers, the reasons for this will need investigating. It is possible this finding is not robust given that it appeared to be driven by an extreme change in a minority of cases (Hamilton-Giachritsis et al., 2018). Further, examination of items that comprise this construct of the Adult-Adolescent Parenting Inventory-2 (AAPI-2; which was

used to measure maltreatment risk) suggests some appear to lack face validity (see Appendix 3.1). In addition, the questionnaire has two forms (A and B) and similar items on the two forms are linked to different constructs (i.e., potty training is in Power and Independence on Form A but Parental Expectations on Form B), which again highlights issues with reliability. Hamilton-Giachritsis et al. (2018) used form A for pre-measurement and Form B as post-measurement; therefore, it is possible changes in score reflect inconsistencies between the forms. In line with these concerns, whilst the original authors of the AAPI demonstrated good validity and reliability for the measure and its constructs (Bavolek & Keene, 2001), other studies have failed to replicate the default proposed factor structure or its reliability (Connors et al., 2006). In particular, items contributing to the Oppressing Power and Independence construct in the original study were split across three factors when factor analysis was repeated with a new sample. The same authors did however find good support for the Value of Corporal Punishment, the Lack of Empathy construct and the scale as a whole. Due to the potential difficulties with the above scale in terms of measuring harmful parenting practices, it is important that an alternative measure of parenting practice is also included in measuring potential change brought about by exposure to the Virtual Reality environment. The Parenting Scale (Arnold et al., 1993) is one of the most widely used scales in measuring parenting practices (Salari et al., 2012) and measures the subscales of parenting practices found to be harmful to children (Arnold et al., 1993). (1) Laxness is associated with permissive and inconsistent parenting, (2) Overreactivity is characterised by harsh and punitive discipline, whilst (3) Verbosity reflects lengthy verbal responses to misbehaviour (Salari et al., 2012).

Finally, given this study was conducted on a population of Spanish mothers, it is important to replicate this on a British (English speaking) sample to explore if it is similarly effective in reducing risk and increasing empathy.

The primary aim of the current study is to extend the Hamilton-Giachritsis et al. (2018) proof of concept study by a) applying it to a British sample of mothers and b) exploring whether virtual embodiment in a child's body and exposure to Positive and Negative mothers in an IVR environment is successful in increasing parental empathy in mothers with different attachment styles. The secondary aim is to explore whether parents indicate self-reported preference for less harmful parenting practices after exposure to the environment and, in particular, the Power and Independence construct of the AAPI for which risk was previously found to increase.

A tertiary aim was to explore participants' subjective experience of the IVR environment including what worked more and less well whilst also exploring the potential

face validity of the effect the VR experience in terms of increasing perspective-taking and more appropriate parenting practices.

Method

Ethical approval

Ethical approval was obtained for this study from the University of Bath Psychology Research Ethics Committee (PREC code: 19-102).

Participants

Participants were mothers over the age of 18 years with at least one child under the age of five years old and were fluent in English with no known parenting difficulties. Participants were excluded if they had a diagnosis of epilepsy, had recently consumed alcohol, had significant back or neck difficulties or if they had contact with Children's Services in relation to their childcare¹³. Participants who reported susceptibility to motion sickness were included but warned of the potential for the Virtual Reality Environment to bring on such symptoms.

Nineteen mothers (sample characteristics are presented in Table 1) between the ages of 22 and 44 years took part ($M\ age = 35.5$, $SD = 5.6$). Most participants were white, married, from a high socioeconomic background, and had reached a high level of education.

No participants reported any motion sickness whilst taking part. No participants reported prior abuse perpetrated by someone outside their family whilst three reported abuse perpetrated by someone inside their family.

Design

The study adopted a mixed methods design. For the quantitative component there were two between-subject factors: (1) the counterbalanced order participants were exposed to the Positive and Negative mother, and (2) the Adult Adolescent Parenting Inventory (AAPI-2.1) Form they completed, both to which they were randomly allocated. There were two within-subjects time variables: (1) one for before and after each condition and (2) before condition one and after condition two (i.e. accounting for change over the combination of the conditions). The relationship between participants' score for adult attachment anxiety and avoidance (measured along a continuous scale) to dependent variables was also explored. The qualitative component involved a semi-structured interview of participants' subjective experience of the VR environment immediately following each condition.

¹³ This was not the case for any participants

Table 3.1
Characteristics of sample (N = 19)

Demographic variable	Mean (SD)
Age years	35.5 (5.6)
Age of youngest child	2.1 (0.9)
	<i>n (%)</i>
No. children	
One only	9 (47)
Two	10 (53)
White ^a	15 (79)
Married/long-term relationship	18 (95)
Highest level of education	
Postgraduate Degree	11 (58)
University Graduate	5 (26)
Currently at University	1 (5)
High School Graduate	2 (11)
Work status	
Full-time	6 (32)
Part-time	10 (52)
Full time education	1 (5)
Stay at home mother	2 (11)
Household income (£)	
< 15,000	1 (5)
15,001 to 25,000	3 (16)
25,0001 to 30,000	0 (0)
30,001 to 40,000	1 (5)
40,001 to 60,000	6 (32)
Over 60,000	7 (37)
Don't know	1 (5)

Notes.

^a of the 4 non-white participants 3 were Asian and 1 multi-racial, all were UK nationals.

Measures

Quantitative

The Adult Adolescent Parenting Inventory version 2.1 (AAPI 2.1). The AAPI is a self-report measure of parenting attitudes (Inappropriate Parental Expectations, Lack of Empathic Awareness, Values Corporal Punishment, Parent-Child Role Reversal and Oppressing Power and Independence) associated with increased maltreatment risk. There are two versions (Form A and B) each with 40 items. In the Hamilton-Giachritsis et al. (2018) study Form A was used before and Form B after exposure to the IVR conditions. Due to potential inconsistencies between the forms, in the current study participants used either Form A or Form B at both time points. Participants respond on a five-point Likert scale ranging from strongly agree to strongly disagree. The AAPI has shown to have good ability to discriminate between abusive and non-abusive parents (Cohen's D between .68 and .98), and good internal reliability (Spearman Brown $r_s \geq .82$; Bavolek & Keene, 2001). The current study is mainly interested in Empathic Awareness however will explore all constructs as well as total risk in view of the total score being shown by other studies to be more reliable than the individual constructs (Conners et al., 2006).

Experiences in Close relationships scale revised (ECR-R). Adult Attachment anxiety and avoidance was measured using the ECR-R (Fraley et al. 2000). Participants respond to a 36-item measure, using a seven-point Likert scale between strongly disagree and strongly agree. The ECR-R has demonstrated good internal reliability (Cronbach alphas $> .93$) and validity (Sibley, Fischer, & Liu, 2005; Sibley & Liu, 2004).

The Parenting Scale. The Parenting Scale is a 30-item measure of dysfunctional discipline practices. It consists of three factors: Laxness, Overreactivity and Verbosity. Participants respond on a seven-point Likert scale ranging from a response reflecting a behaviour considered high in one of the factors (e.g. Overreactivity) at one end and low in the factor at the other end (see Appendix 3.2 for example questions and the response scale). It has been found to have acceptable reliability and validity (Fraley et al. , 2000). Before exposure to the first VR condition participants were asked about their parenting during the past two months, and after the second asked about the parenting during the past week, whilst following the VR conditions they were asked about how they will try to parent in future.

Reading the Mind in the Eyes. The Reading the Mind in the Eyes Test-Child Version (REMT; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) was used to measure cognitive empathy. The task involves describing the emotional state (4-option multiple choice) of a child based only on their eyes. Participants were presented with different versions (which comprised different faces) before and after taking part in each

condition to help control for practice effects. A laptop was used to present the images using Inquisit software.

Post Experience Questionnaire. Participants' experience of virtual embodiment was assessed by a questionnaire after each condition. It included two questions on body ownership (MyBody; Mirror), three on how they responded cognitively and emotionally to the mother, one on agency (Movement), four on whether they felt like a child and two control questions (Features; two bodies). Participants responded on a -3 to +3 Likert scale ranging from strongly disagree to strongly agree.

Qualitative

Semi-structured interview. Following each mother condition participants were interviewed about how they found the experience, how they felt and whether the experience will make them think and behave differently towards their children. After the second VR condition an additional question asked about whether the previous experience of the VR last week affected how they responded to their children in the subsequent week. The interviews were recorded and later transcribed.

Procedure

Participants were recruited from the local area via posters, email adverts and social media posts targeted at local institutions (i.e. Nurseries, schools, universities, parent and child play groups, gyms, exercise classes, libraries and leisure centres).

Participants arrived at the VR lab at the Psychology Department at the University of Bath. They read an information sheet and subsequently had the opportunity to ask questions, they then completed a consent form. Participants were informed that taking part was voluntary and they could stop at any time without giving a reason. The order (as well as information on counterbalancing) that participants completed elements of the study are summarised in Table 3.2.

VR Paradigm

Having suited up with the VR equipment, participants entered the virtual living room (comprehensive detail about equipment and the virtual environment, including information on the child and mother avatars, the dialogue, and the room itself, can be found in Appendix 3.3). Using pre-recorded instructions participants were first asked to look around the room and describe verbally what they see, they were subsequently asked to do some physical exercises whilst looking at their own virtual body in the mirror. This lasted for around 5 minutes. The virtual mother then entered the room and interacted with the

participant; the content of which varied according to whether it was the Positive (PC) or Negative (NC) condition. The Interview and questionnaires then followed the VR condition.

Table 3.2.
Summary of Study Procedure

Time 1	Time 2 (one week later)
<i>Pre VR</i>	<i>Pre VR</i>
1. AAPI (Form A or B)	-
2. Parenting scale	Parenting scale
3. Mind in the eyes (counterbalanced A or B)	Mind in the eyes (counterbalanced A or B)
<i>VR</i>	<i>VR</i>
4. VR paradigm (Positive or Negative)	VR paradigm (alternative condition to that at Time 1)
<i>Post VR</i>	<i>Post VR</i>
5. Post experience questionnaire and Semi structure interview	Post experience questionnaire and Semi structure interview
6. Parenting scale	Parenting scale
7. Mind in the eyes (alternative version to that used at Pre)	Mind in the eyes (alternative version to that used at Pre)
8. -	ECR-R
9. -	AAPI (same version as Time 1)

Participants returned a week later to complete the second condition and questionnaires.

Having completed the study, participants were verbally debriefed about its aims and given opportunity to ask questions. They were given a debrief form which included sources of support if participants had experienced abuse or were concerned about their own parenting.

Participants were reimbursed £10 for taking part.

Data Analysis

Quantitative

Power Analysis. An a priori power analysis was conducted for Analysis of Variance (ANOVA) main effects using G*Power software (Faul et al., 2009), for an alpha of 0.05 and 0.95 power. For change in empathy, based on previous studies finding a medium effect sizes (Hamilton-Giachritsis et al., 2018), the required number of participants would be 34. There are a lack of comparable studies exploring the effect of VR exposure on change in a parenting practices, therefore we assumed a medium effect size, again requiring 34

participants. There are a lack of comparable studies on the relationship between change in empathy and attachment anxiety and avoidance, therefore we assumed medium effect sizes. In order to explore the relationship between attachment avoidance and anxiety together with change in empathy via regression, a sample size of 60 would be required. Due to the COVID-19 pandemic our sample size targets were not met therefore results should be interpreted cautiously due to inflated probability of Type II errors.

Descriptive and Inferential Analyses. All analyses were conducted using IBM SPSS statistics version 25. Due to a small sample and where data was not found to meet the assumptions of parametric testing (normal distribution was checked using the Shapiro-Wilk statistic (Appendix 3.4) whilst homogeneity of variance was checked with a Levene's test), non-parametric equivalents were used to check if this resulted in different findings for main effects (not possible with interactions) and correlations. Due to previously reported issues with the reliability and validity of the AAPI (Conners et al., 2006), the internal reliabilities of the scales used was also checked with the Cronbach's alpha statistic. This was also checked for other measures.

One participant failed to complete half of an AAPI questionnaire so was excluded from this analysis. Analyses of difference in AAPI raw scores from before to after being exposed to both VR conditions was conducted using a factorial analysis of variance (ANOVA) with VR mother order (PC then NC vs NC then PC) as a between-subjects and Time (T1 and T2) as a within-subjects factor. Similarly, analyses of change in mean score for the Parenting Scale and its subscales, and proportion correct for the REMT (the counterbalanced order was also explored as a between subjects factor) before and after each condition separately were conducted using a repeated measures ANOVA with mother order as the between subjects factor and Time (Pre and Post single VR condition and T1 and T2) as within subjects factors. Participants' responses to the post experience questionnaire were checked to ensure responses were consistent with embodiment whilst differences between the PC and NC were compared with paired sample t-tests.

Change scores were calculated for the key study variables. For the AAPI, participants raw scores overall and for each construct separately at T2 were subtracted from their corresponding scores at T1, such that negative scores indicate a reduction in risk. For the Parenting Scale, scores after the VR condition were subtracted from scores before the VR condition such that positive scores show a change towards more effective (less harmful) parenting. For the REMT, pre VR scores were subtracted from post VR scores such that positive scores reflect higher percentage correct at post VR compared to Pre VR. The relationship between these change scores and attachment anxiety and avoidance was then explored via correlation (due to not meeting sample size requirements to power regression).

Qualitative

Participants' responses to the semi-structured interview were analysed using Thematic Analysis following the guidance of Braun and Clarke (2006), using a contextualist stance and an inductive approach (Braun & Clarke 2006). Following transcription, the author re-read all transcriptions for both the PC and NC and generated and applied semantic level codes to the data. The codes were then grouped together into themes and subthemes.

Results

Embodiment

Overall, participants' mean scores for responses to the embodiment statements for the PC and NC were in a direction in line with successful embodiment (see Appendix 3.5). There were no differences between mother conditions in embodiment ($t_s(18) < 1.91$, $p > .07$), except for two questions ("I felt myself responding to the mother regarding my emotions" and "I felt like I was in the child's body") where there was significantly higher agreement with the statements following the PC compared to the NC ($t_s(18) > 2.20$, $p_s < .05$).

Adult Adolescent Parenting Inventory

Scale Reliabilities

The internal consistencies for each AAPI construct and overall score over the different time points are presented in Table 3.3. Scale reliabilities (Cronbach alpha) for Parental Lack of Empathic Awareness (.41 to .68), Strong Belief in the Value of Corporal Punishment (.41 to .71), Parent-child Role Reversal (.06 to .67) and Oppressing Children's Power and Independence (-1.0 to .31) were low and would fall under the threshold of 0.6 for comparing means suggested by Salvia and Ysseldyke (1995). The Overall scale (.71 to .84) and Inappropriate Parental Expectations (.58 to .84) reliability was acceptable.

Time One to Time Two Change

Raw scores (Standard Ten¹⁴ (STEN) scores are presented in Appendix 3.6, the results of change in SEN scores followed the same pattern as the Raw scores) for the separate constructs and overall for T1 and T2 for each mother order condition are presented in Table 3.4. Mean raw scores generally scored at the upper end of the potential range for each construct with higher scores depicting a lower level of risk. For Parental Unrealistic

¹⁴ An individual's score defined by reference to a standard normal distribution.

Expectations (Construct A), Parental Lack of Empathy (Construct B), Value in the use of Corporal Punishment (Construct C) and Parent-Child Role Reverse (Construct D) and Overall, participants scores did not change significantly ($F(1,16) < .05, ps > .83$) from T1 to T2. However for Oppressing Children’s Power and Independence (Construct E), the change between T1 and T2 approached significance ($F(1,16) = 4.05, p = .06$) such that scores were higher at T2 than T1. For Overall score, there was a significant interaction such that for PC then NC there was an increase in score (reflecting less risk) from T1 to T2 while for NC then PC there was a slight decrease ($F(1,16) = 5.0, p = .04$; See Figure 3.2). This same pattern emerged as a trend ($F(1,16) = 3.6, p = .077$) for Value in the Use of Corporal Punishment. There was no interaction between Time and order for any other constructs ($F(1,16) < 2.8, Ps > .11$).

Table 3.3.
Cronbach Alpha’s for AAPI Subscales and Overall Scale

Construct	Form A		Form B	
	Time 1	Time 2	Time 1	Time 2
A. Inappropriate parental expectations	.77	.84	.58	.82
B. Parental lack of empathic awareness of children’s needs	.48	.68	.41 ^a	.50 ^a
C. Strong belief in the use and value of corporal punishment	.71	.41	.47 ^a	.57 ^a
D. Parent-child role reversal	.59	.67	.06 ^a	.41 ^a
E. Oppressing children’s power and independence	.13	-1.03 ^b	-.55 ^b	.31
Overall Scale	.84	.84	.71 ^a	.79 ^a

Notes.

^aItems automatically removed from scale due to zero variance

^bCoding was double checked to ensure items for coded in the correct direction

Relationship with Attachment

The scale reliability for ECR-R was high (Cronbach $\alpha = .88$). Participants scores for attachment anxiety ($M = 2.4, SD = 0.8$) and avoidance ($M = 2.3, SD = 1.0$) were low, suggesting high attachment security. In terms of change over time, there were no significant correlations for any of the AAPI constructs or Overall score and attachment avoidance or anxiety ($r(18)$ between $-.30$ and $.34, ps > .16$) although the relationship between attachment avoidance and change in Construct A approached significance ($r(18) = .42, p = .08$) such that higher avoidance resulted in more change. The pattern of results for non-parametric correlations were consistent with this. The relationship between attachment

anxiety and avoidance and scores for the AAPI at baseline are presented in Appendix 3.7.

Parenting Practices

Scale Reliabilities

The internal consistencies (Cronbach's Alpha) for overall Parenting Scale and its subscales are presented in Table 3.5 and were generally acceptable for Laxness (.54 to .80), Overreactivity (.83 to .92) and Overall, (.70 to .81) but low for Verbosity (.32 to .63), consistent with previous research (Arnold et al., 1992; Salari et al 2012).

Change Over Time

There was no interaction between change and order of mother conditions for any of the parenting subscales at any time point ($F_s(1, 17) < 0.36, p_s > .56$) therefore differences between pre and post VR at T1 and T2 are presented in Table 3.6 with orders merged.

Participants' scores reduced from pre- to post-VR exposure at both T1 and T2 for Total score, Laxness (T2 only) and Overreactivity (z-scores > -2.01) reflecting less harmful parenting practices but not for Verbosity (z-scores < -0.9). When comparing the T1 Pre to T2 Post, to account for effect of both conditions in combination, there was a significant reduction in score for Total score and all three subscales (z-scores > -2.3).

Relationship with Attachment

For change in Parenting Scale scores over time, there was a significant negative correlation between attachment anxiety and change in laxness at T2 ($\tau_b = -0.36, p = .03$) such that higher anxiety resulted in less change, whilst there was also a significant negative correlation between attachment avoidance and change in Total score between T1 pre-VR and T2 post-VR ($\tau_b = -0.33, p < .05$) such that as attachment avoidance increased there was less change. No other correlations were significant. Correlations between attachment scales and baseline Parenting Scale scores are presented in Appendix 3.7.

Reading the Mind in the Eyes Test – Cognitive empathy

The mean proportion of correct responses on the REMT are presented in Table 3.7. No significant difference between pre and post at either T1 or T2 was found ($F_s(1,13) < .21, p_s > .64$) nor did this interact with the counterbalanced order participants completed versions at either time point ($F_s(1,13) < 0.99, p_s > .34$) or the order participants were exposed to the PC and NC ($F_s(1,13) < 0.08, p_s > .78$). There was no significant relationship between attachment dimensions and change in REMT score ($\tau_b < -.26, p_s > .15$).

Table 3.4*AAPI Mean Raw Scores (N=18)*

Construct	Range	Positive then Negative				Negative then Positive			
		Time 1 M (SD)	Time 2 M (SD)	<i>t</i> (<i>df</i> = 7) ^a	<i>p</i>	Time 1 M (SD)	Time 2 M (SD)	<i>t</i> (<i>df</i> = 9) ^a	<i>p</i>
A. Inappropriate parental expectations	7 - 35	28.5 (3.9)	29.5 (4.0)	-0.88	.40	27.4 (4.7)	26.2 (5.0)	1.48	.17
B. Parental lack of empathic awareness of children's needs	10 - 50	47.4 (2.1)	47.4 (2.3)	0.00	1.0	44.9 (3.2)	44.8 (3.7)	0.15	.89
C. Strong belief in the use and value of corporal punishment	11 - 55	51.0 (4.3)	52.1 (2.4)	-0.97	.36	48.6 (4.3)	47.3 (4.3)	1.90	.09
D. Parent-child role reversal	7 - 35	28.0(2.3)	29.3 (3.4)	-0.88	.44	29.6 (3.2)	28.2 (3.9)	1.95	.08
E. Oppressing children's power and independence	5 - 25	19.6 (2.3)	20.6 (2.3)	-1.5	.19	22.2(1.8)	22.6 (1.8)	-1.31	.22
Overall Scale	40 - 200	174.5 (9.7)	178.9 (8.7)	-1.37	.21	172.7 (11.5)	169.1 (12.8)	1.89	.09

Notes. Mean raw scores (and standard deviations) for the AAPI at time 1 and time 2 split by the order in which participants experienced the two mother conditions. Higher scores reflect a lower level of child abuse risk.

^a Non-parametric tests resulted in same results

Figure 3.2

Total AAPI Raw Score for Each Condition Order

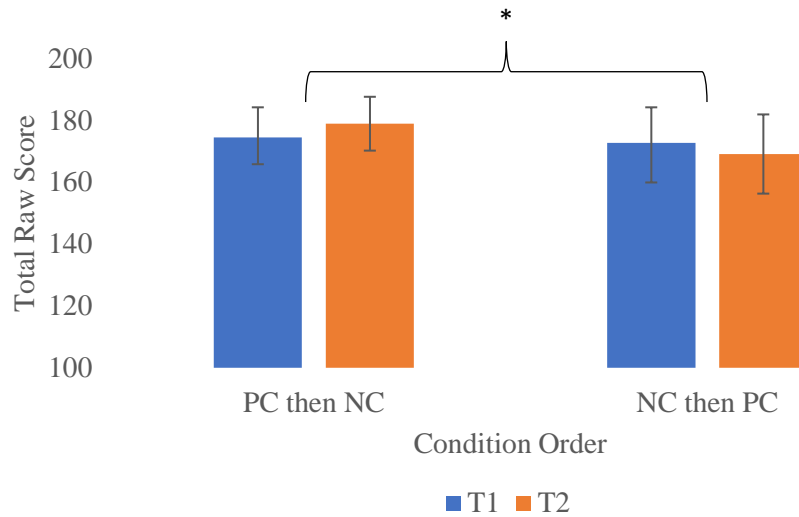


Table 3.5

Cronbach's alphas for Parenting Scale Subscales (N=19)

Subscale	Time 1		Time 2	
	Pre	Post	Pre	Post
Laxness	0.78	0.54	0.64	0.80
Overreactivity	0.83	0.86	0.85	0.92
Verbosity	0.32	0.63	0.46	0.55
Total	0.78	0.76	0.7	0.81

Table 3.6***Mean Parenting Scores at Each Time Point Pre and Post VR***

Subscales	Time 1				Time 2				T1pre vs T2post	
	<i>M (SD)</i>		<i>Z</i>	<i>p</i>	<i>M (SD)</i>		<i>Z</i>	<i>p</i>	<i>Z</i>	<i>p</i>
	Pre	Post			Pre	Post				
Laxness	2.8 (0.8)	2.5 (0.5)	-1.6	.10	2.5 (0.6)	2.2(0.8)	-2.0	.04	-3.0	.003
Over-reactivity	2.3 (0.8)	1.8 (0.7)	-2.7	<.01	2.1 (0.8)	1.4 (0.7)	-3.7	<.001	-3.4	.001
Verbosity	3.9 (0.7)	3.8(0.8)	-0.9	.37	3.6 (0.8)	3.5 (0.9)	-0.9	.36	-2.3	.02
Total	3.0(0.5)	2.7 (0.4)	-2.3	.02	2.7 (0.5)	2.4 (0.6)	-2.6	.01	-3.5	<.001

Notes. Means and standard deviations of scores on the Parent Scale. Lower Scores represent more effective parenting practices. The distribution of scores were high in Skew and/or Kurtosis therefore results of non-parametric, Wilcoxon signed ranks are reported (although results of parametric tests followed the same pattern).

Table 3.7
Proportion of Emotions Identified Correctly

Order	Time 1				Time 2			
	<i>M(SD)</i>		<i>t</i> (df = 8)	<i>p</i>	<i>M(SD)</i>		<i>t</i> (df = 8)	<i>p</i>
	Pre	Post			Pre	Post		
A B	0.57 (0.07)	0.58 (0.82)	-0.19	.85	0.61 (1.10)	0.58 (0.09)	1.07	.31
B A	0.64 (0.09)	0.65 (0.09)	-0.65	.54	0.64 (0.13)	0.66 (0.12)	-0.72	.49

Notes. Order A B reflects completing version A of the Reading Mind in the Eyes Test before exposure to the VR (Pre) and version B after exposure to the VR (Post). Order B A reflects completing version B before exposure to the VR (Pre) and version A after exposure to the VR (Post)

Qualitative data

Thematic Analysis of participants' responses to interviews following the PC and NC resulted in nine themes of: (1) Positive Learning Experience; (2) Positive and Negative Conditions Evoking Expected Responses in Cognitive, Emotional and Physical Domains; (3) Comparing and Contrasting Conditions; (4) Noticing the Size Difference; (5) Integrating Mother and Child Perspective; (6) Reflecting on Past Experiences; (7) Reflections on How Parents may Change their Behaviour Based on this Perspective; (8) Meta-Cognitive Awareness; and (9) VR Challenges and Future Changes. Themes also included underlying subthemes. A summary of themes, subthemes and example quotes, and their prevalence are presented in Table 3.8 (for more details see Appendix 3.8).

Discussion

The current study, using a small sample of British mothers, did not replicate a previous finding (Hamilton-Giachritsis et al., 2018) of an increase in empathy following exposure to an IVR environment in which they were embodied in a child avatar and interacted with a Positive and Negative mother avatar. It also did not replicate the finding of an increase in risk in a measure of a parents' preference for oppressing children's power and independence, instead finding a reduction in risk of this construct. However, there was evidence that the IVR environment resulted in parents endorsing more effective parenting strategies after exposure to the IVR environment. No evidence was found that where participants scored on

dimensions of adult attachment avoidance and anxiety influenced how much the IVR exposure resulted in changes in maltreatment risk across all constructs. However, there was some evidence that higher scores in attachment avoidance was related to less change towards effective strategies overall, whilst higher scores in attachment anxiety was related to less positive change away from a Lax parenting preference. In general, results from the Thematic Analysis suggested the IVR environment was effective in evoking cognitive, behavioural and emotional responses congruent with the mother condition. Mothers also reflected on the child's perspective and their previous experiences of parenting or being parented. They expressed an intention to make changes to their practices in the future. The interviews also drew attention to problems with immersion and relatability to the mother conditions and elements that were experienced as incongruent in some participants.

For both the self-report measure of empathy (AAPI) and cognitive empathy (REMT), we found no evidence that exposure to the VR conditions led to a positive impact on parents' level of empathy. However, the AAPI empathy construct had poor internal consistency for the current sample, whilst participants were likely already scoring at ceiling for this measure (scoring average of 46 out of a maximum of 50) and therefore it is difficult to draw strong conclusions from this as to the effectiveness of the VR in increasing empathy. In addition, our sample size did not meet that determined by power analysis, which increases the risk of a type II error. However, Hamilton-Giachritsis et al., (2018) found a difference in change in empathy between before and after the VR condition using similar sample size which may undermine this explanation.

Internal consistencies were also poor for the other constructs of the AAPI, therefore conclusions drawn are limited. In particular, internal consistency for Oppressing Power and Independence was particularly poor. This was the only construct in which parenting practices moved significantly in a less harmful direction following exposure to the VR compared to Hamilton-Giachritsis et al. (2018) who found this construct significantly increased in risk following VR. The Total score for the AAPI however had good internal consistency. For this we found a significant interaction between time (before and after both conditions) and the order the conditions were presented such that completing the Positive condition followed by the Negative resulted in an reduction in risk, whilst completing the Negative and then the Positive resulted in an increase in risk. Interestingly, Hamilton-Giachritsis et al., (2018) only found an improvement in cognitive empathy for the Negative condition only. Given this, it is possible that the result in the current study represents a recency effect of having been exposed to the Negative mother second.

Table 3.8
Themes and Subthemes Derived from Thematic Analysis

Theme	<i>n</i> ^a	Subtheme	Quote	
(1) Positive Learning Experience	6	Thinking about and discussing VR experience in week in between	<i>“Over the first couple of days I talked about it with friends, I talked about it with my husband...”</i>	
	5	Immersion being preferable to theoretical learning	<i>“I think these are the sorts of things I’m always every day analysing and reading, but when you see it in reality, it’s a lot easier to learn from than reading...”</i>	
			Negative Mother	Positive Mother
(2) Evoking Expected Responses in Cognitive, Emotional and Physical Domains in line with Each Condition	18	Emotional	<i>“It was a bit scary actually”</i>	<i>“It made me feel nice about myself”</i>
	13	Cognitive	<i>“I felt like she was annoyed because I had not done the things she wanted me to do...”</i>	<i>“I felt like she was genuinely asking what I wanted to do...”</i>
	7	Physical	<i>“I could not give the mother eye-contact”</i>	<i>“I wanted to get closer to her”.</i>
(3) Comparing and Contrasting Conditions	13	NA	<i>“after comparing both positive and negative experiences, I’m surprised how effective it is...”</i>	
(4) Noticing the Size Difference	13	NA	<i>“I mean looking up at her, I don’t know, I did feel like a child”</i>	
(5) Integrating Mother and Child Perspective	14	NA	<i>“it also made me realise how easy it might be to intimidate a child if we are not careful with our body language”</i>	

(6) Reflecting on Past Experiences	11	NA	<i>“I think that feeds into your own experience of being parented as well...”</i>
(7) Reflections on How Parents may Change their Behaviour Based on this Perspective,	16	Physical/Behavioural	<i>“My sense was that my boys wanted me down on the floor with them, and now I actually see why it is so important”</i>
	11	Changes to content of information given to children	<i>“I think its easy as an adult to forget, and as a parent to forget that your child probably doesn’t understand or is able to ask or answer back”</i>
(8) Meta-Cognitive Awareness	12	NA	<i>“Just thinking about it more, rather than it just rolling off the tongue, just thinking more, so just thinking about it, and relaying it and thinking what’s the best way I can do something”</i>
(9) VR Challenges and Future Changes	4	Challenges to relatability	<i>“it would have to be really far in the future because I don’t have those sort of expectations with my own child at the moment because he is so little...”</i>
	7	Incongruence between Presented condition and how it was experienced	<i>“But I also noticed the face change, at first I didn’t like it, then she looked nice”</i>
	10	Challenges to Immersion	<i>“I think if I had longer in the VR equipment it might have felt more real”</i>
	4	Questionnaires rather than VR influencing reflections	<i>“I know it was in the questionnaire anyway, but I think I was a little bit more cautious about the way I presented myself”</i>
<i>Notes. NA = Not Applicable</i>			
<i>^an is the number of participants’ interviews the theme was present in (i.e. prevalence)</i>			

Parenting styles were also measured by the Parenting Scale (Arnold et al., 1993) in the current study. As opposed to the AAPI, the internal consistencies for this scale were generally good, with the exception of Verbosity. Using this measure, change from before to after both VR conditions resulted in a significant reduction in harmful parenting practices for all subscales and overall. In contrast to the results from the AAPI, there was no effect of mother order. The largest change appeared to be in Overreactivity which again perhaps reflects exposure to the negative mother and subsequently not wanting to replicate such a style with their own children.

Relationships with Attachment Anxiety and Avoidance

There was no relationship between anxiety or avoidance attachment dimensions and change in empathy over time. In terms of other parenting constructs there were mixed findings. Where there was a significant relationship it tended to follow a pattern of: the higher the attachment anxiety or avoidance, the less change away from harmful parenting practices. Specifically, there was less change in Laxness at Time 1 following VR exposures for participants higher in attachment anxiety. Such a pattern may make theoretical sense given attachment anxiety is characterised by fears of rejection. It is possible that being firm with boundaries with children (which is opposed to Laxness) may arouse parents' fear of being disliked and therefore find it hard to move toward this style. There was less change overall in the Parenting Scale for individuals higher in attachment avoidance. This is perhaps in line with the theoretical underpinning described in the introduction such that those with avoidant attachment styles may disengage the caregiving system when presented with threat (Mikulincer & Shaver, 2016) and therefore this has resulted in the VR environment having less of an impact on such individuals. However, the lack of a consistent change and the small sample size, along with the relatively low score for avoidance and particularly anxiety¹⁵ for the sample as a whole means that results should be considered preliminary, it is possible that better representation of individuals high in attachment anxiety/avoidance could result in different findings.

Implications

Direct comparison to the previous study by Hamilton-Giachritsis et al., (2018) is difficult due to a number of differences between that study and the current study, such as

¹⁵ The ECR-R has been administered to 17,000 people finding a mean score for avoidance of 2.92 (SD = 1.19) and for anxiety of 3.56 (SD = 1.12), meaning that scores for anxiety in the current sample fell at least one standard deviation below the mean of the normed sample. *Norms retrieved from <http://labs.psychology.illinois.edu/~rcfraley/asures/ecrr.htm>*

using an English sample (therefore new English dialogue and voice actor, English wording of the AAPI as opposed to Spanish), and repeating the same AAPI Form version across time points. Nevertheless, the current study did not replicate the findings of increases in maternal empathy following the IVR experience. Some corroboration was apparent between the two studies in that in the current study, as in the previous, a larger reduction in risk relating to parenting behaviours overall was found when participants were exposed to the Negative condition second. Further, results from the interview suggests participants found the VR experience a good learning opportunity and their responses and reflections were in line with the idea of increased perspective taking.

The current study also did not replicate the finding of an increase in risk in the Power and Independence construct and instead found the opposite, a reduction. The internal consistency of that construct in the current study was very low and therefore it is not sensible to draw any conclusions from this. Hamilton-Giachritsis et al. (2018) used a different Form (A) before the VR and after (B) and items contributing to the constructs differed in face validity between the forms which may explain the change in risk in that study. As already highlighted in the introduction and Appendix 3.1, when inspecting the AAPI, certain items contributing to a construct appear to lack face validity. For example, the construct of Power and Independence relates to a parent's belief that a child should give complete obedience to authority (Bavolek & Keene, 2010), however an item contributing to this construct "parents who nurture themselves make better parents" does share a good fit with this definition. Furthermore, the construct of Parental Inappropriate Expectations of Children relates to parents having expectations that exceed the skills and abilities of their child (Bavolek & Keene, 2010). However, an item contributing to this factor "The trouble with kids today is that they are given too much freedom" does not fit well with this and seems to be a better fit for the Power and Independence factor previously defined. It is possible that a lack of fit between some items and the overall construct resulted in the low reliability observed in the current study.

The problems found with the AAPI scale reliabilities in the current study are line with a study by Connors et al. (2006) who found low internal consistencies in the constructs and were not able to replicate the original factor structure. The sample in that study was a low income, rural population whose children were enrolled onto the Head Start program (Mena-Gonzalez, 2009) and therefore very different to the current sample, but perhaps suggests the scale has problems with reliability across different demographic groups. It is also possible British participants in the current study differed to the Spanish participants in Hamilton-Giachritsis et al. (2018) in response tendencies. Research has demonstrated

cultural differences in response tendencies to Likert scales (although there appears to be no research on the difference between British and Spanish specifically). For example, Lee et al. (2002) found US nationals tended to be more likely to use extreme ends of a Likert scale compared to Japanese and Chinese participants, whilst Hui and Triandis (1989) found Hispanics were more likely than non-Hispanics to use extreme ends of a scale.

Whilst not replicating the previous finding of changes in empathy, the current study did lead to a reduction in harmful parenting attitudes, particularly for Overreactivity. Higher scores on this measure have been associated with increased child abuse potential (Kelley et al., 2015) and higher parent child-aggression (Rodriguez, 2010). Given that reducing harmful parenting practices is the overall goal of the IVR environment exposure, the current study has provided additional support for using such a methodology for reducing parenting practices associated with risk of child maltreatment. However, it should be held in mind that the scale has not been validated for participants responding with how they intend to parent in the future, which was how it was operationalised in the current study. Importantly, studies have shown there is not always good concurrent validity between self-reported parenting practices and observed parenting practices (Bellhouse, 2001). As reported above, there was some very preliminary evidence that the effectiveness of the paradigm in changing parenting practices may relate to attachment style (holding all the caveats in mind of generally low mean attachment anxiety/avoidance scores and a sample high in education and socioeconomic status), therefore future research may need to account for attachment style in operationalising the VR paradigm with reference to attachment theory.

Limitations and Future Research

In addition to the limitations already discussed, during the post experience interviews, while many participants responded in line with being immersed and feeling emotions congruent with the virtual mother's actions, some participants also raised some interesting points that warrant further consideration in refining the VR paradigm. Some participants reported feeling scared of the Positive mother initially as a result of previous exposure to the Negative mother (as was also reported in Hamilton-Giachritsis et al., 2018). Some participants also discussed that whilst the tone of the virtual mother was warm in the Positive condition, her actions were not necessarily consistent with what she said (e.g. asking if the participant wanted to play together but then not playing). Participants also discussed that they did not have enough time to fully acclimatise to the environment and needed longer, whilst others felt self-conscious responding verbally to the mother knowing the experimenter was listening in the real world. Further, some participants reported finding it hard to relate to the virtual child because their own child was much younger, whilst they also felt that some questionnaire items were not relevant for the age of their child. These

factors will need further consideration in the design of future studies using such a paradigm. There were also aspects of the paradigm that emerged from participants' interviews that are important to retain, including the exposure to both the positive and negative mother to provide a contrast of styles to reflect on, the clear size difference between the mother and child avatar, and the voice actor's tone of voice.

Future research with a larger, more heterogeneous sample is required. The current difficulties with AAPI reliability and validity (and previously reported difficulties e.g. Connor et al., 2006), highlights the importance of adequate checking of the face validity of items contributing to a construct when selecting a measure to use. It is possible items not appearing to represent well the construct to which they belong impacted on the reliability of the measure. Further, it highlights the importance when constructing a new measure to avoid allocation items to a construct on statistical terms alone, which appears to be the case with the AAPI. It is recommended that in future research an alternative measure of maltreatment risk is used alongside the *total* AAPI score (which has shown good reliability), and the same AAPI form should be used both before and after due to a lack of consistency between the forms. Further, while the adult version of the Mind in the Eyes test has shown consistent reliability and validity across studies (Baron-Cohen, Wheelwright, Hill et al., 2001) the child version has been less widely used (Baron-Cohen, Wheelwright, Spong, & Lawson, 2001) and appears to have only been used once before for adults identifying child faces (Vogindroukas et al., 2014) as in the current study. In addition, while it has shown good ability to discriminate between known groups who are low or not in cognitive empathy (i.e. ASD vs Controls; Baron-Cohen et al., 2001) it is less clear on the measure's sensitivity to pick up changes over time.

A further potential variation to the study relates to the fact that participants were embodied in the same gender as their own (i.e. female for mothers), the current study did not assess the gender of the children of the mothers themselves. It is possible that the effect may be larger when the gender of the child they are embodied in matches the gender of their children rather than themselves. Indeed, one participant discussed feeling more "connected" to the experience because the child looked very similar to her own daughter.

Further, future studies in the area should also look to measure parenting behaviours in the months following the IVR experience to see if reported reductions in harmful parenting practices as found in the current study are enacted in life.

Conclusions

The current study, with a small sample of mostly homogenous high socioeconomic and highly educated participants, did not replicate the previous finding (Hamilton-

Giachritsis et al., 2018) of changes in empathy after exposure to Positive and Negative virtual mothers while embodied in the virtual body of a young child, nor was any change in empathy related to adult attachment dimensions of anxiety or avoidance. The lack of replication is of value in that it suggests changes in maltreatment risk documented in the original study could be attributable to issues with reliability and a lack of consistency between pre and post versions of a measure used to measure maltreatment risk and/or differences in sample characteristics. This requires further investigation.

The current study did find very preliminary evidence that the paradigm resulted in an intention at least, to engage in less harmful parenting practices in the future with some evidence of a relationship with this change and adult attachment style.

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Executive Summary

Jac Neirin Airdrie

Ja846@bath.ac.uk

Date: 05.06.20

Word Count: 997

Supervisor: Dr Jennifer Allen

Executive Summary

Literature Review Project

Post-traumatic stress disorder (PTSD) is a life impacting disorder characterised by intrusive thoughts, avoidance, negative affect, and hyperarousal related to a traumatic event. For many, left untreated, this will be a long-term condition. However, individuals can recover without therapeutic input. Gaining an understanding of the extent, and over what time period this is likely, will help inform the most efficient point in which to assess and treat PTSD. Equally important is gaining an understanding of the factors that predict recovery from PTSD. A factor found to increase risk of *developing* PTSD is being female. However, research is less clear on the role this plays in the likelihood of recovering from PTSD.

We searched the literature for studies that assessed the percentage of individuals who met diagnostic criteria (prevalence) for PTSD at two or more time points within one year following a traumatic event, finding 78 studies. By statistically combining prevalence over time we found that on average, one third of adults who met PTSD criteria one month following trauma, no longer did so after three months. Further, after three months, further prevalence reduction was small (only 1%). We also found that samples with a higher proportion of females had higher PTSD prevalence but were also associated with larger prevalence reduction over time.

Together, the results suggest that assessing PTSD at three months may be optimal to identify individuals who do not recover without intervention. It also highlights that individuals who have met PTSD criteria for more than three months are unlikely to recover without intervention. It suggests that while females may be more likely to meet criteria for PTSD after a traumatic event, they are also more likely to recover without intervention. Future research should explore possible reasons for this, such as cultural gender differences in emotional expression.

Service Improvement Project

PTSD and substance misuse often co-occur, which complicates treatment. If individuals use substances to cope with PTSD symptoms, removing this coping strategy may result in an increase in PTSD symptoms and make long-term abstinence more challenging. Therefore, in the UK, an integrated approach targeting both PTSD symptoms and substance misuse is recommended.

A substance misuse service in England had adopted an integrated treatment modality, called Seeking Safety (SS). SS is a 25-week group program which builds coping skills for symptoms of both difficulties based on cognitive behavioural principles. SS has an

emerging evidence base in the US, but no studies had evaluated it in the UK. We therefore evaluated SS in a UK-based health service.

The depression, anxiety, PTSD and substance misuse symptoms of seven SS attendees were recorded before and after the program and interviews were conducted to explore the aspects they found more and less helpful. It was found that while 71% of attendees were above the cut-off suggestive of clinically significant symptoms for anxiety and depression before the group, none were at its conclusion. Results were more modest for PTSD symptoms, with 100% above cut-off before and 66% after program completion. Difficulties with the wording of questionnaires about substance use prevented drawing conclusions regarding the impact of the program on these symptoms.

During interviews, participants highlighted valuing learning about themselves, practical, present-focused skills to manage emotions, and the opportunity to reconnect with others. Participants emphasised that the primary facilitator of the group was key in managing group dynamics and delivering content in an accessible way. They also suggested focusing on less content to allow time for the consolidation of learning and providing clearer next steps for their treatment at the program's conclusion.

Main Research Project

Child maltreatment (CM) has long-term physical and psychological consequences. Therefore, strategies to reduce CM are crucial. One such approach has shown success in increasing empathy, a lack of which is a risk factor for CM, by using virtual reality (VR) to give mothers the opportunity to observe interactions with caregivers from a child's point of view. However, another factor, not accounted for by the above study, that impacts risk of CM, is the adult attachment style of the parent. Adult attachment style is a psychological model of how one views oneself, others and relationships. Importantly one's attachment style can impact on caregiving. For individuals with an insecure attachment style, threat can hyper- or hypo-activate the attachment system which impacts one's ability to be sensitive to a child's needs. It is possible that if mothers with insecure attachment experience the VR as threatening, their own needs taking priority may impact their ability to relate to the child's perspective and therefore limit the effect of the VR experience. By exploring the effect of the VR on mothers with varying attachment styles, we can determine if it has a universal effect, or whether further tailoring based on parental attachment style is needed.

Using VR, nineteen mothers without parenting difficulties were immersed in the body of a virtual child on two occasions, a week apart. During the experience they interacted with a virtual mother who adopted a warm and collaborative style, or a critical and authoritarian style. Participants' empathy and self-reported parenting style was measured

before and after the VR.

No evidence of change in empathy was found, nor was change in empathy related to attachment style. It is possible that this is because we did not have enough participants to detect a significant change. We also found that the measure of empathy was not reliable (it had low internal consistency) which may have impacted the potential to find a difference. However, we did find that participants' self-reported parenting style changed towards parenting practices associated with less risk of CM. There was also some evidence that individuals higher in attachment insecurity made fewer changes in their parenting style.

The study supports the potential utility of VR to provide parents with an experience of caregiver interactions from a child's perspective to increase effective parenting style. However, larger sample size and a reliable measure of parenting behaviour and risk is needed before applying the approach to higher risk mothers.

Reflective Narrative on Personal and Professional Development

Jac Airdrie

Ja846@bath.ac.uk

Date: 05.06.20

Word Count: 2684

Supervisor: Dr Jennifer Allen

Reflective Narrative on Personal and Professional Development

Divided Attention and (Dis)organisation

My Doctoral training in Clinical Psychology has been a story of divided attention (this was discussed in our cohort as ‘plate spinning’; I am sure it would have been discussed in that way before, therefore I am hoping the analogy isn’t too cliché as it fits really well). Unfortunately, divided attention is not something that I consider to be one of my strengths. It is also very difficult to learn a new skill when you are only able to allocate some of your attention to it. However, as training progressed and with further understanding of mindfulness and the idea of presence, I realised that meeting the demands of training was less about divided attention and more a case of turn taking (or task switching as in the cognitive psychology literature which I covered in my undergraduate thesis) in terms of where your attention is focused.

To keep with the plate spinning analogy, rather than trying to keep all the plates spinning at once, it was more a case of taking the plates off, placing them on the floor and choosing one to spin at a time (this of course is the idealist view and it and was never this simple, for example, as I write this there are at least five other plates spinning as I work towards the thesis deadline). Such an approach requires high levels of organisation – after all, each plate needs to spin for a certain duration to meet the requirements of a project (I’ll stop with the plate analogy here), and this too was something that required development on my part. Before training I was not one who considered myself to be particularly disorganised (perhaps incorrectly), however upon starting my first placement I realised that my current strategies of organisation which had served me well enough during my degree, masters and PhD were not quite up to scratch to manage the competing demands of multiple research topics and clinical placement. I would like to think that by midway through my second placement my organisation was good enough to meet course demands, however my organisational ability is always something I need to monitor and improve, and I believe it may require even further refinement when I take on the increased caseload that accompanies the role of a qualified clinical psychologist.

Reflections on Research Projects and Interaction with Clinical Practice

One motivation for studying clinical psychology was to learn about and apply a broad range of psychological concepts to help others. Prior to training, I completed a PhD, and at times this had a relatively narrow focus (which is inherent in PhDs). When designing my PhD research, I was often preoccupied about potential blind spots in terms of relevant literature that I was not drawing on and confounding variables I was not accounting for. As

such, my initial plan for DClin training was to choose three quite distinct research topics in order to cover a broad a range of literature as feasible. However, now, looking back at my three projects, it appears my choices share more overlap with my PhD topic, and with each other, than I anticipated, and I wonder if this was influenced by how divided my attention already felt, or, that it may be a reflection of being drawn towards my natural interests. Despite their overlap, I still found myself in the new experience of having to develop three separate projects, and while there were similarities, it still meant having to understand three new areas of research literature.

Main Research Project (MRP)

My choice of MRP of using a virtual reality programme to increase perspective taking in mothers was motivated by a desire to cover processes that I felt were missing from my PhD. I have always had an interest in the role of relationships, and in particular, early relationships and experiences in psychological wellbeing. I also felt that this is something that was missing in my PhD research on emotional processing in children and adolescents with ADHD with or without conduct disorder. While there was an acknowledgement that early life factors may have been contributing to a child's current presentation – the research focused on how the child was presenting and processing emotional stimuli in the present, and at times it felt like it located the problem in the child. While awareness of these deficits may lead to interventions that address that specific part of an individual's difficulties (which is all well and good if that mechanism solves the difficulty), it may not address factors that have led to that difficulty in the first place. So while my PhD identified that individuals with ADHD and conduct disorder have difficulties processing emotions, I feel that adequate attention was not paid to the factors that led to the development of those difficulties – and perhaps the same mechanisms/experiences that led them to have difficulties processing emotions are also responsible for other difficulties they are experiencing in their young lives. This is what motivated an interest in my MRP which sought to improve perspective taking using a VR environment in mothers of young children. As already stated, it was somewhat similar to my PhD in that it considered a deficit may be responsible for a clinical presentation, however it focused on a source of a child's early experience, i.e. interactions with a caregiver.

As already discussed in the introduction of my MRP, a lack of parental ability to take the perspective of the child is a risk factor for child maltreatment – and child maltreatment is a risk factor for later behavioural problems in children and subsequent mental health difficulties in later life. I, as do many other researchers and clinicians, see attachment theory as a useful conceptualisation of how interactions in early life with a

central caregiver set up one's later assumptions about the world and expectations of others. By exploring this in research it goes some way in addressing potential early influences on the later presentation of children (and adults).

Despite considering the early life factors that may contribute to later wellbeing, it still suffers from a limitation of my PhD in being reductionist in that it considered perspective taking as static (although changeable with intervention). I think my training more widely (including systemic teaching) has perhaps enhanced my awareness to wider factors that may cause a caregiver's ability to take their child's perspective to fluctuate (e.g. general life stressors, poverty, interpersonal difficulties, amongst others). Although an intervention such as VR may lead to improvements in perspective taking (or positive parenting attitudes) in a controlled setting, in reality, one's ability to take another's perspective, empathise and be sensitive to their needs is likely to vary widely depending on an individual's day to day circumstances. Therefore, social change (brought about politically) may have much larger effect sizes in reducing the prevalence of child maltreatment than singular interventions.

Learning from my CAMHS placement also has relevance to the above ideas. It highlighted how styles of parenting do not necessarily need to be clearly abusive or neglectful to lead to distress in children. At times, I had to be aware of anger that would sometimes arise in me in relation to parenting approaches, especially when they appeared so central to a child's current difficulties. I needed to remind myself that parents' own life experience is influencing their approach. My experience on placement as part of a family therapy reflecting team also helped highlight how parents may be either recreating what they believe is normal or right in terms of child care based on experience, or on the other hand, reacting against their experience growing up (perhaps analogous to adult attachment styles) and tipping the balance too far the other way. It is important to recognise that parents are often doing the best they can in a given situation based on their experience and circumstances and usually do not have an intention to cause harm. Increased awareness of a tendency of parents to move towards the other extreme of a parenting approach if they had a negative experience of being parented also helped give significance to the importance of finding the middle ground which is also key in so many other areas of clinical psychology.

Service Improvement Project (SIP)

My choice of SIP was motivated by an interest in traumatic responses and how one copes with such experiences. I was also interested in comorbidity and interconnectedness between overlapping but separate difficulties leading to more complex maintenance cycles.

Choosing to go towards aversive emotional experience is already so challenging when people have needed to move away from it in order to cope and survive in their life

circumstances, and when chemical dependence is added into this equation, it presents even more of a challenge. My SIP evaluating a *Seeking Safety* group by interviewing attendees with co-morbid PTSD and substance misuse taught me a great deal from a clinical research (i.e. doing research whilst working clinically – headline – importance of organisation again) and clinical practice perspective. It highlighted the importance of service users having a voice in how groups are set up or order to maximise the accessibility of groups to all who could benefit. Further, hearing participants' experience of a therapy group from a relatively impartial position (in that I was not involved in running the group) cemented the importance of the non-specific skills of unconditional positive regard, validation and the importance of boundaries which had been emphasised in teaching. It was also inspiring to hear about the difference individuals were able to make to their lives despite the challenge of the maintenance cycle referred to above. This was very useful in terms of maintaining hope in possibility for change.

Literature Review Project (LRP)

My literature review project too shared a focus on trauma, exploring how the prevalence of PTSD changes over time. This project was useful in highlighting how some individuals are able to recover from PTSD without any specific psychological therapy input, while reading related to the review also highlighted (in the case of debriefing) how a psychological therapy that had intended to be helpful, can actually lead to harm. I think this project heightened my awareness for if and when intervention is warranted. I think my learning from this project was also complemented by the CAMHS teaching we received on PTSD delivered by Dr Vuokko Wallace demonstrating the role of societal reaction to distressing topics in maintaining PTSD symptomology (demonstrated by a fascinating group behavioural experiment), and how individuals are given implicit messages about it being inappropriate to discuss difficult topics. Such learning highlighted the importance of getting systems around a person talking about difficult events in a validating and containing way and how this can reduce distress. I also wonder if this process occurring naturally may be the mechanism as to how there is a reduction of PTSD prevalence over time found in my review project.

Reflections on the Ethical Approval Process

The process of obtaining ethical approval from the University and relevant NHS trust R&D was relatively straightforward, in contrast to my expectations. I was quite pleased, having designed my MRP, that it did not require NHS *IRAS* approval, something I had heard on the grapevine was quite complex. Although avoiding this for the current

projects felt like a short-term gain, in the long term, when I continue to pursue my research interests once qualified, I will inevitably need to go through this process. Therefore, it was a potentially a missed opportunity to gain some experience of this process. Further, it is probable that the process of applying for ethics via IRAS is not as complex as rumoured and therefore in not remaining more curious, I missed an opportunity to challenge an assumption that may not be true.

As with my SIP, the process of obtaining ethical approval also highlighted the importance of involving people with personal experience (PPE) of mental health difficulties in the design of research materials. I was so grateful to the feedback I received from PPE in terms of how materials are worded and how individuals may interpret certain phrasing. It has provided me with motivation to continue PPE involvement in the design of research in the future and potential future design of service delivery if I ever find myself in that role.

Personal Reflections

Personal Resonance with the Fennell Low Self-Esteem Model

Being introduced to the Cognitive Behavioural Model of low self-esteem model in my first year resulted in one of the biggest shifts in my understanding of myself brought about by training. The model represents the interconnectedness between fears of asserting one's self (or acting in other ways in line with needs and values) and subsequent low mood when one does not (a sense of damned if you do damned if you don't), which captures a pattern that I fall into myself so well. Since learning about this model, I so often see it playing out in the lives of clients that I work with. Due to the weight I have applied to this model and how much my own difficulties resonate with it, it will be important for me to check in when I notice this pattern in those that I work with to ensure that, 1. It is present (and to use psychodynamic terminology, to check that I am not projecting), and 2. Whether it is an important part of the formulation that needs addressing. Clinical supervision will be essential for this.

Identity

Related to the topic of self-esteem is that of identity. Issues around my identity were raised in many ways during training; however I will discuss just one here.

My aspirations to be a clinical psychologist have for a long time been a key part of my identity, and after getting over the oh-so-common young person's fantasy of being a professional football player, becoming a clinical psychologist became a more realistic fantasy. I think my genuine and extra-curricular interest in understanding psychological processes and wanting to help others contributed to my eventual success in getting onto

training. However, in starting training, I was confronted with 13 other individuals with similar interests and the same genuine desire to help others. While this was great in terms of forming a shared connection with others, to some extent it took away some of what I felt was different to me from others in the social circles in which I grew up, and even to friends I completed my PhD alongside. As the course progressed, my identity became more and more merged with my career and took some of the energy out of conversations I may have previously enjoyed discussing outside of work.

This process therefore highlighted the importance of self-care and developing interests and hobbies outside the realm of psychology in the (little) free time I had outside of DClin training. The (hopefully temporary) end to my main hobby of football due to an ankle injury coincided with the start of DClin training, however, through remaining open to new experiences I was happily introduced to two new hobbies of road cycling and climbing which I can see now as being cornerstones to self-care for years to come. While it is important to recognise that to some extent training has changed the default lens through which I make sense of the world, it will be important as I continue my career that I find ways of giving myself a break from the themes of work in my free time. At the same time, being appreciative that I am so lucky to have a career that satisfies my interests so closely.

Conclusions

My DClin training has led to the understanding of multiple new concepts and theories while also providing me an abundance of new perspectives. It has confirmed my belief in the value of the dual role of scientist and practitioner that clinical psychologists (which soon will include me) are so well placed to adopt. It has maintained and further enhanced my motivation to continue to seek new learning and perspectives both through personal reflection, clinical work and research in order to support and improve the psychological wellbeing of others.

Appendices

Appendix 1.1. Forest Plots for Point Prevalence

Figure A1

One Month (T1) Point Prevalence (%)

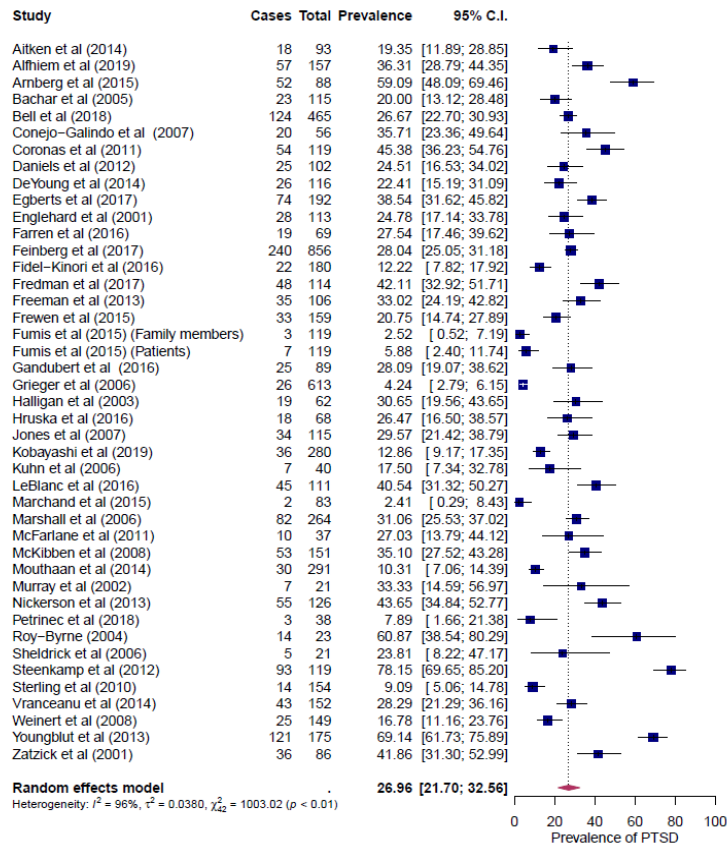


Figure A2

Three Months (T2) Point Prevalence (%)

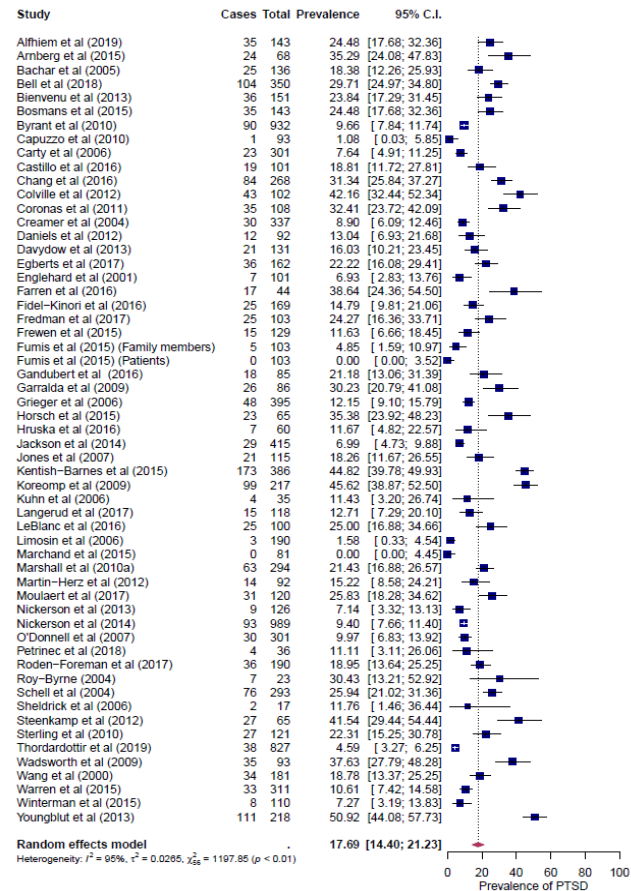


Figure A3

Six Months (T3) Point Prevalence (%)

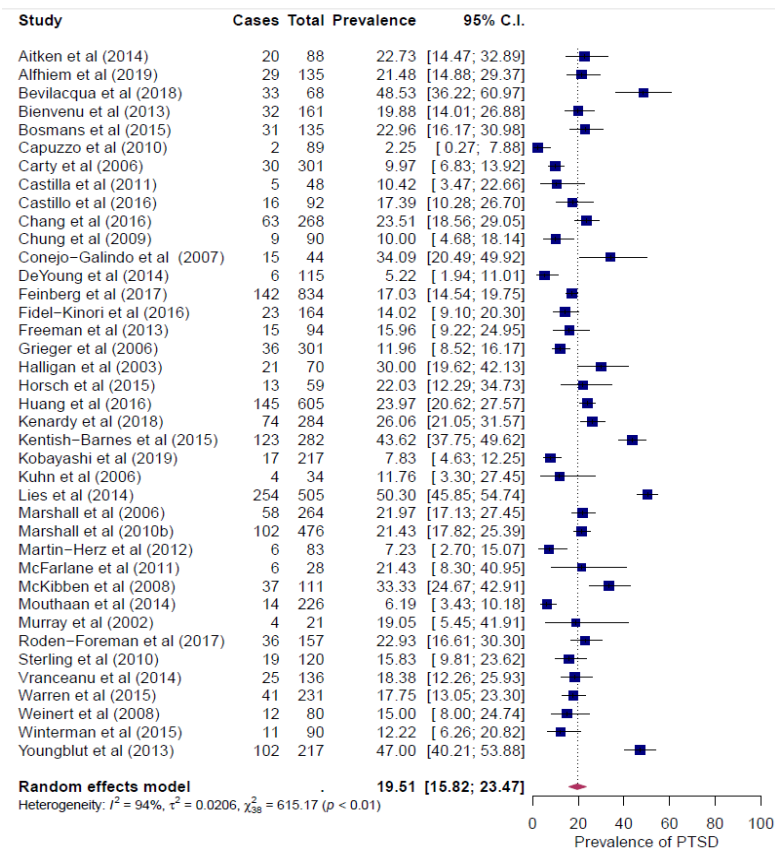


Figure A4

Nine Months (T4) Point Prevalence (%)

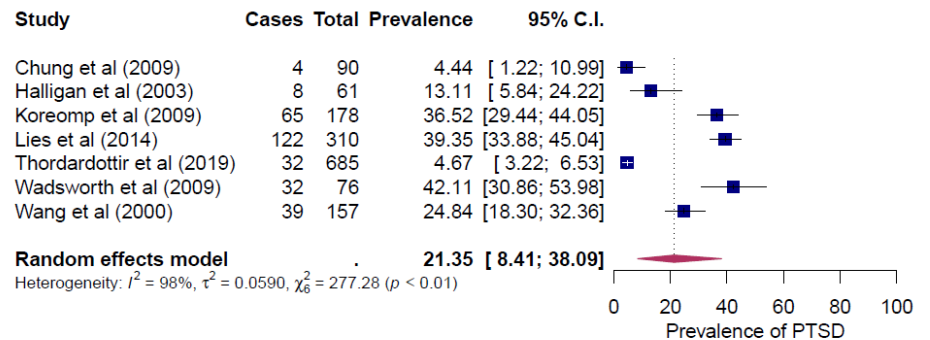


Figure A5
Twelve Months (T5) Point Prevalence (%)

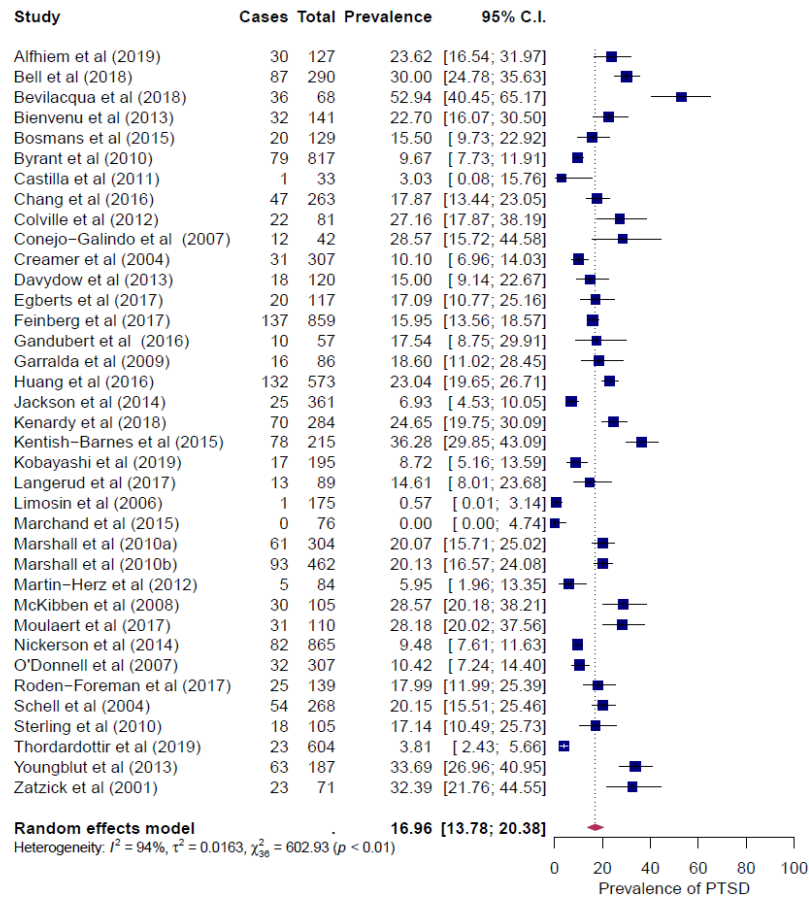


Figure A6
Fifteen Months (T6) Point Prevalence (%)

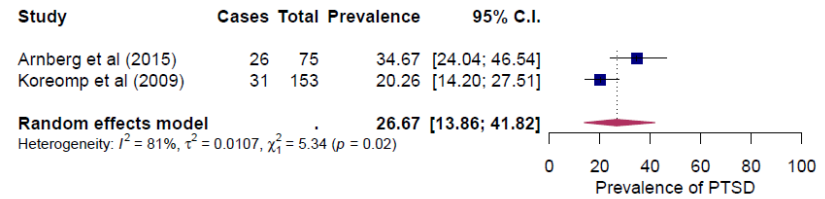


Figure A7
Eighteen Months (T7) Point Prevalence (%)

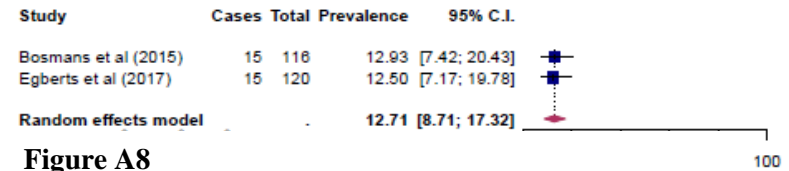
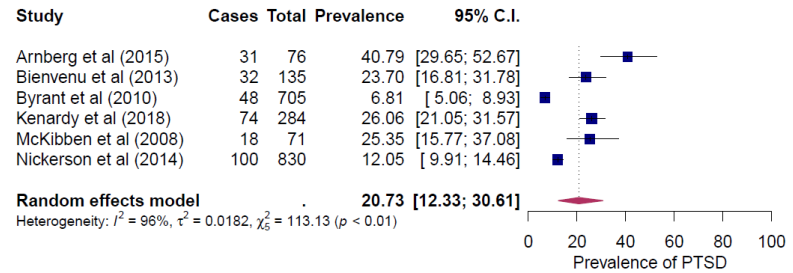


Figure A8
Twenty-four (T9) Point Prevalence (%)



Appendix 1.2. Sensitivity Analysis

Sensitivity Analysis

Outliers

To check the impact of extreme values a sensitivity analysis was conducted removing such values from each analysis for both point prevalence and change scores. This was done using the “findoutliers” function of *metafor* – which considers a study an outlier when the bounds of its 95% CI lie outside the 95% confidence interval of the pooled effect. Removing extreme values did not alter the estimates of point prevalence or risk difference, however it did reduce estimate of between study heterogeneity in most cases. For point prevalence removing outliers function resulted in nearly half of studies being removed (perhaps a reflection of the amount of between study heterogeneity) and therefore this is not reported as non-interpretable.

Leave-one-out analysis

We also conducted leave-one out-analysis to consider the influence of studies with relative extreme values (Wolfgang Viechtbauer & Cheung, 2010). Whilst *baujat* (ref) plots did indicate some studies were potentially influencing pooled effect size and heterogeneity. leave out analysis did not change I^2 or the pool effect size greatly for single point prevalence with prevalence estimate for each time point varying by a maximum of 6%, whilst heterogeneity estimates varied by up to 4%.

For change score analysis, leave one out analysis resulted in only variations of effect size of up to 0.02 (risk difference) for each change point, whilst heterogeneity varied by up to 0.05 (Risk difference) whilst heterogeneity estimated varied up to 18%. Leave one out analysis did not lead to any alternations from the main results in terms of change to the direction of the results or their statistical significance.

Appendix 2.1. Interview Schedule

Coming into the service

1. How did you first become aware of the seeking safety group?
2. Name up to 3 things you hoped to achieve when you started seeking safety
3. How close do you think the service has come to meeting your expectations?
4. How did you find the assessment experience?
 - a. Did you feel that you had time to explore things which were important to you?
 - b. Did you feel understood? What helped with this?
5. What was helpful/unhelpful about the information given to you during your first appointment?
6. How could this information be improved?
7. Did you have any worries or concerns prior to coming to the seeking safety group? What were these?

Modules

8. What have you found helpful/unhelpful about each of the modules that you have completed?
9. Are there any modules that you have preferred over others?
 - a. Why?

The seeking safety group

10. How has the seeking safety group helped/not helped in reducing your substance use?
11. How has the seeking safety group helped/not helped in learning to cope with difficulties?
12. Were there any topics that you found more helpful than others?
13. Were there any topics that you found were not helpful? Why?
14. Is there anything else that is particularly helpful/unhelpful about the seeking safety group?
15. How did you find the length of the group sessions?
16. What do you think about the amount of information presented?
17. What do you think about the amount of people in the group?
18. How could it be improved?
 - a. Can you name up to three ways it can be improved?

19. What is helpful/unhelpful about the resources used within therapy, e.g. resources of seeking safety?
20. What one piece of advice would you give to somebody who was going to start seeking safety?
21. How would you feel about new members joining the group at times in addition to the start and midpoint of the group?
22. Is there anything you would suggest about how best to do this?
23. How helpful did you find the group in preparing you to go to complete direct trauma work?

Relationship with team members

24. What do you think is the main thing that helps build a good relationship between service users and seeking safety group facilitators?
25. If you were to give one piece of advice to the seeking safety facilitators – what would this be?
26. Is there anything else you would like to add that we have not spoken about?

Appendix 3.1. Concerns relating to face validity of the Oppressing Power and Independence Construct of the AAPI-2.1

The development guide of the AAPI defines the power and independence factor as:

“The age old phrase “the terrible two’s” most adequately describes this construct. Parents fear that if children are permitted to use their power and independence to explore their environment, or ask questions, or challenge parental authority, they will become “acting-out” and disrespectful. Hence, obedience and complete compliance to parental authority is demanded. When children’s power and independence are oppressed, they are not allowed to challenge, to voice opinions, or to have choices, but rather are told to “do what they are told to do” without question”

The items that most strongly related to this factor in the validation of this study can be found in the table below (recreated from AAPI development guide):

Table A3.1 showing items contributing to factor E Power and Independence and their loadings on other factors. Table recreated from AAPI development Guide (Bavolek & Keene, 2010)

		Loadings on factors				
Form	Item	Inappropriate expectations A	Empathy B	Corporal Punishment C	Role Reversal D	Power and Independence E
A	Parents who encourage their children to talk only end up listening to complaints	0.24	0.31	-0.09	0.16	0.34
A	Children need to be allowed the freedom to explore their world in safety	-0.13	-0.14	0.00	0.01	-0.45
A	Parents who nurture themselves make better parents	-0.11	0.01	-0.14	-0.19	-0.42
A	Children should be potty trained when they are ready and not before	-0.04	0.02	-0.17	-0.21	0.27
A	Children who receive praise will think too much of themselves	0.17	0.19	0.08	0.17	0.36

B	Consequences are necessary for family rules to have meaning	0.11	-0.12	0.06	-0.11	-0.44
B	Children who learn to recognise feelings in others are more successful in life	0.05	-0.09	-0.16	0.08	-0.45
B	Parents expectations of their children should be high but appropriate	0.10	-0.20	-0.03	0.09	-0.45
B	Rewarding children's behaviour is a good form of discipline	0.12	-0.19	-0.13	-0.07	-0.37
B	Parents who are sensitive to their children's feelings and moods often spoil them	0.26	0.20	0.15	0.11	0.28

As can be seen from the table above, whilst some items do tend to have strong face validity with the definition provided above e.g. “Parents who encourage their children to talk to them only end up listening to complaints” and “Children need to be allowed freedom to explore their world in safety”, other items have a less clear connection with the factor definition e.g. “children should be potty trained when they are ready and not before”, “parents who nurture themselves make better parents”.

Lack of Consistency Between Items Contributing to Constructs Across Form A and Form B

As well as potential difficulties with face validity in terms of the items' relationship with the description of the construct, there is also a lack of consistency in terms of similar items contributing to different constructs across Form A and Form B. For example, for Form A an item worded “Children should be potty trained when they are ready and not before” loads onto construct E (Oppressing power and Independence) however a similar item from Form B “children should be potty trained as soon as they are two years old” loads onto construct D (Parent-child Role Reversal, which in addition seems to lack a clear correspondence with this construct). Similarly an item on Form A worded “Children need to be allowed freedom to explore their world in safety” loads onto construct E, whilst a similarly but oppositely

worded item from Form B “The problem with kids today is that parents give them too much freedom”, loads onto construct A (Parental inappropriate expectations of children).

Appendix 3.2. Example Parenting Scale (Arnold et al., 1993) Questions

1. When my Child misbehaves...

I do something right away I do something later

2. Before I do something about a problem.....

I give my child several reminders I use only one reminder

Appendix 3.3. Equipment and The Virtual Environment

Equipment.

The study used a HTC VIVE™ headset, three VIVE body motion trackers (one for the torso and one on each foot) as well as two VIVE controllers for hand and arm movements. The headset, body trackers and controllers communicated with two VIVE base stations using infrared technology to determine their position in virtual space. The paradigm was programmed using Unity Software. Participants could move around a 3x5m area within the lab if they wished to.

The Virtual Room.

The Virtual room consisted of a large mirror, a sofa, a large window with views of a city townhouse opposite in the daytime, a lamp, some books and a mug on a coffee table, a children's play mat and some toys (a rocking horse, an origami bird, a train set and a ball).

The Virtual Mother(s)

The virtual mother had the same overall appearance for both Negative and Positive conditions but they differed in their facial expressions, body language, tone of voice and words communicated to the participant. The dialogue for the Negative and Positive conditions can be found in Table 3.1 and was the same as that used in Hamilton-Giachritsis et al. (2018) but translated to English. In short, the Negative mother was critical, blaming and authoritarian towards the child whilst the Positive mother was caring, praising and took a more collaborative approach encouraging the participant to help rather than demanding the child tidy up (as in the Negative condition). The pre-recorded sound (the same person for both Positive and Negative conditions) was provided by an English female who was rated in a pilot study ($n = 7$) as highest for warmth ($M=7.8$ out of 10) for the Positive and harshness ($M =7.1$ out of 10) for the Negative mother out of a pool of six voice actors. In the Negative condition the arms of the mother moved relatively vigorously and her facial expression was one of anger whilst, the Positive mother's arm movements were slower and more gentle and had a happy (soft smile with mouth closed) facial expression.

Table A3.3.

Virtual Mother Dialogue

Positive mother	Negative mother
-----------------	-----------------

[Mother]: Hi darling how are you?

[Mother]: There you are, what are you doing?

[Mother]: You are not bored, are you?

[Mother]: Did you call me? I am sure I heard you saying something

[Mother]: Do you want to play together for a while?

[Mother]: don't bother me; can't you see I am busy?

[Mother]: Come on, what toy do you like the most?

[Mother]: Don't you like any of these toys?

[Mother]: That is a very nice toy, I like it too. Tell me what is it that you like about this toy?

[Mother]: You are making too much noise! Stop making noise.

[Mother]: You are right. Um, I'll go and start making dinner and then perhaps we can go for a little walk together - we are going to have fun!

[Mother]: Look, I'm going to make dinner and then we are out of here. I've had enough being inside here.

[Back up phrase: don't you want to come out for a walk with me?]

[Mother]: Once I go, tidy up this room. You have left everything untidy. The room looks a disaster. For God's sake, why can't you do what I am asking you for once? I am tired of doing everything around here without help and on top of that it's you who disorganizes everything, who doesn't do anything. What are you looking at? Tidy up! Now

[Mother]: Well, then I'll see you in a bit?

[Mother]: In the meantime, would you mind tidying up the room here a bit to help me out, please? I am very tired and that would be such a big help for me.

[Mother]: You are such an untidy child. Why do I have such a naughty daughter? Why don't you do what I ask for once? Is it too much to ask to leave me in peace now and then? Leave me in peace! Really, you are such a stupid girl, just like your father, stupid. Wait until he gets home and he hears how horrible you've been today, you will see!

[Mother] What a sweet girl you are! I love you so much! You always help me out, I'm very proud of you and I love spending time together. So does your daddy, maybe when he comes back he can be with us and we can play a game together.

The Child Body

Participants were embodied in that of a white four year old virtual female body. The child is approximately one third of the height of virtual mother.

Appendix 3.4. Tests of Normality

Mind in the eyes

Shapiro-Wilk statistics all $W(18) > .90$, $ps > .06$.

Parenting scale

The Shapiro-Wilk test indicated the assumption of normality was violated for The Verbosity factor at T1 pre ($W(19) = .76$, $p < .001$), the Reactivity factor at T1 post ($W(19) = .85$, $p < .01$), the Laxness factor at T2 pre ($W(19) = .89$, $p < .05$), and the Reactivity factor at T2 post ($W(19) = .62$, $p < .001$). Therefore Wilcoxon-rank sum non-parametric analyses were additionally run for analysis of difference in parenting scale before and after the VR exposure.

Experiences in Close relationship Scale

The Shapiro-Wilk test indicated the attachment anxiety subscale was normally distributed ($W(19) = .96$, $p = .47$), whilst the attachment avoidance subscale was not normally distributed ($W(19) = .89$, $p = .03$) therefore non-parametric correlations were additionally run for analyses including this variable.

Adult Adolescent Parenting Inventory 2.1

The Shapiro-Wilk test indicated The Parental Empathy (construct B) construct was not normally distributed at T1 or T2 ($W(18) < .90$, $ps \leq .05$), and Parental Belief in Corporal Punishment (construct C) at T1 ($W(18) = .87$, $p = .02$) but not for any other constructs at either time point ($Ws(18) > .92$, $ps > .11$). Therefore non-parametric equivalents were also run for analyses involving these variables.

Appendix 3.5. Embodiment Manipulation Check

Participants' scores for the post experience questionnaire are presented in Table 5.1. Scores relating to feeling like a child were in the positive direction and high. However, scores were only marginally in the positive direction for statements relating to feeling like the body was one's own body and feeling like they were looking at themselves in the mirror. Conversely, there were lower scores for control questions related to two bodies and features resembling their own real body, in line with good embodiment. When exploring differences between the conditions, participants were more likely to agree that they responded to the mother in terms of their emotions and felt like they were in a child's body for the Positive condition than the Negative condition.

Table A3.5
Mean Scores to Post Experience Questionnaires

Statement	Positive	Negative	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	
I felt the body was my own body	0.7 (2.1)	0.6 (2.1)	.70
I felt I was looking at myself in the mirror	0.9 (2.2)	0.5 (2.1)	.07
The movement was caused by my own body movement	2.4(1.2)	2.4 (0.8)	.79
I felt the mother was aware of my presence	2.5 (0.7)	2.3 (1.4)	.53
I felt myself responding to the mothers regarding my			
Thoughts	2.0 (1.4)	1.3 (1.8)	.23
Emotion	1.6 (1.5)	0.5 (2.0)	.04
Physical response	1.5 (1.5)	0.8 (1.7)	.12
I felt like I was in a child's body	2.1 (1.3)	1.7 (1.3)	.03
The mother acted as if I was a child	2.7 (0.6)	2.6 (0.8)	.27
I felt much younger than I actually am	2.2 (1.2)	2.0 (1.6)	.45
I felt like a child	2.0 (1.4)	2.1 (1.0)	.58
<i>Control questions^a</i>			
I felt the body resembled my own body in terms of features	0.05(2.3)	0.05 (2.2)	1.0
I felt I had two bodies	-1.7(1.6)	-1.2 (1.7)	.10

Notes. Higher scores represent more agreement (more successful embodiment)

^aControl questions, where lower or negative scores show more successful embodiment.

Appendix 3.6. Mean Standard Ten (STEN) Scores

Table A3.6.

STEN Scores for AAPI Before and After Exposure to Both VR Conditions

Construct	Time 1 M (SD)	Time 2 M (SD)	<i>p</i>
A. Inappropriate parental expectations	7.4(1.6)	7.3 (1.9)	.53
B. Parental lack of empathic awareness of children's needs	6.9 (1.7)	7.1(1.7)	.48
C. Strong belief in the use and value of corporal punishment	7.0(1.5)	7.1 (1.5)	.86
D. Parent-child role reversal	6.5(1.3)	6.4 (1.7)	.88
E. Oppressing children's power and independence	6.5(1.8)	7.1(1.8)	.06

Notes. AAPI = Adult Adolescent Parenting Inventory 2.1. Higher scores associated with lower risk. STEN = Standard Ten

Appendix A3.7. Correlation Matrix Between Attachment Dimensions and Baseline Sores on Key Study Dependent Variables

Table 3.7.

Intercorrelations Between Dependent Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Attachment Anxiety	-											
2. Attachment Avoidance	.53**	-										
3. AAPI Unrealistic expectations	-.31†	-.23	-									
4. AAPI Empathy	-.30†	-.18	.31†	-								
5. AAPI corporal punishment	-.22	-.34*	.37*	.40*	-							
6. AAPI Role reversal	-.05	-.12	.25	.40*	.21	-						
7. AAPI power and independence	-.15	.01	-.05	-.16	-.15	.15	-					
8. AAPI Total	-.30†	-.28	.57**	.53**	.61**	.53**	.06	-				
9. PS Laxness	-.11	-.01	-.10	-.12	-.13	-.32†	-.04	-.19	-			
10. PS Over reactivity	.04	-.20	-.19	-.05	.14	-.11	.01	-.12	.05	-		
11. PS Verbosity	.45*	.34*	-.36*	-.14	-.29	-.25	-.21	-.50*	.04	.30	-	
12. PS total	.05	<.01	-.13	-.11	-.26	-.25	-.13	-.26	.60***	.30*	.30†	-
13. Mind in the eyes	.18	.02	.04	.04	.01	.03	-.37*	-.07	.04	.26	.04	.21

Notes. AAPI = Adult Adolescent Parenting Inventory 2.1. PS = Parent Scale. All correlations Kendall's Tau
 †p<.10 *p<.05 ** p< .01 ***p<.001. PS, Parent Scale All correlations Kendall's Tau

Appendix 3.8. Thematic Analyses of Participants Responses to the Post VR

Interview

Thematic analysis of participants responses to separate interviews following both the positive and negative conditions resulted in nine themes made up of underlying subthemes.

Positive learning experience

Participants discussed how they found the VR a positive learning experience.

Thinking and discussing experience in week between

Five participants reported that they discussed the experience with partners and friends having taken part. For example one participant stated: *“Over the first couple of days I talked about it with friends, I talked about it with my husband...”* and another remarked: *“yeah, I talked to my husband about it when I got back and we had a conversation about that and the importance of following through with what we say”*

Immersion being preferable to theoretical learning

Six participants talked how the VR experience further supplemented and brought to life previous parenting concepts they had learnt about on a theoretical level.

“I think these are the sorts of things I’m always every day analysing and reading, but when you see it in reality, it’s a lot easier to learn from than reading and picking it up and practicing what you have read. And actually you felt the feelings yourself”.

Positive and negative conditions generally evoking the responses we expected in emotional, cognitive and physical domains

Eighteen participants reported responses in the emotional, cognitive and physical domains that were consistent with that expected for the positive and negative conditions.

Emotional response

Emotions reported by participants in response to the negative mother included shame, loneliness, fear and anxiety, sadness and feeling intimidated. For example: *“It was a bit scary actually”* and *“it made me sad because, you know, I wasn’t doing anything wrong, I was just sort of standing there...”*. Whilst emotions evoked by the positive mother included happiness, feeling soothed and relaxed as well as feeling loved: *“It made me feel nice about*

myself". For another, the mother made them feel *"Like a little flower of a human, I felt like, aw, like that tone of voice that really makes you feel soothed and content..."*

Cognitive response

Participants' cognitive responses were also congruent with the interaction style of the mothers in both conditions. In response to the negative mother participants disclosed a sense of unfairness, whilst also thinking they were responsible for something or an inconvenience: *"I felt like she was annoyed because I had not done the things she wanted me to do and I'm irritating"*.

Whilst in response to the positive mother, participants discussed how they trusted the mother and also had a sense that they were being listened to by the mother who appeared interested in what they had to say: *"I felt like she was genuinely asking what I wanted to do and she was willing to do what I wanted and she was taking an interest..."*.

Physical response

Interacting with the mothers also led to a physical/behavioural response in seven participants. For the negative mother, participants reported how they felt physically threatened and as a result cut-off from the mother and became defensive:

"I didn't know what to do with this and it's horrible and how to get away from it. And I knew that I cannot run out the door and I cannot just make it stop. So I just thought if I would make myself really small it would stop".

Another reported wanting to avoid eye contact: *"I could not give the mother eye-contact"*.

Whilst in response to the positive mother, participants reported wanting to seek close proximity to her: *"The idea of actually just going up to her and hugging her leg or something, I felt like she was emanating that vibe, so I wanted to get closer to her"*.

Comparing and contrasting conditions

Reports of thirteen participants also demonstrated they were comparing and contrasting their experiences with the mothers in the two conditions, and it was this comparison that at times helped highlight what the participants felt was important in terms of engaging with children: *"last time you were made to feel like an irritation and an inconvenience whereas this time the things that she was saying made you feel like she values and cares for you"*.

Noticing size difference

An element of the VR experience that stood out for thirteen participants and was common across both conditions was the size difference between their VR body and that of the virtual mothers. This was commented on by thirteen participants: *“I mean looking up at her, I don’t know, I did feel like a child”*. Another participant remarked:

“um, I think the looking up thing was quite interesting, because obviously you don’t normally get that, and so, I do think I try, certainly when my first child was younger I remember thinking I don’t want to be scary, so I want to be down on their level when I’m interacting with them, and I need to make sure I still do that”

Integrating mother and child perspective

The responses evoked by participants in interacting with the mother and an awareness of the size difference indicated participants were experiencing the VR from a child’s perspective. Fourteen participants reflected on their experiences during the interview in such a way that suggested they were holding both the perspective of the child and their perspective as a mother in mind:

“I think so, coz that was quite intimidating even as an adult, so as an adult I would have felt confident to react or to question but as a child, it hasn’t got that confidence yet, and they would just see the intimidation...”

Participants reflected on the difference between how a child and adult can respond in a given situation and showed an increased awareness of how their child might be experiencing an interaction with them as a mother: *“it also made me realise how easy it might be to intimidate a child if we are not careful with our body language”*

Two participants also reflected how interacting does not need to appear overtly abusive to be experienced as threatening by a child: *“Being in that last condition also made me think that it doesn’t have to be as far as verbal abuse to make you feel attacked”*. Whilst four participants commented on the power difference between a mother and a child: *“yeah, it’s the power dynamic, you already have the control but also you are just so big which you forget as an adult. Yeah, that’s really powerful, so I was thinking about that quite a lot”*.

Reflecting on past experiences

For eleven participants, exposure to the VR conditions led to reflections on past experiences which included their own experiences of being parented:

“I think that feeds into your own experience of being parented as well, as in, if you had a person who had abused their power, I think I’m already quite sensitive to that, so I don’t want to do that to my child, I think actually what I worry about is being as good at setting boundaries because I’m so afraid of being authoritarian... That’s hard to get right”

They also noticed similarities and differences between their own parenting styles and that of the virtual mother conditions:

I found myself thinking, “I say this sometimes to my daughter”, even if I’m not necessarily cross, I was thinking, you know “I’ve used these words”, not quite that extreme, but I did think, I recognise myself in it.

“Its difficult because that’s the scenario you put me in, but for example if that was me talking to a child then I wouldn’t come into a room like that... I don’t think she said hello, I’d greet them, if they made a noise I’d ask them if they are okay, what is going on, because they are on their own”.

Whilst for four participants exposure to the positive mother reinforced to them what they were already doing well.

“It just reminds me that it is worth doing, rather than just telling them that “you need to do this” and the reinforcing about what I think about them rather than just assuming that they know like “I love you and I’m proud of you”, even the small things”

Reflecting how they might change their behaviour based on this perspective

Most participants (eighteen) also discussed how this experience would change how they intend to interact with their child in the future. The theme can be broken down in terms of more physical elements of interacting with a child and an element relating to content of information delivered to a child.

Physical/behavioural changes

Participants discussed an intention to change how they come across physically including being more conscious of tone and volume of speech as well as physically lowering themselves to the child’s level when interacting with them: *“My sense was that my boys wanted me down on the floor with them, and now I actually see why it is so important”,* whilst also having an overall intention of coming across more positively. *“So even after*

doing it last week, I found that I was more positive, just from thinking about how it made me feel”

Changes to content of information given to children

Participants also talked about an intention to hold their child’s level of understanding in mind and as a result altering how they provided information or instructions to their child: *“I think its easy as an adult to forget, and as a parent to forget that your child probably doesn’t understand or is able to ask or answer back”*, and an intention to ensure they gave their child time to talk: *“I will give my children the opportunity to talk and engage in my request”*.

Whilst also considering how much information a child can cope with:

“she was saying quite a lot of stuff, she was sort of giving instruction, telling me how she feels, telling me what’s going to happen, that she’s tired, there are a lot of things for a child to take in in those few sentences you know.”

However, whilst the majority said the VR would change how they came across, three participants in response to the negative mother stated that it wouldn’t change their behaviour going forward: *“I don’t think this week has changed anything I don’t think, like last week it had a bit of an effect on me but this week I don’t think so”*.

Meta-cognitive awareness

Twelve participants also talked of an intention to engage in meta-cognitive awareness in their day to day life in interacting with children: *“Just thinking about it more, rather than it just rolling off the tongue, just thinking more, so just thinking about it, and relaying it and thinking what’s the best way I can do something”*. They discussed how they thought it would be important to take a moment to pause before responding in their interactions with children and in this time check in with their own emotions and ensure they are not having a negative impact on the interaction. Whilst also ensuring they were considering the perspective of child in the situation.

“just thinking about how it felt last week with the shouting and the “you need to do this...rah”, it kinds of gives you second just to think “no actually that felt really shitty” and just like reign it in a bit, count to ten, not to go down that route because it does feel really horrible, yeah it definitely has been in my mind how it felt to be the child in that situation”

VR challenges and future changes

Despite exposure to the VR generally being a positive learning experience, evoking emotions and reflections that appeared to evidence an intention in participants to take the perspective of their children and motivating parenting changes. There were some problems with the VR exposure. By gaining an understanding of the problems it helps motivate future changes to fine tune the VR experience going forward.

Challenges to relatability

Two participants discussed how the VR child appeared to be younger than their own children and therefore it made it harder to relate:

“it would have to be really far in the future because I don’t have those sort of expectations with my own child at the moment because he is so little. The idea of sort of like blaming him for mess and stuff would just be ridiculous because he’s only 15 months”

Whilst the need for similarity to one’s own children was further emphasised by one participant finding it very easy to relate due to similarities of the VR child and their own child: *“The child looked like my daughter, same hair colour as me, and this made me feel more connected”*.

Incongruence between presented condition and how the condition was experienced

Whilst some of the above themes demonstrate, for most participants, the conditions evoked the responses one would predict, some participants’ comments suggested that certain elements of the VR conditions were experienced as the opposite to what we anticipated. Participants at times talked about the positive condition as being anxiety provoking, especially in regards to her body language as she entered the room: *“But I also noticed the face change, at first I didn’t like it, then she looked nice”*. Whilst the dialogue of the positive condition at times led participants to feel disappointed that they were asked if they would like to play together without that ever coming to fruition: *“I think it was the juxtaposition between being asked to play and then not doing that...”* and *“yeah, like “maybe we will do it later”, it was like oh, a bit disappointing I guess”*.

Challenges to immersion

Ten participants also spoke about difficulties feeling fully immersed in the experience. Some of the challenges to feeling immersed in the experience included a pre-occupation with the experimenter being in the real room (one participant).

“Having seen “myself” in the mirror it definitely felt like the body was mine, however I was still conscious about responding verbally – the voice being my adult voice and having an awareness of others in the real room”

Others did not find the interaction believable (two participants): *“so that one was a little bit weird, um, very surreal, I just couldn’t relate to that, it was a bit surreal, not something that I ever imagine would happen”*. Whilst others stated they needed more time in the environment (4 participants): *“I think if I had longer in the VR equipment it might have felt more real”*, and relatedly, it feeling easier to feel immersed the second time (3 participants): *“It felt easier to slot into the situation this week. I didn’t have the same nervousness I had last week as I knew what to expect”*. Two participants also commented that it felt unnatural talking to the virtual mother: *“I felt a bit awkward talking to the parent. It didn’t feel quite natural”*.

Questionnaires rather than VR influencing reflections

Whilst many participants attributed the VR itself to being responsible for changes, four participants discussed how thinking about the statements on the questionnaires in the context of their wider experience facilitated reflections on their parenting style and potentially could have contributed to intention to change parenting behaviours. When asked if the experience will make them think about how they respond to their own child, one participant’s response was: *“yeah, I guess certainly, I think doing the questionnaire as well”*, whilst another participant responded: *“I know it was in the questionnaire anyway, but I think I was a little bit more cautious about the way I presented myself”*.

Appendix A3.9. Post Experience Interview Questions

1. How was that experience?
 2. How did you feel when the mother was so angry/negative/ignored you?
 3. How did you feel when the mother was warm?
 4. Do you think that this experience will make you **think** more about how you respond to your own children?
 5. Do you think that this experience will make you **behave** differently to your own children? Why?
 6. (T2 only) Has the experience of the VR last week made you think about how you might respond to your child over the last week?
-

Appendix 3.10. Post Experience Questionnaire (Embodiment)

How much do you agree with the following statements about your experience? Each statement should be answered with:

-3 Disagree strongly

-2 Disagree

-1 Disagree somewhat

0 Neither agree nor disagree

1 Agree somewhat

2 Agree

3 Strongly agree

1. The I felt the virtual body I was looking down at was my own body.

Disagree -3 -2 -1 0 1 2 3 Agree

2. I felt was looking at myself when looking in the mirror.

Disagree -3 -2 -1 0 1 2 3 Agree

3. The felt the virtual body resembled my own (real) body in terms of shape, skin tone or other visual features.

Disagree -3 -2 -1 0 1 2 3 Agree

4. I felt that I had two bodies.

Disagree -3 -2 -1 0 1 2 3 Agree

5. I felt that the movements of the virtual body were caused by my own real body movements.

Disagree -3 -2 -1 0 1 2 3 Agree

Please turn over

6. I felt the mother I saw was aware of my presence.

Disagree -3 -2 -1 0 1 2 3 Agree

7. I felt myself responding to the mother

a. About my thoughts

Disagree -3 -2 -1 0 1 2 3 Agree

b. About my feelings and emotions

Disagree -3 -2 -1 0 1 2 3 Agree

c. Physically

Disagree -3 -2 -1 0 1 2 3 Agree

8. I felt like I was in a child's body

Disagree -3 -2 -1 0 1 2 3 Agree

9. I felt the mother acted as if I was a child

Disagree -3 -2 -1 0 1 2 3 Agree

10. I felt much younger than I actually am

Disagree -3 -2 -1 0 1 2 3 Agree

11. I felt like a child

Disagree -3 -2 -1 0 1 2 3 Agree

12. Please write down any other comment or feeling you had regarding your experience.

13. Do you have any after-effects from the experiment (continue response onto next page if needed)?

Appendix 4. Clinical Psychology Review Instructions for Authors

CLINICAL PSYCHOLOGY REVIEW

AUTHOR INFORMATION PACK

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Appendix 5. Journal of Dual Diagnosis Instructions for Authors

Journal of Dual Diagnosis – Instructions for Authors

About the Journal

The *Journal of Dual Diagnosis* is a quarterly, international publication that focuses on the full spectrum of complexities regarding dual diagnosis. The co-occurrence of mental health and substance use disorders, or “dual diagnosis,” is one of the quintessential issues in behavioral health. Why do such high rates of co-occurrence exist? What does it tell us about risk profiles? How do these linked disorders affect people, their families, and the communities in which they live? What are the natural paths to recovery? What specific treatments are most helpful and how can new ones be developed? How can we enhance the implementation of evidence-based practices at clinical, administrative, and policy levels? How can we help clients to learn active recovery skills and adopt needed supports, clinicians to master new interventions, programs to implement effective services, and communities to foster healthy adjustment? The Journal addresses each of these perplexing challenges.

The *Journal of Dual Diagnosis* includes articles and perspectives from four overarching domains relevant to the field: Psychopharmacology & Neurobiology; Psychotherapy & Psychosocial Issues; Services & Policy; and Clinical Forum. Each issue serves to encourage integration of these domains. The Journal seeks to publish articles relevant to a wide range of people interested in dual diagnosis: researchers, physicians, clinicians, trainees, administrators, and policy makers. High-quality empirical research, brief reports, timely reviews, thought-provoking commentaries, and ongoing discussions of clinical issues will be considered for publication, all with the aim of developing a better understanding of the basis of, and optimal treatment for, co-occurring psychiatric and substance use disorders. Please see the journal's [Aims & Scope](#) for information about its focus and peer-review policy.

Please note that this journal only publishes manuscripts in English.

Journal of Dual Diagnosis accepts the following types of article:

- articles, brief reports, literature reviews, editorials & commentaries, clinical reviews, letters to the editors

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Abstract Page - see above specifications

Text

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Methods , including statements indicating:

- There was a complete discussion of the study with potential participants;
- Written informed consent was obtained after this discussion (or if a waiver of consent was obtained, an explanation of this);
- The study was conducted in accordance with the Declaration of Helsinki, including the name of the committee (e.g., IRB) who approved and monitored the study.

Results

Discussion, including a description of the strengths and limitations of the study.

Note

- Always required for Clinical Forum and any other papers that include a case description.
- Must state whether the case is hypothetical or real, and if real, what measures were taken to protect the person’s identity.

Acknowledgments

- Recognize people who contributed in an important way to the manuscript. ·

- If the paper was presented at a meeting in the last three years, give the meeting name, city and state, and full meeting dates.

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Article (Research, Non-Clinical Trial)

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- structured abstract of 350 words,
- organized sections (Introduction, Methods, Results, and Discussion)

Article (Research, Clinical Trial)

- Word limit of 3,500 words
- Structured abstract of 350 words, following CONSORT guidelines
- organized sections (Introduction, Methods, Results, and Discussion)

Article (Non-Research)

- Word limit of 3,500 words
- Unstructured abstract of 350 words
- Organize sections locally according to topic

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- Word limit of 2,000 words
- Unstructured abstract of 200 words
- organized sections (Introduction, Methods, Results, and Discussion)

Literature Review

- Word limit of 7,000 words
- Structured abstract of 350 words
- organized sections (Introduction, Methods, Results, and Discussion)
- Methods section refers to method of searching the literature and selecting articles for review

Editorial/Commentary

- Word limit of 2,000 words
- No abstract necessary
- Organize sections locally according to topic

Clinical Review (or Clinical Forum)

- Word limit of 3,500 words
- Unstructured abstract of 350 words
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Appendix 6. Journal of Clinical Child & Adolescent Psychology Instructions for

Authors

About the Journal

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Please note that this journal only publishes manuscripts in English.

Journal of Clinical Child & Adolescent Psychology accepts the following types of article:

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- Should contain a structured abstract of 250 words.
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All Regular Article and Brief Report submissions must include a title of 15 words or less that identifies the developmental level of the study participants (e.g., children, adolescents, etc.). JCCAP uses an unstructured abstract format. For studies that report randomized clinical trials or meta-analyses, the abstract also must be consistent with the guidelines set forth by CONSORT or MARS, respectively. The Abstract should include up to 250 words, presented in paragraph form. The Abstract should be typed on a separate page (page 2 of the manuscript), and must include each of the following label sections: 1) Objective (i.e., a brief statement of the purpose of the study); 2) Method (i.e., a detailed summary of the participants, N, age, gender, ethnicity, as well as a summary of the study design, measures, and procedures); 3) Results (i.e., a detailed summary of the primary findings that clearly

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In addition, a clear developmental rationale is required for the selection of participants at a specific age. The Journal is making diligent efforts to insure that there is an appropriately detailed description of the sample, including a) the population from which the sample was drawn; b) the number of participants; c) age, gender, ethnicity, and SES of participants; d) location of sample, including country and community type (rural/urban), e) sample identification/selection; f) how participants were contacted; g) incentives/rewards; h) parent consent/child assent procedures and rates; i) inclusion and exclusion criteria; j) attrition rate. The Discussion section should include a comment regarding the diversity and generality (or lack thereof) of the sample. The Measures section should include details regarding item content and scoring as well as evidence of reliability and validity in similar populations.

All manuscripts must include a discussion of the clinical significance of findings, both in terms of statistical reporting and in the discussion of the meaningfulness and clinical relevance of results. Manuscripts should a) report means and standard deviations for all variables, b) report effect sizes for analyses, and c) provide confidence intervals wherever appropriate (e.g., on figures, in tables), particularly for effect sizes on primary study findings. In addition, when reporting the results of interventions, authors should include indicators of clinically significant change. Authors may use one of several approaches that have been recommended for capturing clinical significance, including (but not limited to) the reliable change index (i.e., whether the amount of change displayed by a treated individual is large enough to be meaningful, the extent to which dysfunctional individuals show movement to the functional distribution).

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Please refer to these [quick style guidelines](#) when preparing your paper, rather than any published articles or a sample copy.

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Please use double quotation marks, except where “a quotation is ‘within’ a quotation”. Please note that long quotations should be indented without quotation marks.

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Appendix 7. Evidence of Ethical Approval for Projects

Main Research Project Approval

psychology-ethics <psychology-ethics@bath.ac.uk>

Thu 23/05/2019 09:18

To: Jac Airdrie <ja846@bath.ac.uk>; Catherine Hamilton-Giachritsis <chg26@bath.ac.uk>

Dear Jac Airdrie

Full title of study: The impact of maternal attachment style on the efficacy of an immersive virtual reality environment for increasing parental empathy

PREC reference number: 19-102

On behalf of the Committee, I am pleased to confirm that you have received full ethical approval for the above proposal from the Psychology Research Ethics Committee.

If you intend to display recruitment posters/materials, please ensure you obtain the appropriate permission to do so from those who manage the location(s) you choose.

Please inform PREC about any substantial amendments made to the study if they have ethical implications.

Please make sure you quote your unique PREC code, 19-102, in any future correspondence.

Rebecca Wise

On behalf of Psychology Research Ethics Committee

Service Improvement Project – NHS R&D Approval

FW: Approval for [REDACTED]

[REDACTED]

Mon 21/01/2019 12:27

To: Jac Airdrie <ja846@bath.ac.uk>

[REDACTED]

7 attachments (672 KB)

Seeking Safety project proposal.xlsx; Interview schedule for SIP v.02.docx; Debrief form v.02.docx; Information sheet for seeking safety study v.02.docx; Consent form v.02.docx; AWP Use of audio or visual recording involving service users Consent Form.docx; Re: PREC 18-344 ;

Dear Jac,

I am replying to the earlier thread of emails from yourself so that I could include the documents you sent me etc and cc in a colleague.

Thanks for the email dated 3/01/19 (attached) re the confirmation that this is not research from HRA.

I have reviewed the documents and your proposal and I am happy to approve this Service Evaluation project today. I note that a couple of your documents (info sheet/consent forms etc) use the term "research study". As this is not research we need to refrain from use of that wording and replace with something like "Service Evaluation" or "Evaluation Study" please.

Please could you send through your final mark-up versions of the attached documents once you have them so that we can keep these on file. I have no further additional questions or amendments to your documents as they are all very thorough and I can see these have been worked on between yourself and supervisor with many amendments already and all that I would have suggested has already been made!

Please could you update the excel proposal pack with some further details on the timescales of your project please and re-send for our files and workplan notes, also so that we can be in contact with you for an update at an appropriate point in your project.

Once you have completed your project it will need to be written up in an AWP format to which I will forward to you in the next few weeks as we are currently updating our templates and makes sense you use the updated version once we have it.

[REDACTED] We don't currently have a facilitator actually covering specialised Jess can be queries that arise during your project and assist in any of the write up aspects

Trust Identifying information blacked out to preserve anonymity of substance misuse service

Service Improvement Project – University approval

PREC 18-344

1

You forwarded this message on Mon 17/12/2018 16:40

P

psychology-ethics
Mon 17/12/2018 13:27

To: Jac Airdrie
Cc: Emma Griffith

Dear Airdrie

18-344 Airdrie: An investigation of the experiences of individuals attending a Seeking Safety group.

On behalf of the Committee, I am pleased to confirm that you have received full ethical approval for the above proposal from the Psychology Research Ethics Committee.

It is not a condition of approval, but please note one reviewer commented that the sample size calculations are contradictory and you may wish to clarify this amongst your team before you begin recruitment.

If you intend to display recruitment posters/materials, please ensure you obtain the appropriate permission to do so from those who manage the location(s) you choose.

Please inform PREC about any substantial amendments made to the study if they have ethical implications.

Please make sure you quote your unique PREC code, 18-344, in any future correspondence.

Rebecca Wise
On behalf of Psychology Research Ethics Committee