SYSTEMATIC REVIEW: Are Dispositional Attachment Styles Associated with the Effectiveness of a Security Attachment Prime upon State Felt Security?

EMPIRICAL PAPER: The Effects of a Remote Security Attachment Prime, and Subsequent Repeated Primes, upon Perceptions of Social Support in a Healthy Student Sample

Submitted by Stephanie Kelsey to the University of Exeter as a thesis for the degree of Doctor of Clinical Psychology in
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Table of Contents

List of Tables

Systematic Review

Empirical Paper

List of Figures

Systematic Review

Empirical Paper

SCHOOL OF PSYCHOLOGY

DOCTORATE IN CLINICAL PSYCHOLOGY

SYSTEMATIC REVIEW

Are Dispositional Attachment Styles Associated with the Effectiveness of a Security Attachment Prime upon State Felt Security?

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Abstract

Objective: Empirical research documents mixed findings with regard to whether dispositional attachment orientations impact the effectiveness of security attachment primes (SAPs) on a range of variables. To date, no attention has been devoted to explore whether dispositional attachment orientations affect the core purpose of security attachment priming (i.e., changes to state felt security). Therefore, this systematic review examined research that investigated the association between dispositional attachment and the effectiveness of SAPs upon state felt security.

Method: A systematic review of literature exploring the association between dispositional attachment and changes to state felt security (post SAP) was conducted following the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) guidelines and using Web of Science, Embase, Medline, PsycINFO and Scopus databases.

Results: Five studies were yielded for review and results indicated the possibility that dispositional attachment orientations, specifically avoidant attachment, may be associated with the effectiveness of security attachment primes (positive, negative and no moderation effects were found). Moreover, findings highlighted the possible value of repeating primes in making secure internal working models more chronically accessible.

Conclusions: The generalisability of the findings are limited by the small number of studies within the review. As such, further research is required to ascertain the relationship between dispositional attachment and security attachment primes, indicating whether adaptations to primes are necessary in order to ensure similar manipulated effects irrelevant of dispositional attachment.

Keywords: attachment, security, security attachment priming, systematic review

Introduction

At present, empirical research indicates mixed findings with regard to whether dispositional attachment orientations impact the effectiveness of security attachment primes on a range of variables. To date, there exists no review examining whether dispositional attachment orientations affect the core purpose of security attachment priming (i.e., enhancing state felt security). In order to address this gap, the current paper will systematically review security attachment priming research, exploring whether dispositional attachment orientations impact the effectiveness of the primes upon state felt security.

Attachment

Originating from the seminal work of John Bowlby (1907-1990) and Mary Ainsworth (1913-1999), attachment theory began to emerge in the 1940s. Bowlby (1969/1982) proposed an innate psychobiological attachment system which, during times of need or perceived threat, would activate, driving infants to seek proximity to individuals who would protect them (i.e., attachment figures) (Mikulincer & Shaver, 2005). Subsequent social interactions within relationships (e.g., with primary caregiver) affect the operation of this attachment system, leading to the formation of a generalised expectation of the self, the world and of others - an “internal working model” (IWM) (Bowlby, 1969; Bowlby, 1973).

Though most important during a person’s early years, Bowlby (1988) postulated that the IWM remains active into adulthood, creating moderately stable individual differences in attachment security, impacting proximity seeking behaviours and associated thoughts during times of need (Bowlby, 1988; Hazan et al., 1987; Main et al., 1985; Mikulincer & Shaver, 2003). In this regard, infants who receive consistent, responsive, sensitive and available care are likely to develop a positive

IWM, a core sense of attachment security (Bowlby, 1973; Main, 1990). This attachment security is said to contribute to balanced self-representations and an increased confidence in proximity seeking (actual or imagined) during times of need, facilitating emotion regulation via a sense of felt security (Bowlby, 1973; Mikulincer et al., 2001; Mikulincer & Shaver, 2003; Psouni et al., 2015; Sroufe & Waters, 1977). Following the successful attainment of felt security, the attachment system is deactivated (Boag & Carnelley, 2016; Bowlby, 1969/1982). Conversely, infants who experience insensitive and inconsistent caregivers during times of need, learn that proximity seeking fails to relieve distress and thus they do not attain a sense of felt security (Bowlby, 1973; Main, 1990; Mikulincer & Shaver, 2003). As such, a negative IWM is likely to develop, known as an insecure attachment style (Bowlby, 1973; Main, 1990). In order for these individuals to relieve distress, compensatory (secondary) attachment strategies may be employed, consisting of hyperactivation (up-regulation of attachment behaviours, aimed to increase proximity) and deactivation (down-regulation of attachment behaviours, aimed to increase distance from others and self-reliance) (Main, 1990). These secondary attachment strategies closely link to the two dimensions commonly used to conceptualise and measure insecure attachment - attachment avoidance (deactivation strategies) and attachment anxiety (hyperactivation strategies). Individuals can be high or low on either dimension, with those low on both dimensions described to possess attachment security (Rowe et al., 2020). Those high in attachment avoidance may disregard or ignore emotional threats, seek independence from others and strive for emotional distance (Brennan et al., 1998; Rowe et al., 2020). Those who are high in attachment anxiety may be hypervigilant to signs of rejection, fearful of abandonment

and hold apprehensions surrounding the availability of others during times of need (Brennan et al., 1998; Rowe et al., 2020).

Internal Working Model Structures

It has been proposed, supported by empirical evidence, that individuals hold relationship-specific attachment styles (i.e., multiple IWMs), as opposed to one chronically accessible (dispositional) attachment applying to all relationships (Baldwin et al., 1996; Collins & Allard, 2001; Collins & Reed, 1994; Gillath et al., 2016; Mikulincer & Shaver, 2005). It is thought that the possession of multiple IWMs exists through a range of experienced interactions with others (e.g., romantic partners, friends, peers, etc.) across social contexts (Mikulincer & Shaver, 2005). As such, an individual may hold a dispositional insecure attachment representation towards a caregiver but hold a relationship-specific secure attachment representation towards a romantic partner.

Interactions with others are likely to be variable and thus the generation of alternative IWMs is thought to be adaptive, activating the appropriate working model corresponding to the specific attachment relationship (Baldwin et al., 1996; Mikulincer & Shaver, 2007). These IWMs are reported to be hierarchically organised, with the individual's dispositional attachment style chronically accessible at the top and relationship-specific attachment styles existing further down the hierarchy (Collins & Reed, 1994; Mikulincer & Shaver, 2003; Mikulincer & Shaver, 2005; Rowe et al., 2020).

Empirical research has demonstrated that relationship-specific IWMs can be temporarily, and reliably, activated (primed) via actual or imagined interactions with supportive (security attachment representation) or unsupportive (insecure attachment representation) others (Homan et al., 2018; Rowe et al., 2020; Gillath &

Karantaz, 2019). With specific regard to priming secure attachment representations, evidence indicates that secure working models can be temporarily activated following a prime, becoming more cognitively accessible, driving information processing and increasing a sense of state felt security (Carnelley & Rowe, 2007; Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019; Mikulincer & Shaver, 2007). In this regard, security attachment primes can be effective for individuals who hold a *dispositional* insecure attachment style, through the activation of a secure relationship specific IWM that temporarily increases their *state* security (Mikulincer & Shaver, 2003). The temporary activation of IWMs is commonly known as attachment priming.

For the purpose of this systematic review, the term security attachment priming will be used when referring to the temporary activation of a secure attachment representation.

Security Attachment Priming

A range of methods exist whereby secure attachment representations can be temporarily activated (Oehler & Psouni, 2018). One common method is a supraliminal priming technique whereby individuals are provided with an explicit cue such as the presentation of words associated with a sense of affiliative security (e.g., ‘comfort’ and ‘love’), exposure to pictures implying attachment-figure availability (e.g., a mother embracing an infant) and visualisation of a secure attachment figure (e.g., someone who makes you feel supported and loved) (Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019, Gokce & Harma, 2018; Mikulincer & Shaver, 2012; Otway et al., 2014). The other commonly used method is a subliminal priming technique whereby individuals are implicitly (i.e., below conscious threshold) exposed to stimuli such as security-related words (e.g., ‘support’ and ‘love’) or

pictures which evoke a sense of being loved (e.g., people hugging) (Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019; Gokce & Harma, 2018; Oehler & Psouni, 2018; Otway et al., 2014).

Research exploring the impact of security attachment priming has demonstrated its ability to influence a variety of variables including improvements in felt security (Otway et al., 2014); attachment security (Lin et al., 2013); mood (Liao et al., 2017; Mikulincer et al., 2006); relationship expectations (Carnelley & Rowe, 2007); prosocial feelings (Mikulincer & Shaver, 2001); percieved pain (Pan et al., 2017); compassion and altruism (Gillath et al., 2005); and a decrease in symptoms of mild PTSD (Mikulincer et al., 2006).

It is important to note that while the majority of security attachment priming research is short-term in its design (i.e., focusing on one-time primes) there is a developing field of researchers undertaking repeated priming studies (i.e., where security attachment is primed on subsequent occasions following an initial prime). Within these studies it is often hypothesised that through the use of repeated primes, secure working models can become more chronically accessible (Carnelley & Rowe, 2007). Evidence indicates that repeatedly activating secure working models can produce relatively long-lasting, beneficial effects (Carnelley et al. 2018; Carnelley & Rowe, 2007, Gillath et al., 2008; Otway et al., 2014).

Security Attachment Priming and Dispositional Attachment

While undertaking attachment priming research, some studies have reported that the effects of security attachment priming are independent from dispositional attachment style. Examples can be seen through studies exploring its impact upon cognitive openness (Jarvinen & Paulus, 2017), affect (Carnelley & Rowe, 2007; Rowe & Carnelley, 2003), willingness to engage in mindfulness (Rowe et al., 2016)

and interpersonal expectations (Rowe & Carnelley, 2003). In this regard, it has been hypothesised that security attachment primes are able to induce similar effects across participants, over-riding dispositional attachment styles (Gillath et al., 2008). However, other studies have indicated that the effects of primes may be impacted by dispositional attachment (Oehler & Psouni, 2018) with recent systematic reviews reporting that approximately 47% (Rowe et al., 2020) and 67% (Gilliath & Karantzas, 2019) of studies testing the interaction between security attachment priming and dispositional attachment found moderating effects on a range of variables including paranoid thinking (Hutton et al., 2017), affect (Cassidy et al., 2009), pain intensity (Pan et al., 2017), negative image intrusions (Bryant & Chan, 2017) and the dissolution of network ties (Gillath et al., 2017).

It could be argued that when examining dispositional attachment and its association with variables other than state felt security, additional factors may be at play. Examples of this can be seen through empirical studies highlighting mediating and moderating effects (e.g., moral identity, management of social networks, angry rumination, dysfunctional attitudes) between attachment dispositions and a range of variables (e.g., prosocial behaviours, social network characteristics, forgiveness, later depressive symptoms; Burnette et al., 2007; Gillath et al., 2017; Hankin et al., 2005; Shi et al., 2020). Research may also report ‘no moderation effect’ if attachment dispositions are found to not interact with their main dependent variable (e.g., Rowe et al., 2016). As such, it is possible that within these studies, interactions between dispositional attachment and state security post prime do exist, despite not being explicitly identified. It is evident therefore that the effects of dispositional attachment styles following security attachment primes remain unclear.

It has been postulated that if the effects of security attachment primes are indeed related to dispositional attachment, adaptations may be required to ensure primes are equally as effective for participants, irrelevant of dispositional attachment style (Oehler & Psouni, 2018). If this is the case, it may have important implications for future research (e.g., the development of secure attachment primes). Although existing reviews (Gillath & Karantzas, 2019; Rowe et al., 2020) include brief summaries regarding the association between dispositional attachment and a range of variables, no review has been undertaken looking specifically at dispositional attachment and its relation to security attachment primes. Moreover, no review has summarised literature exploring the links between dispositional attachment and the core aim of security attachment priming (i.e., enhanced levels of state felt security post prime). Therefore, the current systematic review aims to answer the question: *"Are dispositional attachment styles associated with the effectiveness of a secure attachment prime upon state felt security?"*

Methodology

In order to address the research question, this systematic review employed the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) to guide identification, screening, eligibility and synthesis of studies (Moher et al., 2009). Studies were selected based on explicit and pre-defined inclusion criteria and subsequently appraised utilising the Quality Assessment Tool for Quantitative Studies (QAT) (Effective Public Health Practice Project [EPHPP], 2009) (Appendix A).

Inclusion and Exclusion Criteria

Characteristics of studies included within the review are based on Population, Intervention, Comparator, Outcome and Study Design (PICOS) criteria as outlined in

Table 1. An initial scoping review was undertaken to confirm the relevance of the inclusion and exclusion criteria (Munn et al., 2018).

Table 1

Inclusion and Exclusion for Systematic Review

	Inclusion Criteria	Exclusion Criteria
Population	• Humans (all ages) • Clinical or non-clinical samples	
Intervention	• A security attachment prime induced by either subliminal or supraliminal techniques • Single or repeated security primes	• Insecurity priming (i.e., not a security prime)
Comparator	• Treatment as usual • Active controls • Waiting list controls • No controls	
Outcomes	• The assessment of dispositional attachment style • Assessment of state security immediately following a security attachment prime	
Study Design	• Articles will reside from peer reviewed journals • Quantitative or quasi-experimental methodologies • Analysis examining the interaction between dispositional attachment style and state security (following a security attachment prime)	• Qualitative methodology • Non-empirical • Articles not published in English due to limited time and translation resources • Due to resource limitations, grey literature (e.g., theses, newsletters, conference abstracts etc.) will not be searched

A security attachment prime was operationalised as exposure to an implicit (subliminal) or explicit (supraliminal) method, with the aim of enhancing affiliative security (i.e., a sense of felt security) (Canterberry & Gillath, 2013; Carnelley & Rowe, 2007; Gillath & Karantzas, 2019; Rowe & Carnelley, 2003). Explicit methods

could include mental imagery tasks whereby participants are required to visualise a secure attachment figure and implicit methods could include unconscious exposure to security-related stimuli such as pictures of people hugging.

In line with previous research, state felt security was operationalised as the extent to which the priming task was perceived, by the participant, as evoking a feeling of security (Oehler & Psouni, 2018; Otway et al., 2014). The concept of felt security has been described as “a sense that the world is generally safe, that attachment figures are helpful when called upon, and that it is possible to explore the environment curiously and confidently and to engage rewardingly with other people” (Fraley et al., p. 5). Example measures could include the security subscale within the State Adult Attachment Measure (SAAM; Gillath et al., 2009) and the Felt Security Scale (FFS; Luke et al., 2012).

Information Sources

Five electronic databases were searched to identify literature for the review: PsycInfo, Medline, Embase, Scopus and Web of Science (Core Collection). Searches within PsychInfo, Medline and Embase were each facilitated by the Ovid database. All searches included the full range of coverage dates and were undertaken between 1st February 2021 and 15th February 2021.

Search Strategy

In addition to confirming relevant inclusion criteria, the scoping review facilitated the generation and development of search terms (Munn et al., 2018). Two recent, and relevant, systematic reviews (Omri & Karantzas, 2019; Rowe et al., 2020) were checked for supplementary search terms and specific authors, known to conduct work in attachment and security priming, were included. In line with Cochrane guidance (Cochrane Training, 2021), a combination of both free-text words

and subject headings (i.e., Medical Subject Headings [MeSH]) were used, when facilitated by the database platform (e.g., Ovid). Truncations (e.g., attachment prim* to cover attachment primes and attachment priming terms, secure?prim* to include secure prime and secure-primes) were employed and search strategies customised for each database, combined utilising Boolean operators (e.g., OR, AND etc.). Furthermore, a manual search of the reference lists of included studies was subsequently undertaken to capture any relevant articles that may have been missed using the search strategy.

Table 2 details the search strategy for PsychInfo (via OVID). For all databases, attachment authors were limited to 'author' and free-text terms to 'title' and 'abstract' to ensure that retrieved articles addressed the key concepts of the question. For the full search syntax for all databases please see Appendix B.

Table 2

Systematic Search for PsycInfo

Searches		
1	MeSH terms	Attachment Behavior or Attachment Theory
2	Authors	shaver philip r OR mikulincer mario OR gillath omri OR carnelley katherine b OR rowe a c
3	Free-text terms	"attachment securit*" OR "secure attachment*" OR "anxious attachment*" OR "avoidant attachment*" OR "attachment orientation*" or "attachment tendenc*" OR "dispositional attachment*" OR "baseline attachment*"
4	Search strategy	1 OR 2 OR 3
5	MeSH term	Priming
6	Free-text terms	"secure?prim*" OR "security?prim*" OR "attachment prim*" OR "prim* attachment*" OR "mental representation*" OR "activating attachment*"

7	Search strategy	5 OR 6
8	Final search strategy	4 AND 7

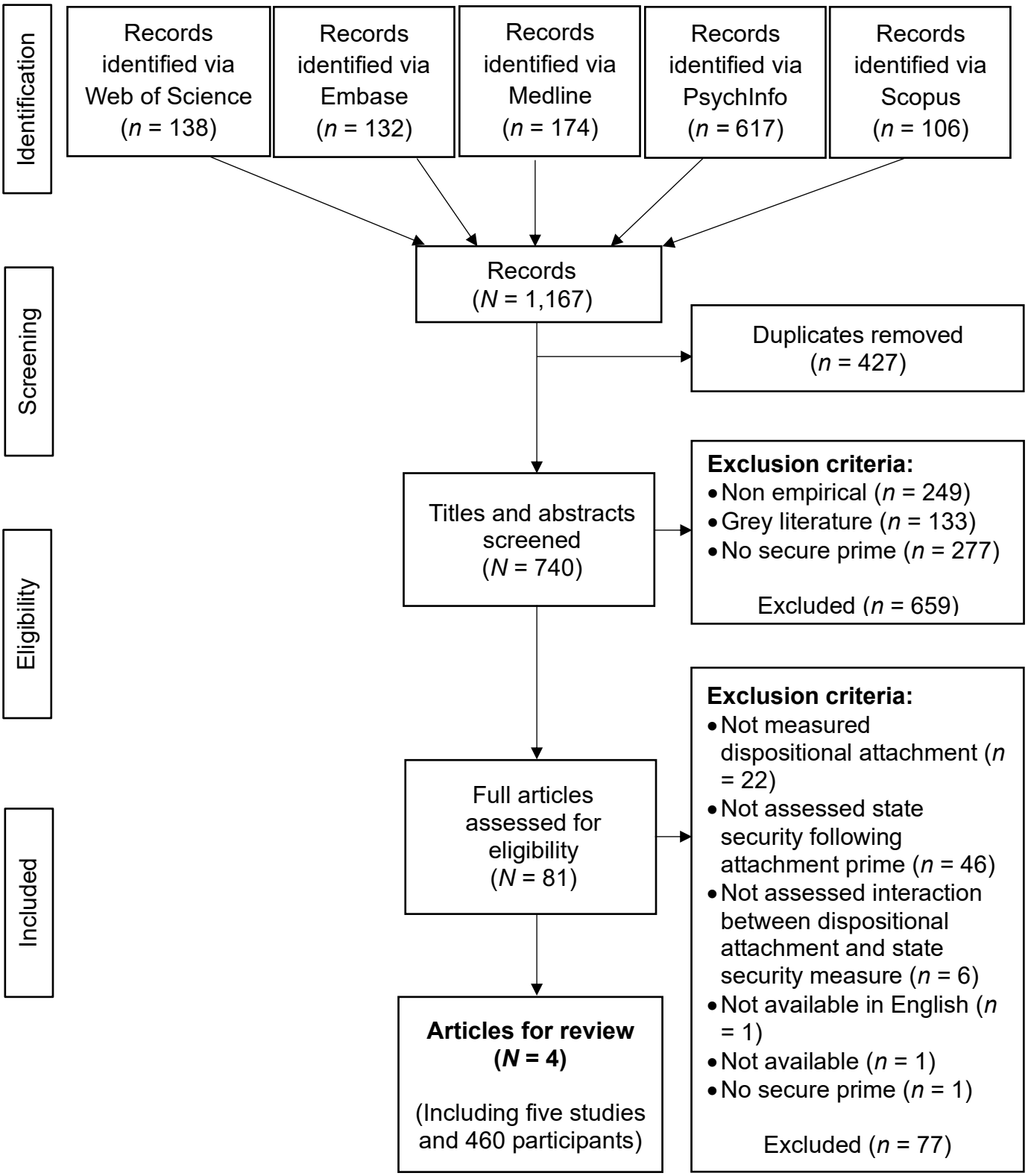
Results

Study Selection

Across the identified databases, a total of 1,167 publications were found from the search terms (Figure 1). Duplicate articles were removed, leaving papers to be screened by title and abstract against the PICOS inclusion and exclusion criteria. Following initial screening and removal of ineligible publications, the full text versions of the remaining papers were read and screened for eligibility against the aforementioned criteria, with four papers (five studies) meeting criteria. Of the papers included within the full-text search, 10% (*n* = 8) were randomly selected and cross-checked against the PICOS criteria by an independent reviewer (another Trainee Clinical Psychologist), yielding 100% inter-rater reliability. The reference lists of two recent reviews (Omri & Karantzas, 2019; Rowe et al., 2020) were screened for additional publications as well as the reference lists of accepted papers, in line with Cochrane guidance (2021). This screening identified no additional studies.

Figure 1

Results of Systematic Review Search Strategy (Moher et al., 2009)



Data Extraction

Relevant data from each accepted study was extracted using the PICOS criteria (Table 3). In order to appraise the quality of the studies, the QAT was utilised (EPHPP, 2009) - developed to provide high quality reviews, it has been found to demonstrate content and construct validity and deemed suitable for systematic reviews (Amjio-Olivo et al., 2012). This tool was selected based on its applicability to quantitative studies, suiting the study designs accepted for review.

Three papers were quality assessed (according to the EPHPP criteria) by the same independent reviewer, yielding 100% inter-rater reliability of global scores. Any component rating discrepancies were discussed, and an agreement reached.

Study Populations

Across the studies, a total of 460 participants were recruited, with 209 of those receiving security attachment primes. The majority of participant samples consisted of university students (2, 3, 5), one study tested healthy (no history of severe mental health illness) adults (4) and another, a clinical sample (1) meeting diagnostic criteria (International Criteria for Diseases-10; World Health Organisation, 2016) for primary depressive disorder. Studies reported age ranges between 18-76 with a mean age of 27. The average percentage of females across the studies was 79.8%. Studies inconsistently reported ethnicity but, where reported (1-3, 5), 84% of participants were either British or Caucasian.

Participant samples varied in that one (5) was powered at 0.80 to detect a medium effect (f =.25), another (2) at 0.94 to detect a medium to large effect (f =.33) and others powered ([1] = 0.77, [3] = 0.94) to detect a large effect (f =.40). The remaining study (4), did not undertake an a priori power analysis, instead basing sample size ‘broadly’ on previous attachment priming literature.

Table 3

Summary of Study Characteristics (alphabetical order)

Authors	Population	SAP Intervention	Comparator	Outcome Measures	Study Design & Key Security Findings	Evaluation	QAT
1. Carnelley et al., 2018 (UK)	Adults with primary depressive disorder (ICD-10), undergoing one or more psychotropic drug treatment. (*N*=48)	Supraliminal: Mental imagery and written task (10-minutes) Repeated supraliminal primes: Mental imagery task (3-minutes), sent via text for 3 consecutive days	SAP (*n*=24) vs. control (neutral prime) (*n*=24)	Baseline attachment: ECR-S State security post prime: FSS	Design: Experimental, between- and within- subjects. Data collected at baseline, post-intervention and three and four days post intervention. Key Findings: Participants within SAP condition experienced significantly more felt security post prime, than the control group (p = .008). Dispositional attachment avoidance did moderate the effects of prime upon felt-security (p = .026, η_p^2 = .112). This effect reduced as time progressed with avoidance predicting less felt security at Time 1 (p <.001, η_p^2 = .234), but not at Time 4 (p = .404, η_p^2 = .017) or Time 5 (p = .084, η_p^2 = .069).	Strengths: Randomised trial with a control arm, allowing for comparison between SAP and neutral prime. Analysis controlled for baseline attachment (covariates) upon state felt security. Repeated aspect of study enabled follow up, exploring repeated priming over time. Limitations: Small sample size within a relatively homogenous sample (i.e., majority White British females). Low statistical power ('near sufficient to detect a large effect'). No pre prime assessment of state felt security.	A: Moderate B: Strong C: Weak D: Weak E: Strong F: Moderate Global: Weak

2. a)	Carnelley et al., 2016 (UK) Study 1	Undergraduate students (*N*=144)	Supraliminal: Mental imagery and written task (10-minutes)	SAP (*n*=38) vs. anxious prime (*n*=35); avoidant prime (*n*=33); control (neutral prime; *n*=38)	Baseline attachment: ECR State security post prime: FSS	Design: Experimental, between-subjects. Key Findings: Participants within SAP condition reported significantly more felt security post prime, than the anxious (p <.001), avoidant (p <.001 and neutrally primed (p <.001) conditions. The interactions between attachment avoidance and the secure dummy variable were found to be significant. Further analyses generated an error (code 12417). Authors subsequently summarised that 'attachment dimensions did not moderate the effects of the prime'*	Strengths: Randomised trial with the use of active primes and neutral control, allowing for comparison between SAP and avoidant, anxious and neutral prime. Limitations: Low statistical power (sufficient to detect medium to large effect). Relatively homogenous sample (i.e., British University students, majority Caucasian and female). No pre prime assessment of state felt security.	A: Moderate B: Strong C: Weak D: Weak E: Strong F: Weak Global: Weak
3. b)	Carnelley et al., 2016 (UK) Study 2	University students (*N*=81)	Supraliminal: Mental imagery and written task (10-minutes) Supraliminal repeated primes: Mental imagery task (3-minutes), sent via text for 3	SAP (*n*=38) vs. control (neutral prime; *n*=43)	Baseline attachment: ECR-S State security post prime: FSS	Design: Experimental, between- and within- subjects. Data collected at baseline, post-intervention and, three and four days post intervention. Key Findings: Participants within SAP condition reported significantly higher felt security post prime (*M*=4.97, *SE*=0.13), than the	Strengths: Randomised trial with a control arm, allowing for comparison between SAP, avoidant, anxious and neutral primes. Repeated aspect of study enabled follow up, thus exploring repeated priming over time. Limitations: Low statistical power (sufficient to detect a large effect, *f*=.25).	A: Moderate B: Strong C: Weak D: Moderate E: Strong F: Weak Global: Weak

			consecutive days			neutrally primed participants (*M*=2.97, *SE*=0.14). At all timepoints, attachment anxiety did not correlate with felt security (p >.05). Attachment avoidance was found to negatively correlate at Time 1 (p = <.01) and Time 4 (p = .05) but not at Time 5 (p >.05). When used as a covariate, attachment avoidance was found to not moderate the effects of prime upon felt-security (p = .11)	Relatively homogenous sample (i.e., British University students, majority Caucasian and female). No pre prime assessment of state felt security.	
4.	Rowe et al., 2016 (UK)	Adults (*N*=117)	Supraliminal: Mental imagery and written task (10-minutes)	SAP (*n*=39) vs. self-compassion prime (*n*=39); control (neutral prime; *n*=39)	Baseline attachment: ECR-S State security post prime: FSS	Design: Experimental, between-subjects. Key Findings: Participants within both the SAP and self-compassion priming groups reported significantly higher felt security post prime than the neutrally primed participants (p <.01 and p <.05 respectively). There was no significant difference in felt security scores between participants primed with security and those primed with self-compassion (p >.05).	Strengths: Randomised trial with a control arm, allowing for comparison between SAP, mindfulness and neutral primes. Limitations: ECR sent to participants following intervention. Low ECR response rate (41%) limiting analyses. Prime followed immediately by mindfulness induction. No a-priori power calculation (sample size based 'broadly' on previous research). No pre prime	A: Weak B: Strong C: Weak D: Weak E: Strong F: Weak Global: Weak

						Participants higher in attachment avoidance reported less felt security (p >.05) post prime**	assessment of state felt security.	
5.	Stevenson et al., 2021 (UK) Study 2	Undergraduate students (N=70)	Supraliminal: Guided visualisation (9-minutes 30 seconds)	SAP vs. mindfulness prime; control (neutral prime)	Baseline attachment: ECR-12 State security post prime: SAAM	Design: Experimental, within-subjects. Key Findings: Participants within the securely prime condition reported significantly higher state security post prime when compared to both the mindfulness (p <.001) and neutrally primed participants (p = .007). SAP participants higher in attachment avoidance reported significantly more (positive) change in state security from pre- to post-intervention (p = .023).	Strengths: Participants randomly assigned to prime induction ordering (i.e., counterbalanced). Assessment of state felt security prior to intervention. Limitations: Relatively homogenous sample (i.e., undergraduate students, majority British and female). 30 participants excluded from study if they did not indicate having a secure attachment figure (via ANRASM), limiting generalisability.	A: Moderate B: Moderate C: Not applicable D: Weak E: Strong F: Strong Global: Moderate

Key: ANRASM = The Attachment Networks and Relationship-specific Attachment Styles Measure, ECR= Experience in Close Relationships Scale, ECR-12 = Experience in Close Relationships Scale-12, ECR-S= Experience in Close Relationships Scale-Short Form, FSS = Felt Security Scale, ICD-10 = International Classification of Diseases-10, SAAM = State Adult Attachment Measure, SAP = security attachment prime, UK = United Kingdom, QAT = quality assessment tool; A = selection bias, B = study design, C = confounders, D = blinding, E = data collection method, F = withdrawals and dropouts.

*The paper's authors were contacted with regard to the 'error' message. The authors confirmed this was likely due to multicollinearity and small sample size and as no interpretable effect was found, 'no moderation' was stated within the main text.

** As baseline variables, including dispositional attachment, did not correlate with the main dependent variable (willingness to engage in mindfulness) no further analysis was undertaken (i.e., not included as covariates).

Intervention

All studies employed supraliminal priming techniques. Four of the studies (1-4) requested that participants spent 10 minutes visualising and writing about a secure relationship and how they felt with them. The other study (5) utilised a guided imagery task for nine and a half minutes, whereby participants were requested to imagine a close attachment figure (Stevenson et al., 2021). Following an initial security prime, two studies went on to utilise repeated security primes (1,3). In both studies, the first repeated prime was sent 24 hours following the initial prime. All repeated primes were delivered via text message and participants were requested to spend three minutes visualising the relationship from the initial prime. One of the studies (1) provided participants (n = 1) who were unable to recall a secure attachment representation, with a description of a secure relationship and requested that they imagine being in such a relationship.

Comparator

All studies employed the use of comparator groups. Two studies included a neutral priming condition (1,3) and three studies utilised a combination of neutral and active (i.e., non-neutral) priming conditions (2,4,5). All primes lasted between 9-10 minutes and studies who went on to subsequently employ repeated primes utilised three-minute primes.

Neutral conditions involved participants visualising and writing about a recent supermarket trip (1-4) or a guided imagination exercise of a woodland walk (5). Studies utilising repeated priming methods (1,3) sent primes via texts, requesting participants to visualise neutral events (e.g., their walk home from the supermarket).

Active conditions included a self-compassion prime (4) where participants were requested to visualise and write about being completely compassionate and

warm towards themselves; a guided mindfulness induction exercise (5) focusing on the breath and thoughts; and an anxious and an avoidant prime (2) where, depending on condition, participants spent time thinking and writing about either an anxious or avoidant relationship.

Assessment of Dispositional Attachment and Primed State Security

All studies assessed dispositional attachment using a variant of the Experiences in Close Relationships Scale (ECR; Brennan et al., 1998), a 36-item self-report questionnaire assessing attachment on a dimension of anxiety and avoidance. Two studies (1,3) employed the ECR-S (Wei et al., 2007), two (2,4) employed an ECR adaption by Carnelley and Rowe (2003) (eliciting responses regarding ‘close others’ as opposed to solely ‘romantic partners’) and the other (5), the ECR-12 (Lafontaine et al., 2015). In addition to the ECR-12, one study (5) utilised the Attachment Networks and Relationship-specific Attachment Styles measure (see Rowe & Carnelley, 2003) as a screening tool to ascertain if participants had at least one secure attachment figure, rendering 30 participants ineligible.

The most common measure of state felt security (1-4) was The Felt Security Scale (Luke et al., 2012). One study employed the State Adult Attachment Measure (SAAM; Gillath et al., 2009), providing a self-report profile of state attachment security, anxiety and avoidance.

All employed dispositional attachment and state security measures were found to show sufficient validity and reliability. In this regard, alpha coefficients for dispositional attachment measures ranged from .72 to .90 and test re-test reliability from .70 to .83. For state security measures, alpha coefficients ranged from .81 to .97.

Study Design

Two studies (1-3) employed an experimental between-and within- subjects design while two others (2, 4) employed an experimental between- subjects design. Within these studies (1-4) all participants were randomly allocated to condition. One study (5) employed the use of an experimental within-subjects design, randomly allocating participants to one of six possible condition combinations (i.e., counterbalancing).

Manipulation Checks

All studies found that when compared to the neutrally primed conditions, participants primed with a security attachment prime reported significantly more state felt security. When compared to active controls, two studies (2,5) found that the security primed groups reported significantly more state felt security post prime. One study found that attachment security was as effective at increasing state felt security scores as a self-compassion prime (4).

It is important to note that one study (4) administered the primes (security, self-compassion or neutral, depending on condition) followed immediately by a mindfulness induction. As such, state felt security was assessed following both a prime and a mindfulness induction. Empirical evidence has found that both attachment security and mindfulness predict similar psychosocial outcomes (e.g., enhanced wellbeing, higher levels of self-esteem, greater capacity for emotion regulation etc.) leading to the speculation that mindfulness and attachment security are likely related (Arch & Craske, 2006; Melen et al., 2017; Mikulincer & Shaver, 2007; Park et al., 2004; Pepping & Halford, 2016). It is therefore not possible to accurately ascertain direct changes in felt security resulting from the security prime or what may have been a combination of the mindfulness induction and prime.

Dispositional Attachment and State Felt Security Post Prime

In answer to the systematic review question, three out of five studies (1, 3, 4) found that dispositional attachment avoidance negatively correlated with state felt security, post prime. Within these studies, those employing the use of the repeated primes (1, 3) found that the effects of dispositional attachment upon state felt security lessened over time, until they were no longer significant. This suggests that over time, the use of repeated primes may override dispositional differences in attachment styles. Following further analyses (i.e., dispositional attachment avoidance as a covariate) one study (1) found higher attachment avoidance to be associated with lower felt-security (moderated by time), another (3) found no moderation effect and the third study (4) did not undertake additional analyses due to limited statistical power. Within these studies (1, 3, 4) however, it appears as though analysis exploring dispositional attachment and changes to state felt security, post prime, were not undertaken specifically within the securely primed conditions, rather that the conditions were grouped (i.e., neutral and secure participants combined). In this regard, the impact of dispositional attachment upon primes and subsequent state felt security may be muted as a sample of the participants within the analysis did not receive the intervention (security attachment prime). One study (1) indicated that while it would have been ‘useful’ to determine whether the effects of dispositional attachment on felt security were comparable between the neutral and securely primed groups, limited sample size removed this as a possibility. Moreover, one of the studies (4) sent the dispositional attachment questionnaire (ECR) the following day (i.e., after the primes). In this regard, empirical evidence has found the effects of security attachment primes to still be visible a day, or days, later (Carnelley et al., 2016; McGuire et al., 2018; Rowe et al. 2020). As such, it is unknown whether

the effects of the prime impacted participants' responses to the ECR and whether it is therefore an accurate representation of dispositional attachment, making inferences difficult.

Two studies (2, 5) which undertook analyses exploring the interaction between dispositional attachment and state felt security, specifically following a security attachment prime, found significant statistical effects. Following additional tests one study (2) received an 'error' message, concluding no moderation of dispositional attachment and the other (5), found that participants higher in dispositional avoidance showed more (positive) change in state security from pre to post manipulation.

Overall, no studies reported any statistical findings with regard to dispositional attachment anxiety and state felt security scores post prime. With regard to dispositional attachment avoidance, three studies undertaking moderation analyses found differing results, including a positive effect (5), a negative effect (1) and no effect (3) of attachment avoidance upon state felt security post prime. As such, results within this review do not provide sufficient evidence to make a firm conclusion surrounding whether dispositional attachment dispositions do, or do not, impact the effectiveness of security attachment primes.

Quality Assessment

According to the EPHPP criteria, the quality of studies included within the review were weak (1-4) to moderate (5). The most significant sources of bias (i.e., receiving 'weak' sub scores) were the lack of blinding (1, 2, 4, 5) or clarity surrounding this, and unreported information surrounding withdrawal and dropout rates (1-4). With regard to confounders, none of the clinical controlled trials (1-4) assessed group differences in felt security scores prior to the intervention (prime),

introducing the possibility of pertinent and unascertained baseline group differences. Overall, studies employed the use of strong designs (i.e., clinical controlled trials, *n* = 4), reliable outcome measures (*n* = 5) and appropriate statistical tests (e.g., analysis of covariance) to explore possible effects of dispositional attachment. However, one study (4) was noted to have lost too many participants at follow up (i.e., unreturned ECR questionnaires), to undertake moderation analysis (i.e., lack of statistical power).

Discussion

The current systematic review aimed to explore whether dispositional attachment styles were associated with the effectiveness of a secure attachment prime upon participants' state felt security. Studies within the review reported no statistical findings pertaining to dispositional anxious attachment and mixed statistical findings relating to dispositional avoidant attachment and its association (i.e., positive [5], negative [1] and no moderation effect [3]) with state felt security following supraliminal security attachment primes. However, findings are limited by methodological weaknesses including unknown group differences in baseline state felt security, relatively homogenous populations and analytical limitations, making it difficult to accurately ascertain the association between dispositional attachment and the effectiveness (i.e., enhanced state security) of security attachment primes.

Theoretical and Clinical Implications

It has previously been suggested that security attachment priming effects are independent from dispositional attachment orientations (Carnelley & Rowe, 2007; Gillath et al., 2008; Rowe & Carnelley, 2003; Rowe et al., 2016), leading to the suggestion that security attachment primes may over-ride dispositional differences in attachment orientation (Gillath et al., 2008). While the evidence presented within this

review is not strong, some findings challenge this view, documenting both positive (5) and negative (1) effects of *avoidant* dispositional attachment upon state felt security following a security attachment prime. No studies, within this review, documented any significant effects with regard to dispositional attachment *anxiety* and the effectiveness of a security attachment prime (i.e., levels of state felt security).

The findings of this review differ from recent systematic reviews which found the effects of security attachment primes (on a range of variables – not just state felt security) may be related to both dispositional avoidant and anxious attachment (Carnelley et al., 2020; Gillath & Karantaz, 2019), rather than only avoidant (as found within this review). Furthermore, one review (Gillath & Karantaz, 2019) found that security attachment primes may be particularly effective for individuals with dispositional attachment *anxiety*. In this regard, it has been postulated that participants high in attachment *avoidance* may be more resistant to the positive effects of security attachment priming (Bryant & Hutanamon, 2018; Gillath & Karantaz, 2019). Of the studies undertaking further statistical analyses within the current review, one provides support for this, finding that participants higher in attachment avoidance experienced less felt security post prime (1). Another study (5), the most methodologically strong (QAT score: moderate), challenges this concept, finding that participants higher in attachment avoidance experienced greater increases in felt security scores post prime. The third study successfully undertaking further analysis (3), also a healthy student sample, found no moderating effect. It is important to note that the participants within these studies systematically differed in that one employed a clinical sample (1) and the others, healthy student samples (3, 5). In this regard, empirical evidence has found links between high levels

of dispositional attachment avoidance and anxiety, and the presence of psychological difficulties (e.g., depression and anxiety; Carnelley et al., 1994; McDermott et al., 2015; Reis & Greyner, 2004; Wei et al., 2005). Given this, it is possible that the clinical sample (i.e., participants with a diagnoses of primary depressive disorder) of Carnelley and colleagues (2018), consisted of participants with higher levels of attachment avoidance and anxiety than the participants within the studies employing the use of healthy samples (3, 5). It may be that one-off security attachment primes are unable to override dispositional attachment orientations if individuals are particularly high on either attachment dimension (i.e., avoidance or anxiety) and it is possible that this may occur more in clinical samples than healthy samples.

Studies employing the use of repeated priming methodologies (1, 3) found beneficial effects whereby the association between dispositional attachment and state felt security, lessened over time (i.e., with increased number of primes). It is important to note that this was found within both a clinical (1) and a healthy sample (3). Beneficial effects of repeated priming methodologies found in this review are broadly in line with a recent paper, finding positive and cumulative effects of repeatedly priming secure attachment representations, on affect (Carnelley et al., 2020). Theoretically, these findings can be supported by Bowlby's (1973) conceptualisation that repeated interactions with an attachment figure impacts the IWM in both the short- and long-term. As such, it is possible that by repeatedly priming attachment security, the secure IWM is regularly activated, making it more accessible, weakening insecure models and driving information processing and behaviour (Carnelley & Rowe, 2007; Gillath et al., 2008). These findings indicate that repeating security attachment primes may be effective in overriding dispositional

differences between participants, thereby providing a practical way to effectively prime people with differing attachment styles. This may be particularly pertinent for individuals with high levels of attachment avoidance and anxiety (e.g., clinical populations).

All studies within the review employed the use of supraliminal security priming methods. Prior to the supraliminal prime, two studies (1, 5) utilised a screening measure to ascertain whether participants had at least one secure attachment figure in their lives. Each of the studies took a different approach following this screen, with one study (5) excluding participants (n = 30) who did not indicate having a secure attachment figure (score of three or above on The Attachment Networks and Relationship-specific Attachment Styles Measure), limiting ecological validity in applying the findings to the wider population. The other study (1) provided participants (n = 1) with a description of a secure relationship and requested that they imagine a relationship such as this. The theory surrounding attachment security priming is based upon the activation of a secure IWM, making them more accessible and thus enhancing felt security (Carnelley & Rowe, 2007; Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019; Mikulincer & Shaver, 2007). As such, it brings into question how researchers may be able to reliably manipulate felt security within participants who do not hold a secure relationship-specific IWM within their hirearchy. Interestingly, it has been postulated that for inviduals without access to a secure IWM, being exposed to a security attachment prime may produce a contrast (i.e., negative) effect (Lutz, et al., 2003; Oehler & Psouni, 2018). As such, it will be pertinent to explore how, moving forwards, we may be able to reliably and validly enhance felt security for individuals without a relationship specific secure IWM. In this regard, rather than providing a description, it may be important to spend time

with individuals, drawing upon their own memories and imagination to build and develop a secure attachment figure. If corroborated by future research, the existence of a secure attachment figure could be determined as part of a clinical assessment and, if missing, could be developed as part of a psychological intervention. Once developed, this figure could be utilised for a secure attachment prime and over time (through the use of repeated primes), may facilitate the individual to experience a sense of felt security.

Strengths and Limitations

Due to time constraints, non-peer-reviewed studies and un-published data were omitted from the review and it is possible that in undertaking this approach, publication bias was introduced during the selection procedure. With regard to limitations within the reviewed papers, only a small number of studies met the specified search criteria for the systematic review. While this may limit the generalisability of its findings, it may also indicate a novel and growing area of research. Moreover, the relatively homogenous populations (majority student samples, 79.8% female) within the included studies and limited statistical power further restricts the generalisability and applicability of the findings. All studies within the review employed the use of supraliminal security attachment primes and as such, it has not been possible to explore whether dispositional attachments interact differently with different security attachment primes (i.e., supraliminal or subliminal). In addition, it is important to note that several studies (1-4) did not employ the use of pre- and post-tests for state felt security. As such, it is not possible to measure the degree of change attributed to the security primes and alternative explanations for changes of state security, between conditions, are unable to be discounted (Morgan & Renbarger, 2018). Moreover, it is important to highlight that dispositional

attachment may be correlated with other factors that help to determine the efficacy of secure attachment priming such as interpersonal expectations and self-esteem (Otway et al., 2014). Lastly, it should be noted that felt security was not the primary outcome measure for any of the studies within the current review and, therefore, studies were often not set up to investigate the association between dispositional attachment and security attachment primes (e.g., sample sizes too small, thus limiting analysis).

Strengths of this review include its systematic nature and the use of a second rater, reducing the possibility of researcher bias. Regarding the strengths of the studies, all employed the use of active or neutral control comparator groups (i.e., not passive controls), reducing threats to internal validity (e.g., experimenter contact, demand characteristics and motivation; Boot et al., 2013) and valid and reliable dispositional attachment measures were employed.

Future Research

It will be important for future research to assess participants' state felt security pre- and post-security attachment prime, analysing interactions between dispositional attachment orientations and changes in state felt security. Moreover, it will be pertinent to explore this with explicit regard to repeated priming methodologies. For example, a longitudinal security attachment priming study could examine whether repeatedly priming attachment security is more effective at overcoming dispositional attachment differences between participants when compared to a single prime, followed by neutral primes. This may highlight the possible utility, value and importance of repeating primes, mitigating dispositional differences between participants. In particular, studies investigating dispositional attachment orientations and state felt security following security primes with

participants deriving from clinical populations, underrepresented within this review, would be welcomed. It would be beneficial for studies exploring the association between dispositional attachment and changes to state felt security (following a security attachment prime) to control for other variables which may be associated with attachment (e.g., self-esteem; Otway et al., 2014) and for participant samples to include wider age ranges (no children and young people or older adult populations were represented within this review), more ethnic diversity and, where possible, more even gender distributions.

Conclusions

The systematic review has highlighted the importance of considering whether dispositional attachment is associated with the effectiveness of security attachment primes. In this regard, reviewed literature indicates the possibility that dispositional attachment orientations, specifically avoidant attachment, may affect the manipulation of experimentally induced feelings of state felt security and the value of repeating primes in making secure IWMs more chronically accessible has been highlighted. However, the strength of the evidence is limited by a paucity of studies explicitly designed to investigate the association between dispositional attachment style and experimentally manipulated state felt security. Despite limitations in its generalisability, this review is an important first step in synthesising current evidence, identifying gaps within literature and providing recommendations for future research. It is hoped that through this, further clarity surrounding the relationship between dispositional attachment and security attachment primes can be clarified, adapting primes to ensure similar manipulated effects for individuals if necessary.

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Appendices

Appendix A: EPHPP Quality Assessment Tool for Quantitative Studies

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify _____
8 Can't tell

Was the study described as randomized? If NO, go to Component C.

No Yes

If Yes, was the method of randomization described? (See dictionary)

No Yes

If Yes, was the method appropriate? (See dictionary)

No Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

1 Yes
2 No
3 Can't tell

The following are examples of confounders:

1 Race
2 Sex
3 Marital status/family
4 Age
5 SES (income or class)
6 Education
7 Health status
8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

1 80 – 100% (most)
2 60 – 79% (some)
3 Less than 60% (few or none)
4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

1 Yes
2 No
3 Can't tell

(Q2) Were the study participants aware of the research question?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

1 Yes
2 No
3 Can't tell

(Q2) Were data collection tools shown to be reliable?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group?

1 Yes
2 No
3 Can't tell
4 Not Applicable (i.e. one time surveys or interviews)

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell
5 Not Applicable (i.e. Retrospective case-control)

RATE THIS SECTION	STRONG	MODERATE	WEAK	
See dictionary	1	2	3	Not Applicable

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes
2 No
3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

4 Yes
5 No
6 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office individual

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office individual

(Q3) Are the statistical methods appropriate for the study design?

1 Yes
2 No
3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

1 Yes
2 No
3 Can't tell

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 1-4 onto this page. See dictionary on how to rate this section.

A	**SELECTION BIAS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
B	**STUDY DESIGN**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
C	**CONFOUNDERS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
D	**BLINDING**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
E	**DATA COLLECTION METHOD**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
F	**WITHDRAWALS AND DROPOUTS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	Not Applicable

GLOBAL RATING FOR THIS PAPER (circle one):

1	STRONG	(no WEAK ratings)
2	MODERATE	(one WEAK rating)
3	WEAK	(two or more WEAK ratings)

With both reviewers discussing the ratings:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

No Yes

If yes, indicate the reason for the discrepancy

1	Oversight
2	Differences in interpretation of criteria
3	Differences in interpretation of study

Final decision of both reviewers (circle one):

1	**STRONG**
2	**MODERATE**
3	**WEAK**

Appendix B: Full Search Syntax

	#	Search strategy
Attachment MeSH Terms	1	**Medline:** Object Attachment/ **PsycInfo:** Attachment Behavior/ OR Attachment Theory/ **Embase:** Emotional Attachment/
Attachment related authors	2	**Medline:** (shaver pr OR mikulincer m OR gillath o OR carnelley kb OR rowe ac).au. **PsycInfo:** (shaver philip r OR mikulincer mario or gillath omri or carnelley katherine b or rowe a c).au. **Embase:** (shaver pr OR mikulincer m OR gillath o OR carnelley kb OR rowe ac).au. **Web of Science:** (shaver pr OR mikulincer m OR gillath o OR carnelley kb OR rowe ac) **Scopus:** (shaver, philip) OR (mikulincer, mario) OR (gillath, omri) OR (carnelley, katherine) OR (rowe, angela)
Attachment	3	**All databases:** ("attachment securit*" OR "secure attachment*" OR "anxious attachment*" OR "avoidant attachment*" OR "attachment orientation*" or "attachment tendenc*" OR "dispositional attachment*" OR "baseline attachment*")
Search strategy	4	**Medline, PsychInfo and Embase:** 1 OR 2 OR 3 **Web of Science and SCOPUS:** 2 OR 3
Security priming MeSH terms	5	**Medline:** Repetition Priming/ **PsycInfo:** Priming/ **Embase:** Repetition Priming/
Security priming	6	**All databases:** ("secure?prim*" OR "security?prim*" OR "attachment prim*" OR "prim* attachment" OR "mental representation*" OR "activating attachment*")
Search strategy	7	**Medline, PsychInfo and Embase:** 5 OR 6 **Web of Science and SCOPUS:** 6
Search strategy	8	**All databases:** 4 AND 7

SCHOOL OF PSYCHOLOGY

DOCTORATE IN CLINICAL PSYCHOLOGY

EMPIRICAL PAPER

The Effects of a Remote Security Attachment Prime, and Subsequent Repeated Primes, upon Perceptions of Social Support in a Healthy Student Sample

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Target Journal: Attachment and Human Development

Word Count: 8,086 words (excluding abstract, table of contents, list of figures, references, appendices)

Submitted in partial fulfilment of requirements for the Doctorate Degree in Clinical Psychology, University of Exeter

Abstract

Objective: The current study investigated the effects of both single and repeated security attachment primes, compared to neutral attachment primes, on increasing state perceptions of social support, positive affect and decreasing perceived stress in a healthy student sample.

Methods: The study employed a mixed between- and within-subjects design, with participants (*N* = 118) remotely receiving either a security attachment prime or a neutral attachment prime followed by daily repeated security attachment primes or neutral attachment primes, over a five day period. Baseline self-report measures included dispositional attachment style, perceived social support, stress and the impact of COVID-19. Self-report state measures of felt security (manipulation check), perceived social support, positive affect and stress were measured pre prime, post prime and on four subsequent days.

Results: Findings suggest that, during a global pandemic, participants receiving a remote (one-off) security attachment prime reported significantly higher levels of state felt security post prime when compared to participants receiving a (one-off) neutral attachment prime. However, no significant differences were found with regard to the other assessed variables - state perceived social support, positive affect or perceived stress. During the repeated aspect of the study, no significant differences were found, between conditions, for state perceived social support, positive affect or felt security, though some evidence was found to suggest that with repeated security attachment primes, participants report less perceived state stress than those receiving repeated neutral attachment primes.

Conclusions: Though findings are mixed, the research does highlight the possible utility of remote security attachment primes in experimentally manipulating state felt

security and, in addition, the potential use of repeated security attachment primes in reducing state perceived stress. Though further research is required, and recommendations for this are provided, the findings are relevant to models of attachment theory and the future delivery of remote clinical interventions.

Keywords: Attachment, security priming, repeated priming, perceived social support, stress, positive affect.

Introduction

Research has evidenced links between baseline attachment styles and perceived social support (Bartholomew et al, 1997; Mallinckrodt & Wei, 2005) as well as the impact of perceived social support upon physical and mental health (Chao, 2012; Cohen, 2004; Mallinckrodt & Wei, 2005; Sarason et al., 1997). In addition, research has found numerous positive effects of security attachment priming (i.e. the activation of a mental representation of an individual whom one feels safe with) upon a range of variables (Gillath & Karantzas, 2019) but, to date, no research has explored the effects of attachment security priming upon perceived social support. If found to be effective, and supported by additional research, the use of security attachment primes may be a beneficial future avenue for psychological intervention.

Social Support

Social support has been described as a complex and multifaceted construct (Barrera, 1986; Moreira et al., 2003). In this regard, numerous conceptualisations of the term exist including, but not limited to, the structural property of an individual's social network (Silberfeld, 1978), satisfaction with received social support (e.g., Sarason et al., 1983) and the existence of an intimate tie (Brown et al., 1975). Despite the complexity within the construct of social support, it is widely indicated that how one *perceives* social support constitutes the crux of the concept (Chiu et al., 2016; Moreira et al., 2003; Sarason et al., 1987). Indeed, empirical evidence has found that perceived social support is consistently associated with a range of health outcomes whereas associations between these outcomes and *received* social support regularly draws inconsistent or non-significant findings (Harandi et al., 2017; Henderson, 1981; Uchino, 2009).

As this study was exploring perceived social support, it felt pertinent to incorporate a theoretical framework that would tap into this specifically (rather than received support). In this regard, Weiss (1974) developed the 'social provisions theory', focused on perceived support and based on extensive analysis of social relationships. Within this theory, Weis (1974) proposed six types of relational provision; (a) social integration (i.e., a sense of belonging within a group with mutual interests); (b) guidance (i.e., ability to receive advice or information); (c) attachment (i.e., feelings of peace and intimacy); (d) opportunity for nurturance (i.e., providing care to others); (e) reliable alliance (i.e., tangible help) and (f), reassurance of worth (i.e., validation of competence and value by others). Weiss (1974) posited that all six of the provisions are required for an individual to feel sufficiently supported.

Weiss' theory (1974) currently forms the basis of one of the most widely utilised measures of perceived social support (Bell, 2006; Perera, 2016), The Social Provisions Scale (SPS; Cutrona & Russell, 1987). The SPS has since been shortened to reduce participant burden (Caron, 2013; Orpana et al., 2019), translated into other languages (Caron, 1996; Iapichino et al., 2016; Martínez-López et al., 2014) and validated with different client groups (Chiu et al., 2016; Perera & DiGiacomo, 2015; Steigen & Berg, 2019). While the measure has seen several developments since its inception in 1987, the fundamental construct of Weiss' theory of social provision remains at its core.

University Students' Health and Perceived Social Support

Evidence has found that, when compared to the general population, students in higher education experience lower levels of happiness, higher levels of anxiety, higher prevalence rates of depression and typically fare worse on measures of psychological well-being (Brown, 2016; Ibrahim et al., 2013; Roberts & Zelenyanski,

2002). Researchers postulate that the social, financial and academic stressors of university can contribute to the difficulties experienced by students (Beiter, et al., 2015; Larcombe, et al., 2016; Robotham, 2008) which may subsequently impact attendance levels and reduce the likelihood of degree completion (Blanco, et al., 2008). During the recent, and enduring, COVID-19 pandemic the mental health of students is noted to have declined during lockdown (i.e., set of restrictions limiting day-to-day activities and the requirement to socially distance) (Mind, 2021; Office for National Statistics [ONS], 2021; Savage et al., 2020; Son et al., 2020). Stressors noted to have impacted this include fears surrounding health (personal and that of loved ones), a decrease in socialising and increased worry surrounding academic performance (Son et al., 2020).

With respect to physical and mental health, evidence supports the notion that social support acts as a buffer against life stressors (Berkman et al., 2000; Cohen et al., 2000; Moak & Agrawal, 2010; Preil & Shami, 1995; Safree & Dzulkifli, 2010; Stanton & Campbell, 2014). In this regard, high levels of perceived social support have been shown to be related to reductions in psychological distress when faced with a stressful event (Harandi et al., 2017), to support with the self-regulation of distress (Urano & Ikeda, 2020) and greater life expectancy (Iyer et al., 2009). Moreover, low perceived social support has been found to be a predictor of psychological difficulties such as low self-esteem, low mood and anxiety (Roohafza et al., 2014; Senra et al., 2012). With specific regard to students, research has found perceived social support to be an important factor in the transition to university (Friedlander et al., 2007), to be negatively associated with low mood and anxiety (Syeda & Afzal, 2019) and to influence academic motivation (Emadpoorl et al., 2016) and task performance (Rees & Freeman, 2009). As such, social support is described

to act as a buffer in supporting the physical and mental health of individuals (Cohen et al., 1985) yet, to date, existing psychological interventions, including within student wellbeing services, may fail to account for, or to screen for, individual differences in perceived social support.

Individual Differences in Perceived Social Support

One theoretical framework which can provide an explanation for individual differences in perceived social support is attachment theory (Gillath et al., 2017; Mikulincer & Florian, 1998; Mikulincer & Shaver, 2009; Stanton & Campbell, 2014). Attachment theory posits that patterns of interactions in early relationships with others (e.g., caregivers) lead to the formation of generalised expectations of the self, the world and of others, an “internal working model” (IWM) (Bowlby, 1969, 1973). Two dimensions commonly used to conceptualise the IWM are attachment avoidance and attachment anxiety. Individuals low on both dimensions are described to possess attachment security (i.e., secure IWM) and individuals high on either dimension are described to possess an attachment insecurity (i.e., negative IWM) (Rowe et al., 2020).

It has been hypothesised that differences in the IWM affect the degree to which individuals consider and value support and whether it is perceived as reliable and available (Mikulincer & Shaver, 2008). In this regard, empirical evidence has found that individuals possessing a negative IWM of the self (i.e., an anxious attachment disposition) and of others (i.e., an avoidant attachment disposition) experience biased expectations and perceptions of social support, recalling helpful behaviours from others as less supportive and are more likely to be reactive to concerns surrounding the availability of support (Collins & Freeney, 2004). As such, individuals possessing a negative IWM are described to report lower levels of

perceived social support than individuals possessing a secure IWM (Mikulincer & Shaver, 2009; Priel & Shamai, 1995).

Therefore, when considering interventions to support the physical and mental health of individuals, a potential avenue may be to explore increasing perceptions of social support via the experimental manipulation, and activation, of the secure IWM.

Experimental Manipulation of IWM

Despite the dispositional nature of the IWM, it has been theorised, and evidenced, that it can be reliably and temporarily changed (Baldwin & Meunier, 1999; Bartz & Lydon, 2004; Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019; Mikulincer & Shaver, 2012) and if repeatedly done, working models can become more chronically accessible with the potential for more long-term, trait level changes (Carnelley et al., 2018; Carnelley & Rowe, 2007, Gillath et al., 2008). In this regard, empirical evidence has supported the notion that individuals hold relationship specific attachment styles (i.e., multiple IWMs) (Baldwin et al., 1996; Collins & Allard, 2001; Collins & Reed, 1994; Gillath et al., 2016; Mikulincer & Shaver, 2005). These IWMs are reported to be hierarchically organised, with the individual's dispositional attachment style (e.g., anxious) chronically accessible at the top and relationship-specific attachment styles (e.g., secure) existing further down the hierarchy (Collins & Reed, 1994; Mikulincer & Shaver, 2003; Mikulincer & Shaver, 2005; Rowe et al., 2020).

To date, several techniques have been developed to activate relationship-specific secure attachment representations, including supraliminal priming techniques, whereby individuals are provided with an explicit (i.e., conscious) cue to security related stimuli (e.g., presentation of words associated with affiliative security). There also exist subliminal priming techniques, whereby individuals are

implicitly (i.e., unconsciously, through momentary exposure) exposed to security related stimuli (e.g., pictures of people hugging) (Bartz & Lydon, 2004; Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019, Mikulincer & Shaver, 2012).

Empirical research employing the use of security attachment primes has documented its ability to positively influence a range of variables including improvements in felt security (Lin et al., 2013; Otway et al., 2014); positive affect (Liao, Wang, Zhang, Zhou, & Liu, 2017); perceived stress (Oehler & Psouni, 2018), a reduction in depressed and anxious mood (Carnelley et al., 2018; Otway et al., 2014); percieved pain (Pan et al., 2017; Rowe et al., 2012) and lower intrusion-related distress (Karl, et al., 2021). However, no research to date has explored the impact of security attachment primes upon perceptions of social support. Moreover, methods are typically laboratory-based and are thus time consuming (Otway et al., 2014). As such, the need for additional research has been highlighted with regard to exploring the ability for security attachment primes to be extended outside of the laboratory (Gillath & Karantzas, 2019; Otway et al., 2014).

The Present Study

The study aimed to explore whether a security attachment prime (SAP), compared to a neutral attachment prime (NAP), is able to increase students' perceptions of social support (primary dependent variable). Secondary dependent variables, associated with student mental health (i.e., affect and stress) were also explored. Moreover, previous research (Otway et al., 2014) has highlighted the importance of exploring the extent to which repeated SAPs can "boost" outcomes, following an initial prime. This study aims to build on this, exploring whether, with the use of repeated SAPs, effects can be maintained over time. Lastly, the study will employ purely remote methods (i.e., non-laboratory based) with which to deliver the

initial and subsequent primes. To this end, the study specifically examined two primary hypotheses.

Hypotheses

Phase 1: Self-report State Perceptions of Social Support, Positive Affect and Stress

a. Participants primed with a remote SAP (Group SS and Group SN) will report significantly higher state scores in perceived social support and affect, compared to participants receiving a remote NAP (Group NN).
b. Participants primed with a remote SAP (Group SS and Group SN) will report a significantly reduced score of perceived stress, compared to participants receiving a remote NAP (Group NN).

Phase 2: Self-report State Perceptions of Social Support, Positive Affect and Stress

a. Following an increase in state scores in perceived social support and positive affect from baseline (due to the SAP), it is hypothesised that participants who receive repeated remote SAPs (Group SS) will maintain this increase over time, reporting significantly higher scores when compared to participants who received a remote SAP followed by repeated NAPs (Group SN) and with participants who received an initial remote NAP followed by repeated remote NAPs (Group NN).
b. Following a decline in perceived state stress from baseline (due to the SAP), it is hypothesised that participants who receive repeated remote SAPs (Group SS) will maintain this decline in perceived state stress over time, reporting significantly lower scores when compared to participants who received a remote SAP followed by repeated remote NAPs (Group

SN) and with participants who received an initial remote NAP followed by repeated remote NAPs (Group NN).

Method

Design

For Hypotheses 1a and 1b, the study employed a 3x2 mixed factorial design with a between-subject factor of condition ([a] participants receiving a SAP followed by repeated SAPs [Group SS], [b] participants receiving a SAP followed by repeated NAPs [Group SN] and [c] participants receiving a NAP followed by repeated NAPs [Group NN]) and a within-subjects factor of time (pre- and post-prime). To test Hypotheses 2a and 2b, the study used a 3x6 mixed factorial design with a between-subject factor of condition (Group SS, Group SN and Group NN) and a within-subjects factor of time (pre-prime, post-prime and four further time points, each 24 hours apart).

Prior to recruitment, the study was approved by the School of Psychology Ethics Committee at the University of Exeter (Appendix A).

Participants

Participants were recruited via the University of Exeter's research participation system, SONA, and were reimbursed for their time, receiving psychology credits (1.5) and a £5 Amazon voucher. The target sample size was based on a-priori power calculation using G*Power (Faul et al., 2009) (Appendix B). Analyses were calculated to explore a small-to-medium effect size (f=0.175) with 80% power and an alpha error rate of 0.05, indicating that a total of 84 participants were required for Phase 1 and 38 participants for Phase 2.

A total of 125 participants took part in the study. However, the study encountered duplicate survey responses with the same participants (n = 7) repeating

the study numerous (57) times, circumventing procedures in place to prevent this. All repeating participants were found to have initially (i.e., first completion of the study) been ineligible (i.e., Patient Health Questionnaire-8 [PHQ-8] scores ≥ 10) and thus all repeating participants' data were removed prior to analysis. As such, 118 participants' data were analysed (see Table 1 for participant characteristics and Figure 1 for participant flow through the study). All participants were fluent English-speaking students, over the age of 18 and non-depressed (as assessed by the PHQ-8).

The longitudinal aspect of the study (Phase 2) encountered a relatively high dropout rate (33%). As such, the study employed the use of an intention-to-treat (ITT) analysis (all participants) and a per protocol (PP) analysis (n=79) (dropout participants removed). Participants were deemed to have dropped out if one or more of the repeated priming days were missing (i.e., state measures not completed) or if one or more of the repeated priming days were completed more than 24 hours after it was received.

Table 1

Participant Characteristics

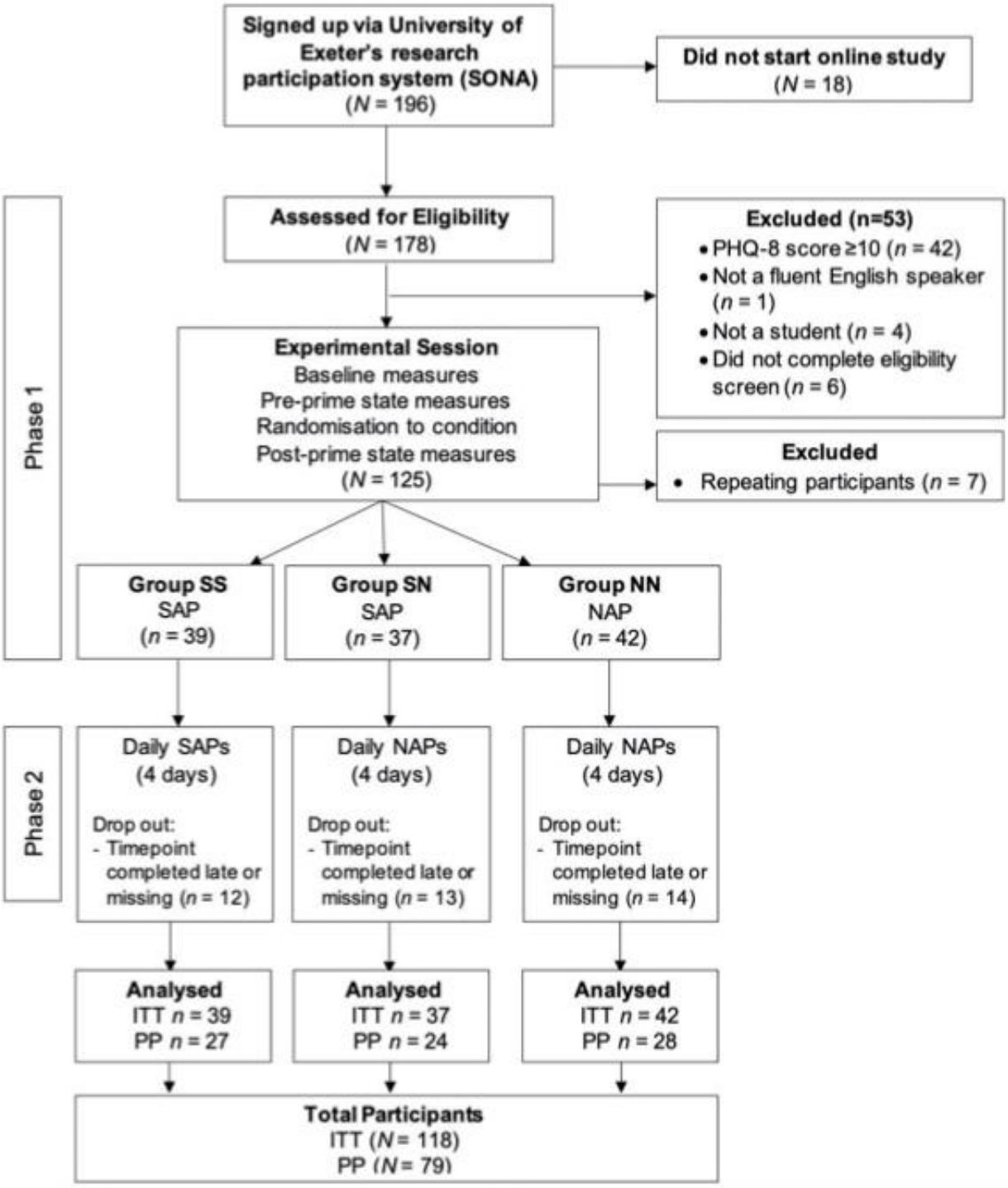
Characteristic	**ITT**	**PP**
N	118	79
Age	*M* = 19.77 (*SD* = 3.88)	*M* = 19.80 (*SD* = 4.06)
Student Status		
Undergraduate	109 (92%)	72 (91%)
Postgraduate	9 (8%)	7 (9%)
Gender		
Female	103 (87%)	70 (89%)
Male	15 (13%)	9 (11%)
Ethnicity		
White British	97 (82%)	66 (84%)
Asian/British Asian	13 (11%)	7 (9%)
Arabic	5 (4%)	4 (5%)
Hispanic	1 (1%)	0 (0%)

Black/African/Caribbean/Black British	1 (1%)	1 (1%)
Prefer not to say	1 (1%)	1 (1%)
Relationship Status		
Single	109 (92%)	73 (95%)
Co-habiting	5 (4%)	3 (2%)
Married/Civil Partnership	2 (2%)	2 (2%)
Prefer not to say	2 (2%)	1(1%)

*Please note that where necessary, numbers have been rounded to the nearest whole number.

Figure 1

Participant Flow Through Study



Materials

Demographic Variables

Demographic data were obtained from participants in the form of a short questionnaire. Information collected included age, gender, ethnicity, education level (undergraduate or postgraduate) and marital status.

Screening Questionnaire

PHQ-8

The PHQ-8 was employed to screen for depression (Appendix C). The PHQ-8 has been found to have good validity and reliability (α=.88; Shin et al., 2019) and it can be used as a standardised cut-off for clinically significant depression (≥10) (Kroenke et al., 2001). Participants were ineligible to continue with the study if they scored over this clinical cut off (≥10) as it is not yet known how depressive symptomology may interact with the primes and perceptions of social support.

Baseline Self-Report Measures

Experiences in Close Relationships – Relationship Structures Questionnaire (ECR-RS)

Participants' dispositional attachment styles were assessed utilising the ECR-RS (Fraley et al., 2006) (Appendix D). The ECR-RS is designed to explore attachment related anxiety and avoidance, assessing patterns of attachment across a range of close relationships (i.e., mothers, fathers, partners and friends), providing a composite index of global attachment when scores are averaged across the four relationships. The ECR-RS has been found to have good reliability estimates (internal α=.85 to .92., test re-test α=.65 to .80; Fraley et al., 2006).

Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS was utilised to ascertain participants' perceptions of social support from three sources (family, friends, and a significant other) with good validity and reliability (internal α=.88, test re-test α=.85; Zimet et al., 1988). Higher scores indicate greater perceptions of social support (Zimet et al., 1988) (Appendix E).

Perceived Stress Scale (PSS)

Participants' perceived stress was assessed using the PSS (Cohen et al., 1983) (Appendix F), with higher total scores indicating greater perceived stress. The PSS has been found to have good validity and reliability (internal α=.84 to .86., test re-test α=.85; Cohen et al., 1983).

COVID-19

Due to the context in which this research was undertaken (i.e., global pandemic), participants were requested to rate how affected they feel they had been personally impacted by COVID-19. This scale ranged from 0 ("not at all") to 5 ("extremely").

State Measures of Felt Security, Positive Affect and Perceived Stress

Visual Analogue Scales

The visual analogue scale (VAS) (Appendix G) explored participants' state affect (i.e., positive affect and state perceived stress) and felt security (manipulation check). Questions surrounding state felt security derived from the security subscale within the State Adult Attachment Measure (Gillath et al., 2009) and questions regarding perceived stress originated from the Perceived Stress Scale (Cohen et al., 1983). This VAS scale was adapted from Kirschner and colleagues (2019) who documented a Cronbach's alpha range from .66 to .73.

Social Provision Scale (SPS)

The study sought to ascertain state perceived social support via the SPS-5 (Appendix H). The SPS-5 (Orpana et al., 2019) is a shortened version of the SPS, based upon Weiss's model of social provisions (1974). There also exists the SPS-10, with excellent psychometric properties (internal reliability α = .88), strong concurrent validity with the SPS (*r* = .93) and preserved construct validity (Caron, 2013). However, the reduction in items of the SPS-5 further decreases respondent burden yet maintains a strong correlation of scores with the SPS-10 (*r* = 0.93) and good internal reliability (α = .88) (Orpana et al., 2019).

Stimulus Material

Primes

Participants receiving the SAP were asked to visualise someone who was important and meaningful to them and to write about this relationship for 10 minutes (Appendix I; Carnelley et al., 2018). Participants receiving the NAP were requested to write for 10 minutes about a specific large or weekly supermarket shop (Appendix I; Mikulincer & Shaver, 2001).

Repeated Primes

Adapted from Otway and colleagues (2014), repeated SAPs and NAPs (3-minutes in length) were sent daily via email to participants over a four-day period (Appendix J).

Procedure

If participants followed the study link from SONA, they were taken to Qualtrics and presented with the information sheet (Appendix K) and consent form (Appendix L). If informed consent was provided, individuals were subsequently presented with eligibility questions to clarify whether participants were over the age of 18, currently a

student and were fluent English speakers. If participants were found to not meet these criteria, they were shown an ineligibility sheet (Appendix M) and the study ceased. Participants meeting these criteria went on to complete the demographic, COVID and PHQ-8 measures. Students were ineligible to continue with the study if they scored over clinical cut off (≥10) on the PHQ-8. These excluded participants were signposted to mental health services (Appendix N) and received an information pack about depression (Appendix O).

Eligible participants went on to complete baseline trait questionnaires (PSS, MSPSS and ECR-RS) (Figure 2). Participants were subsequently randomly stratified (Appendix P) based on ECR-RS scores, ensuring that attachment dispositions were evenly distributed between the conditions. Once allocated to condition, participants completed state measures (SPS-5 and VAS) and received either a SAP (Groups SS and SN) or a NAP (Group NN). With the hope of encouraging participants to write freely, it was made clear that written text pertaining to the primes would not be included within any part the study. In addition, the page presenting the primes included a 10 minute countdown whereby participants were unable to progress with the study until the timer had elapsed. It was hoped that this would encourage participants to engage with the primes for the full amount of time. Following the primes, participants completed post-prime state measures (SPS-5 and VAS) and provided an email address, to facilitate Phase 2 of the study. This signified completion of Phase 1 of the study.

Exactly 24 hours following completion of Phase 1, participants received (via email) the first of the repeated primes, either a SAP (Group SS) or NAP (Groups SN & NN) and subsequently every 24 hours thereafter, for four days (Figure 3). Following completion of the study, participants received a full written debrief

(Appendix Q). Following debrief, participants within Group NN (*n* = 42) were provided with the opportunity to undertake the intervention (i.e., SAP), with 55% (*n* = 23) choosing to do so.

All data recruitment took place within a four-week period during a global pandemic (7th October 2020 – 4th November 2020).

Figure 2

Phase 1 Timeline

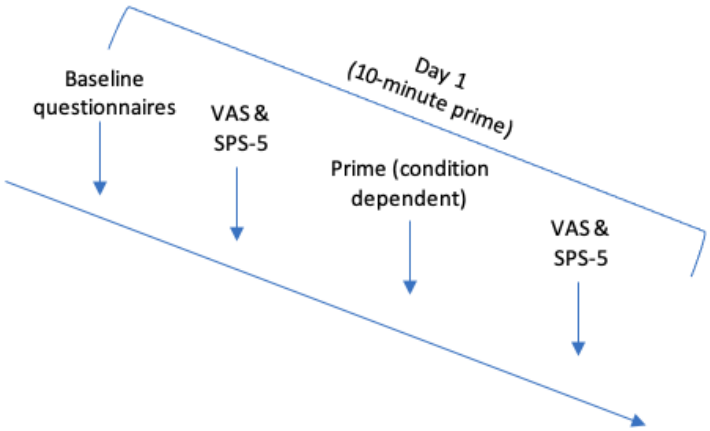
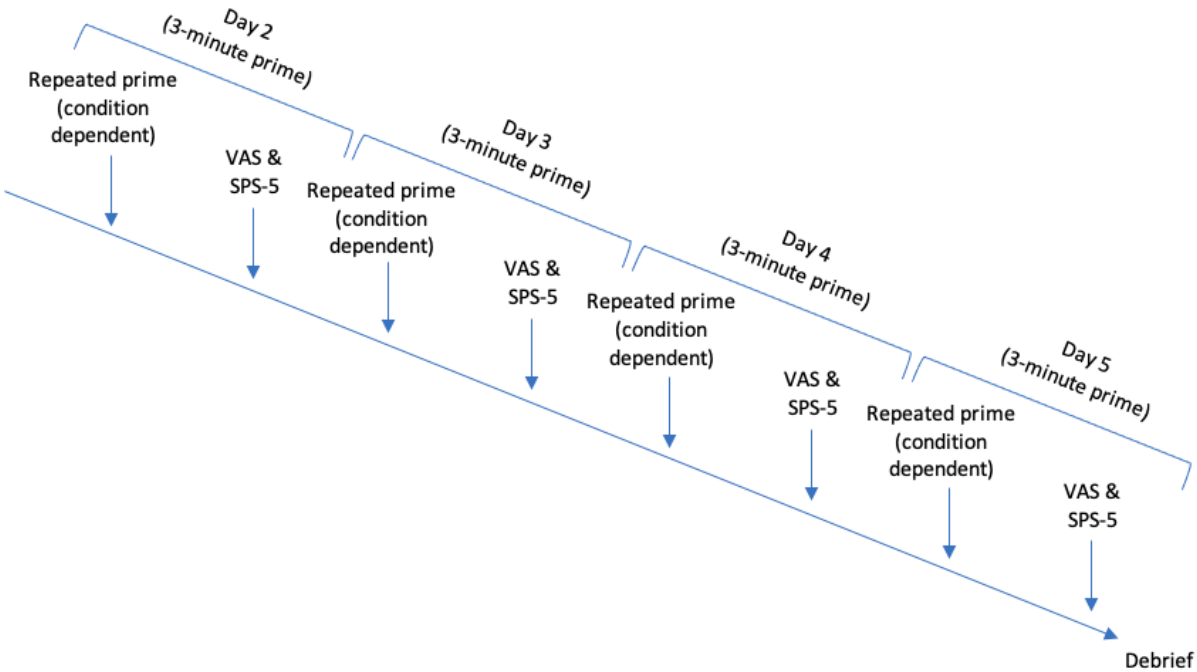


Figure 3

Phase 2 Timeline



Data Analytic Plan

All analyses were performed with IBM SPSS Statistics (Version 26). For Hypotheses 1 differences between conditions for self-reported felt security (manipulation check), perceived social support, positive affect and stress were investigated by conducting a mixed Analysis of Variance (ANOVA). The within-subjects factor was time (Time 1 - Time 2) and the between-subjects factor was condition (Group SS, SN and NN).

For Hypotheses 2, differences between conditions for self-reported felt security (manipulation check), perceived social support, positive affect and stress were investigated by conducting another mixed ANOVA. The within-subjects factor was time (Time 1 – Time 6) and the between-subjects factor was condition (Group SS, SN and NN). Focus was placed on the maintenance of effects between conditions (i.e., Time 1 versus Times 3-6) and whether scores increased or decreased following the initial prime (i.e., Time 2 versus Times 3-6).

For all hypotheses, Tukey post hoc tests were planned for simple main effect analyses.

Each ANOVA was run with the different samples (i.e., ITT and PP). For the PP sample, a post hoc power calculation revealed that the study was powered at 78.5% to detect a small-medium effect ($f = 0.175$) within Phase 1 and at 97.7% within Phase 2.

Data Cleaning and Influential Statistics

Analyses exploring missing data (found within Phase 2; Appendix R) indicated that the data were not missing completely at random (i.e., participants higher in dispositional attachment avoidance and dispositional attachment anxiety completed significantly less of day 4). As such, no participants were removed and, instead,

missing values were replaced with the last value recorded (i.e., last observation carried forward; Salkind, 2010). The exception to this occurred if participants completed none of the repeated priming days or if a participant was missing the first of the repeated priming days (i.e., Time 3). On these occasions, baseline scores were carried forwards.

All data were checked for outliers via the inspection of boxplots and z-scores. In order to retain data, outliers were not removed but winsorised - replaced with a score one unit smaller or larger than the next not-outlying score (Tabachnick & Fidell, 2007).

To assess for normality, histograms were visually explored. ANOVA has been described to be robust to moderate deviations from normality and, moreover, the concept of central limit theorem suggests that with adequate sample sizes (i.e., approximately >30) the normality of sample parameters can be assumed (Field, 2018). However, where distributions were found to be highly skewed, log transformations were undertaken to improve fit and reduce the impact of skewness.

Where Mauchly's test of sphericity was violated (ITT: all Phase 2 variables, PP: Phase 2 state felt security and perceived social support), degrees of freedom were corrected using the Greenhouse-Geisser estimates.

Results

Descriptive Statistics

Descriptive statistics were calculated (Table 2) for baseline measures of dispositional attachment, perceived social support, perceived stress and the perceived impact of COVID-19. Overall, both samples had low levels of attachment anxiety and avoidance, a high level of baseline perceived social support, average

levels of perceived stress and reported an overall moderate to considerable impact of COVID-19.

Table 2

Descriptive Statistics for Baseline Variables

Variable		ITT Sample		PP Sample	
	Range	*M*	*SD*	*M*	*SD*
ECR-anxiety (1-7)	1 - 5.83	2.14	1.00	1.97	0.85
ECR-avoidance (1-7)	1 - 5.25	2.54	0.82	2.42	0.80
MSPSS (12-84)	30 - 84	69.69	9.89	70.58	9.15
PSS (0-40)	9 - 30	16.78	6.11	16.27	6.48
COVID-19 (0-5)	1 - 5	2.97	0.97	2.92	0.99

Key: ECR = Experiences in Close Relationships Scale, MSPSS = Multidimensional Scale of Perceived Social Support, PSS = Perceived Stress Scale.

Phase 1 Analyses (One-Off Remote Prime)

Manipulation Check

For state felt security pre- and post-prime (ITT sample), a mixed ANOVA revealed no significant effect of group, $F(2, 115) = 1.32$, $p = .269$, $\eta\rho^2 = .023$, but found a significant effect of time, $F(1, 115) = 26.13$, $p < .001$, $\eta\rho^2 = .185$, and a statistically significant interaction between condition and time, $F(2, 115) = 3.24$, $p = .043$, partial $\eta 2 = .053$. Results of further, simple effects, analyses indicated that felt security scores significantly increased from Time 1 to Time 2 for Group 1 (SS), $F(1, 38) = 9.82$, $p = .003$, partial $\eta 2 = .206$, and for Group 2 (SN), $F(1, 36) = 18.86$, $p < .001$, partial $\eta 2 = .344$, but not Group 3 (NN) $F(1, 41) = 1.29$, $p = .26$, partial $\eta 2 = .031$ (Figure 4). These results indicate that the experimental manipulation of state felt security (i.e., SAP) was successful. PP analysis did not reveal any differences to ITT, in direction or significance (Appendix S).

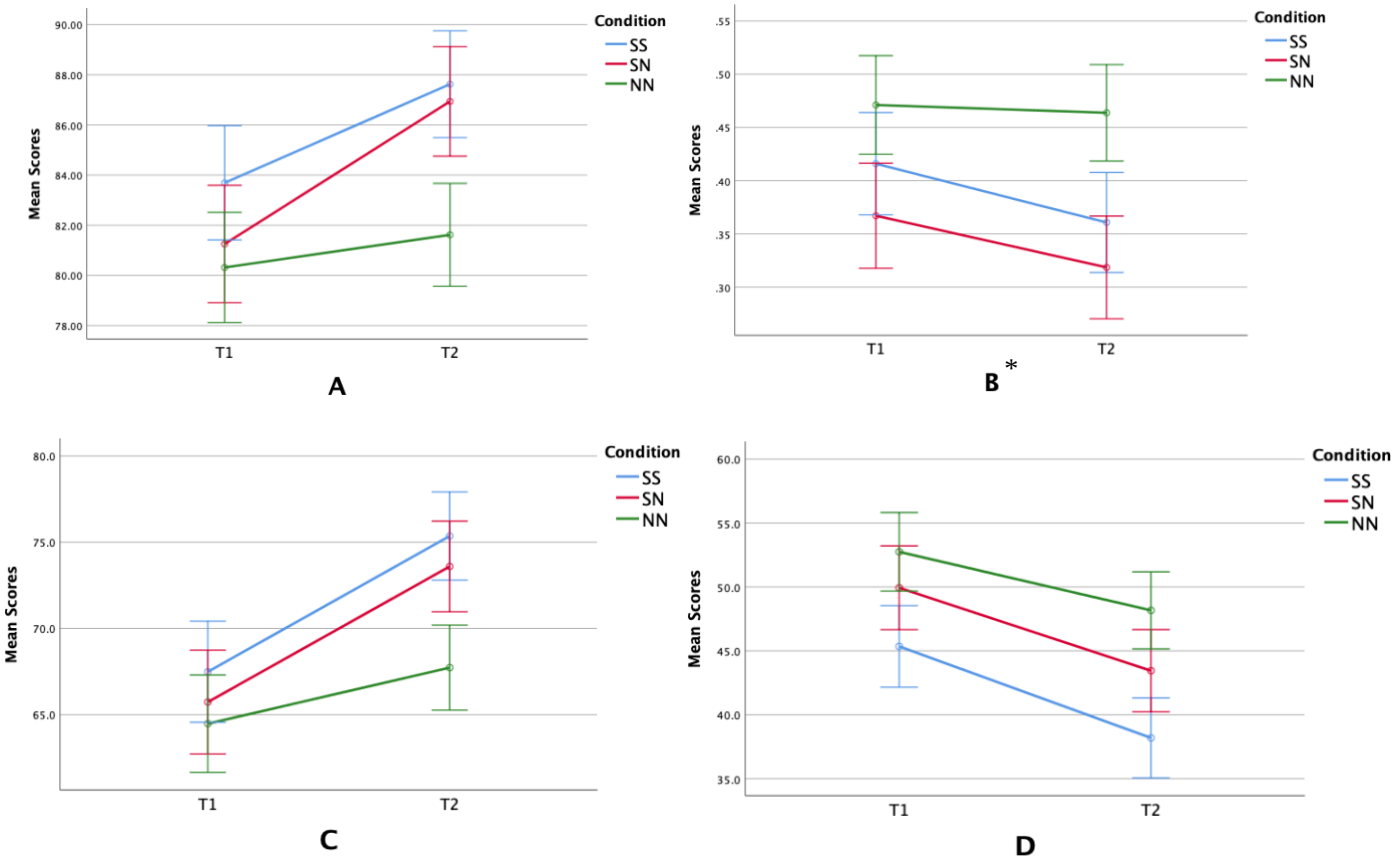
Hypothesis 1a. State Perceived Social Support (SPS-5) and Positive Affect (VAS)

For state perceived social support (ITT sample), a mixed ANOVA revealed a significant main effect of time, $F(1, 115) = 10.18$, $p = .002$, partial $\eta 2 = .081$. However there was not a significant effect of condition, $F(2, 115) = 1.88$, $p = .157$, partial $\eta 2 = .032$, and no significant interaction between time and condition $F(2, 115) = 1.72$, $p = .182$, partial $\eta 2 = .029$. This indicates that changes in participants' perceived social support was significant, increasing from Time 1 to Time 2 (Figure 4). However, this did not significantly differ between conditions and Hypothesis 1a is therefore not supported. PP analysis did not reveal any differences to ITT, in direction or significance (Appendix S).

For state positive affect (VAS) (ITT sample), there was a significant main effect of time, $F(1, 115) = 22.38$, $p < .001$, partial $\eta 2 = .163$, but no significant effect of condition, $F(2, 115) = 1.13$, $p = .295$, partial $\eta 2 = .021$, nor an interaction between time and condition $F(2, 115) = 1.37$, $p = .258$, partial $\eta 2 = .019$. This indicates that participants' state affect scores changed significantly, increasing from Time 1 to Time 2 (Figure 4). However, this did not significantly differ between conditions and Hypothesis 1a is therefore not supported. PP analysis did not reveal any differences to ITT, in direction or significance (Appendix S).

Figure 4

Mean Scores Pre- and Post-Prime



Key: A= Felt Security (VAS) Scores, B = Perceived Social Support (SPS-5) Scores, C = Positive Affect (VAS) Scores, D = Perceived Stress (VAS) Scores, T1= Time 1 (pre-prime), T2 = Time 2 (post-prime).
* SPS-5 scores (panel B) were reflect and logarithmic transformed due to non-normal data (i.e., left skewed), the figure presented is therefore reversed and should be interpreted as such.

Hypothesis 1b. State Perceived Stress (VAS)

For state perceived stress (VAS) (ITT sample), there was a significant main effect of time, $F(1, 115) = 22.33$, $p < .001$, partial $\eta 2 = .163$, but no significant effect of condition, $F(2, 115) = 2.24$, $p = .110$, partial $\eta 2 = .038$, nor an interaction between time and condition, $F(2, 115) = .37$, $p = .690$, partial $\eta 2 = .006$. As expected, results show that state perceived stress scores decreased from Time 1 to Time 2 (Figure 4). However, this was found not to differ significantly between conditions and Hypothesis

1b is therefore not supported. PP analyses did not reveal any differences to ITT, in direction or significance (Appendix S).

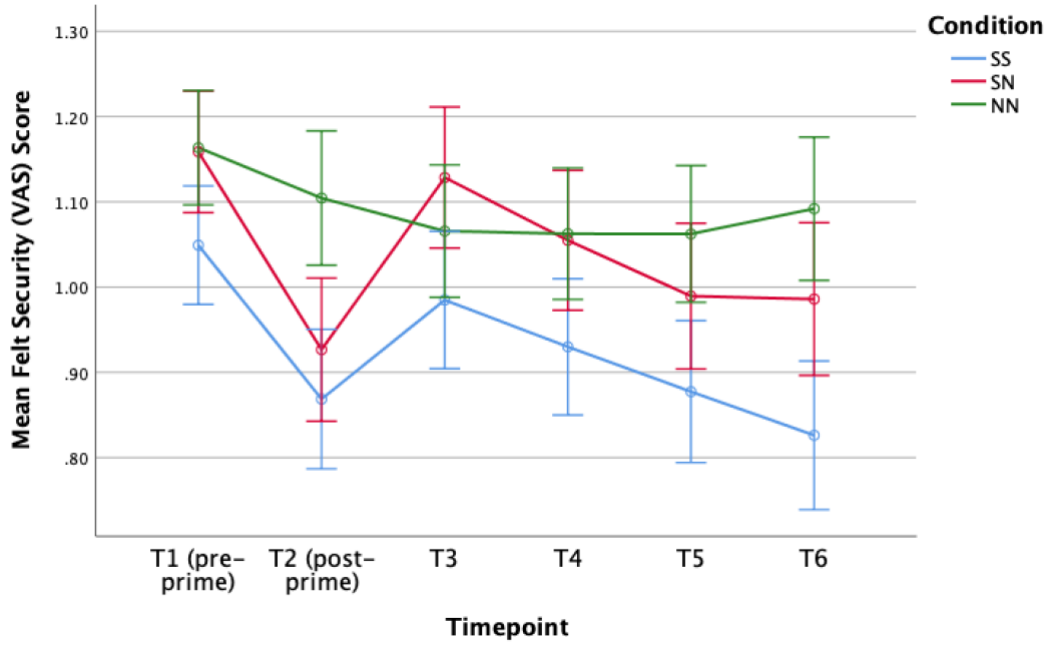
Phase 2 Analyses (Repeated Remote Priming)

Manipulation Check

For state felt security during the repeated phase of the study, a mixed ANOVA revealed a significant main effect of time, $F(4.06, 466.87) = 7.75$, $p < .001$, partial $\eta 2 = .063$, but no significant effect of condition, $F(2, 115) = 1.48$, $p = .232$, partial $\eta 2 = .025$, nor an interaction between time and condition, $F(8.11, 466.87) = 1.53$, $p = .143$, partial $\eta 2 = .026$ (Figure 5). Pairwise comparisons for differences between timepoints, with a Bonferroni adjustment, found significance between Time 1 and Time 2 (reported within Phase 1, Manipulation Check), no significance between Time 1 to Time 3 ($p = .984$) but significance between Time 1 to Time 4 ($p = .042$), Time 1 to Time 5 ($p = .001$) and Time 1 to Time 6 ($p = .001$). Results showed that at these time points, state felt security scores were significantly higher than when compared to baseline (Time 1). However, this did not significantly differ between conditions and the maintenance of the experimental manipulation of state felt security (i.e., SAP) was therefore unsuccessful. Analysis with the PP sample revealed findings consistent with the ITT sample, though Time 1 and Time 4 were found to not be significantly different ($p = .539$) (Appendix T).

Figure 5

Manipulation Check (Mean Felt Security Scores, ITT sample)



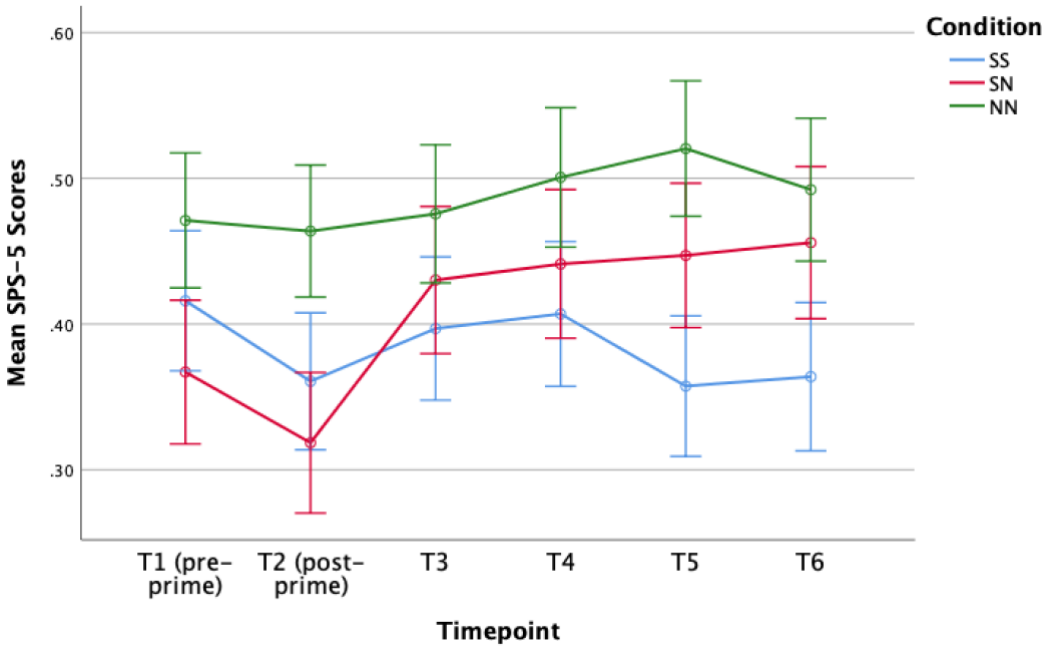
Note. State felt security scores were reflect and logarithmic transformed due to non-normal data (i.e., left skewed), the means are therefore reversed. In this regard, if the means demonstrate a decrease, an increase of means should be interpreted.

Hypothesis 2a. State Perceived Social Support and Positive Affect

For state perceived social support (ITT sample), a mixed ANOVA revealed a significant main effect of time, $F(3.53, 405.81) = 3.06$, $p = .021$, partial $\eta 2 = .026$, but no significant main effect of condition, $F(2, 115) = 1.88$, $p = .157$, partial $\eta 2 = .032$. Pairwise comparisons, with a Bonferroni adjustment, for differences between timepoints found a significant increase from Time 1 and Time 2 (reported within Phase 1, Hypothesis 1a). Although not statistically significant, results indicate a trend towards an interaction between time and condition, $F(7.06, 405.81) = 1.85$, $p = .074$, partial $\eta 2 = .031$ (Figure 6). As this interaction was not significant, Hypothesis 2a is not supported. PP analysis did not reveal any differences to ITT, in direction or significance (Appendix T).

Figure 6

Mean SPS-5 Scores (ITT sample)

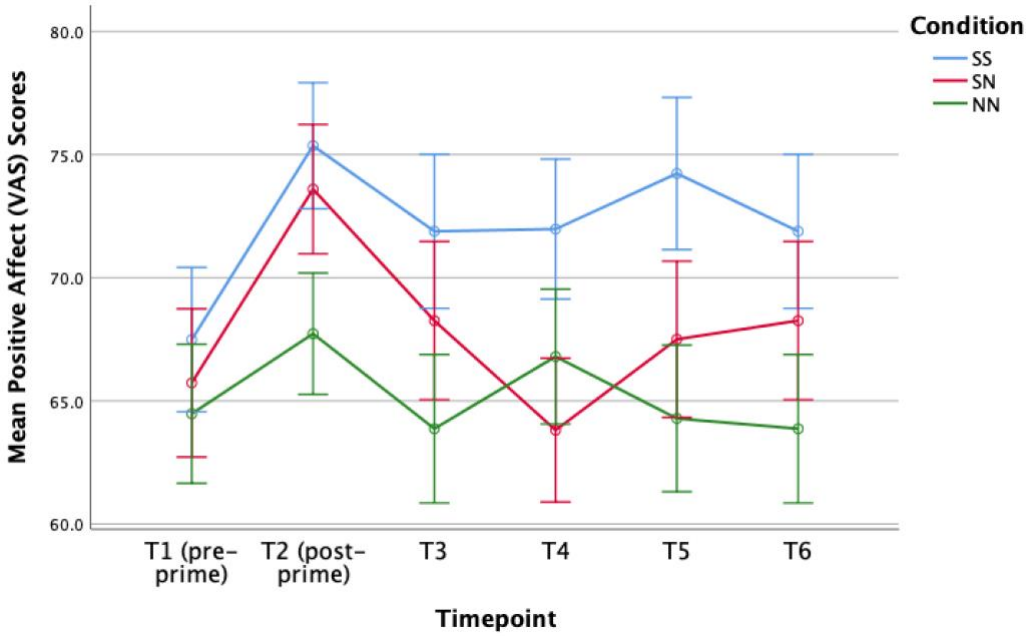


Note. SPS-5 scores were reflect and logarithmic transformed due to non-normal data (i.e., left skewed), the means are therefore reversed. In this regard, if the means demonstrate a decrease, an increase of means should be interpreted.

For state positive affect (ITT sample), a mixed ANOVA revealed a significant main effect of time, $F(3.20, 367.79) = 3.78$, $p = .009$, partial $\eta 2 = .032$ (Figure 7). Pairwise comparisons for differences between timepoints, with a Bonferroni adjustment, showed that there was no additional significant difference in time points, other than the differences between Time 1 and Time 2, explored within Phase 1 analyses (Hypothesis 1a). There was no significant main effect of condition, $F(2, 115) = 2.19$, $p = .116$, partial $\eta 2 = .03$, nor a significant interaction between time and condition, $F(6.40, 367.79) = 1.10$, $p = .362$, partial $\eta 2 = .019$. As such, Hypothesis 2a is not supported. PP analysis did not reveal any differences to ITT in direction or significance (Appendix T).

Figure 7

Mean State Positive Affect VAS Scores (ITT sample)



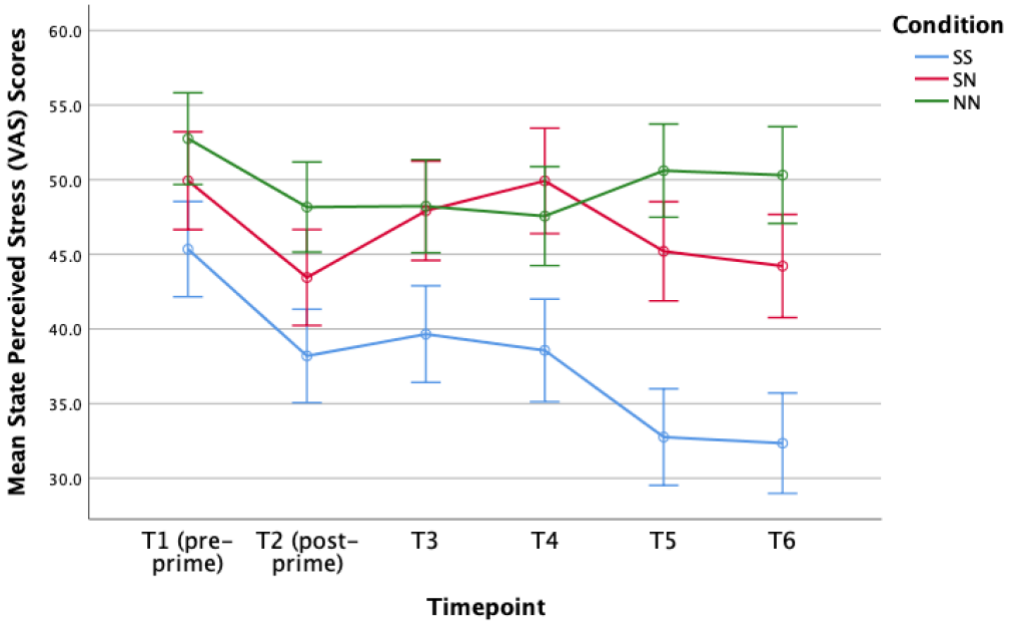
Hypothesis 2b. State Perceived Stress

For state perceived stress (VAS), there was a significant main effect of time, $F(4.19, 482.34) = 5.00$, $p < .001$, partial $\eta 2 = .042$, and a significant main effect of condition $F(2, 115) = 5.29$ $p = .006$, partial $\eta 2 = .084$ (Figure 8). Pairwise comparisons for differences between conditions, with a Bonferroni adjustment, showed a significant difference between Group SS and Group NN ($p = .007$) and a trend towards significance between Group SS and Group SN ($p = .065$). In this regard, Group SS were found to report significantly lower levels of perceived stress than Groups NN and trended towards reporting significantly lower scores than Group SN. With regard to time, results revealed significance between Time 1 to Time 2 ($p < .001$), Time 1 to Time 5 ($p = .006$) and Time 1 to Time 6 ($p = .001$). Although not significant, there was a trend towards an interaction between time and condition $F(8.39, 482.34) = 1.93$, $p = .051$, partial $\eta 2 = .032$. As such, Hypothesis 2b has failed

to be supported. PP analysis did not reveal any differences to ITT in direction or significance (Appendix T).

Figure 8

Mean State Perceived Stress VAS Scores (ITT sample)



Discussion

The current study employed an experimental design to investigate whether participants receiving a remote security attachment prime, compared to participants receiving a remote neutral attachment prime, would report an increase in state perceived social support, positive affect and a decrease in perceived stress. It was further hypothesised that participants subsequently receiving repeated remote security attachment primes would maintain these effects over time, compared to participants receiving repeated remote neutral attachment primes. The study found that participants receiving an initial remote security attachment prime, compared to participants receiving an initial remote neutral attachment prime, reported significantly higher levels of state felt security, indicating that despite the remote means of delivery, it is possible to experimentally manipulate felt security outside of

the laboratory. Although the majority of hypotheses for both the initial, and the repeated, security attachment primes were not supported, there was limited evidence to support the hypothesis that with repeated security attachment primes, participants report less perceived state stress than those receiving repeated neutral attachment primes.

Experimental Manipulation

The theory surrounding security attachment priming is based upon the activation of a secure IWM, making it more accessible and enhancing state felt security (Carnelley & Rowe, 2007; Gilliath & Karantzas, 2015; Gilliath & Karantzas, 2019; Mikulincer & Shaver, 2007). The results from this study are concordant with this, with participants receiving a security attachment prime perceiving significantly higher state felt security than participants receiving a neutral attachment prime. Partial eta squared indicated that the security attachment prime accounted for between 20.6% (Group SS) to 34.4% (Group SN) of the variance in felt security. These effect sizes are comparable to experimental studies delivering security attachment primes within a laboratory (Karl et al., 2021; Otway et al., 2014). In this regard, studies employing similar samples (i.e., university students) and similar priming methods (i.e., supraliminal visualisation) have reported partial eta squared effect sizes ranging between 14.4% to 39% (Karl et al., 2021; Otway et al., 2014).

For Phase 2, the manipulation check indicated that repeated security attachment primes failed to maintain the effects of the initial prime and no significant differences were observed between conditions. This is contradictory to the concept, supported by empirical research, that through the repeated activation of the secure IWM, it becomes more chronically accessible (Carnelley, 2018; Carnelley & Rowe, 2007; Gillath & Karantzas, 2019; Otway et al., 2014). It is possible that differences in

findings may be explained by the remote means of delivery. Indeed, a recent study (Oehler & Psouni, 2018) employing purely remote means to deliver repeated primes found that following seven days, there were no differences when compared to participants receiving no intervention, indicating a failure to remotely induce changes of state felt security over time.

Alternatively, it may be that the research findings within this study have been impacted by the context in which it was undertaken (i.e., during a global pandemic). Students within the sample reported being moderately to considerably impacted by the enduring pandemic (COVID-19) and literature has highlighted a decline in the mental health of students (Mind, 2021; ONS, 2021; Savage et al., 2020; Son et al., 2020). It is possible therefore that during lockdown participants may have perceived any regular message, irrelevant of content, in a positive or comforting way. Indeed, results found no significant difference between conditions during the repeated priming phase but did find a significant improvement in levels of felt security over time. As such, it may be pertinent for future experimental research undertaken during this context to include qualitative interviews in order to explore participant perceptions to experimental manipulations (e.g., security attachment prime and neutral attachment prime).

Perceived Social Support (Primary Dependent Variable)

Contrary to hypotheses, the results showed that the security attachment primes were no more effective than the neutral attachment primes in increasing levels of perceived social support from pre to post prime. Moreover, no differences were observed between conditions during Phase 2, suggesting that the repeated security attachment primes were no more effective in maintaining, or inducing, feelings of perceived social support than repeated neutral attachment primes. As this

is a novel area to explore within security attachment priming, it is not possible to compare these findings with existing literature. However, these results are perhaps surprising given the aforementioned links found within empirical research between attachment and perceived social support (Collins & Freeney, 2004; Mikulincer & Shaver, 2009; Priel & Shamai, 1995) and the beneficial effects of security attachment priming on a range of variables (see Gillath & Karantzas, 2019). One explanation for this may be the high levels of baseline perceived social support of participants within the study. In this regard, attachment theory posits that individuals who possess a positive IWM report higher levels of perceived social support than individuals possessing a negative IWM (Mikulincer & Shaver, 2009; Priel & Shamai, 1995). Therefore, it is perhaps unsurprising that given the low levels of dispositional attachment anxiety and avoidance found within the sample, participants experienced high levels of perceived social support at baseline. As such, it may have been difficult to observe experimental improvements in perceived social support. Moreover, in order to reduce participant burden, a brief perceived social support measure (SPS-5) was chosen. However, the limited number of questions and skewness found within the original data (i.e., prior to transformation) suggests the possibility of a ceiling effect and thus the validity of the findings may be limited (Lewis-Beck et al., 2004). Alternatively, it is also possible that remote security attachment primes are not effective in increasing levels of perceived social support. As such, further research is required in order to ascertain whether one-off, or repeated, security attachment primes can increase perceptions of social support.

Affect (Secondary Dependent Variables)

Positive Affect

Results pertaining to positive affect showed that although participants within Group SS and Group SN reported a larger increase in state positive affect (pre to post prime) than participants within Group NN, this difference was not statistically significant. As such, the initial security attachment prime was no more effective than the neutral attachment prime in increasing feelings of state positive affect. Moreover, no differences were observed between conditions during Phase 2, suggesting that the repeated security attachment primes were no more effective in maintaining, or inducing, feelings of state positive affect than repeated neutral attachment primes. The findings of the current study failed to replicate empirical evidence highlighting the beneficial effects of one-off, and repeated, security attachment primes upon state positive affect (Hudson & Fraley, 2018; Gillath et al., 2008; Rowe & Carnelley, 2003). It is possible that due to the healthy sample employed for this study (i.e., scores of 9 or below on the PHQ-8), participants may not have benefited from the experimental manipulation. Alternatively, to date, no study has explored positive affect with security attachment primes delivered via remote means. As such, it is plausible that the remote delivery of attachment primes may be less effective (e.g., possibly due to reduced level of engagement with the remote primes) in experimentally increasing state positive affect.

State Perceived Stress

For Phase 1, the results showed that the security attachment prime was no more effective than the neutral attachment prime in reducing feelings of state perceived stress from pre to post prime. As such, the findings from this study fail to support findings from empirical research which has demonstrated significant

differences in noradrenergic responses between participants receiving a security attachment prime and participants receiving a neutral attachment prime (Bryant & Chan, 2015). Possible explanations may include differences in primary outcomes (i.e., self-report versus physiological), baseline differences in perceived stress (i.e., average within this study versus “below severe levels on the Depression Anxiety Stress Scale”; Bryant & Chan, 2015) and the method of security attachment prime delivery (i.e., remote versus laboratory).

For Phase 2, results indicated that participants receiving consistent security attachment primes (Group SS) compared to participants receiving consistent neutral attachment primes (Group NN), reported significantly lower levels of state stress. This finding is in line with previous research, highlighting the beneficial effects of repeated security attachment primes upon state stress when compared to either repeated neutral attachment primes or no intervention (Dandeneau et al., 2007; Oehler & Psouni, 2018). Although results within this study found that, compared to a one-off security attachment prime (followed by repeated neutral attachment primes; Group SN), participants receiving consistent security attachment primes (Group SS) reported a larger decrease in state perceived stress, this was not significant. As such, the study falls short of providing evidence that repeated security attachment primes are more effective in reducing state levels of perceived stress, compared to a one-off security attachment prime, followed by repeated neutral attachment primes. It is possible that with a longer period of repeated security attachment primes (e.g., over the course of two weeks), a larger effect size may result. Indeed, research has documented that when repeatedly priming security attachment over a period of four months, effects become more pronounced over time (Hudson & Fraley, 2018). Though not significant, the results within this study are concordant with this, finding

that participants receiving repeated security attachment primes reported less state stress over the course of the five days when compared to participants receiving repeated neutral attachment primes.

ITT and PP

Analyses of the ITT and PP samples found no significant differences in main effect (i.e., time or condition) or interaction effects for any of the hypotheses. As such, this indicates that for the current study, improved adherence to the intervention (PP sample) may not significantly alter outcomes. However, it is important to note that the PP sample contained participants lower in dispositional attachment anxiety and avoidance and thus it is not possible to distinguish whether the lack of difference in intervention effects may in fact be due to the participant characteristics of the sample.

Clinical Implications

The results of this study are the first to indicate that the remote delivery of a one-off security attachment prime may induce similar changes in state felt security, when compared to a one-off security attachment prime delivered within a laboratory. This may have important implications as this method of prime delivery is inexpensive and time efficient (e.g., no requirement to attend, or hire, a laboratory space). Moreover if, moving forwards, security attachment primes are used within the therapeutic space (McGuire et al., 2018), the results demonstrate the possible utility of successfully transferring this technique to remote means of working (e.g., delivered via videoconferencing therapy).

In addition, with further refinement and corroborative research, repeated security attachment primes may be a viable and relatively low-cost intervention to support students (reducing perceived state stress). In this regard, security

attachment primes could be an adjunct to existing student wellbeing support services, utilised alongside other forms of psychological intervention. This may be particularly pertinent during periods of high stress (e.g., transition to university or exam periods; Beiter, et al., 2015; Friedlander et al., 2007; Larcombe, et al., 2016).

Strengths

This study includes several notable strengths with regard to its methodology and analyses, including the use of stratified (attachment disposition) randomisation to allocate participants to condition and the use of a participant sample which was representative of the target sample (i.e., students in higher education). In addition, the study design allowed for the analysis of pre and post security attachment prime changes to variables, as well as a longitudinal aspect (Phase 2), exploring repeated attachment priming. With regard to Phase 2, the employment of a control group receiving consistent neutral attachment primes (Group NN) facilitated a comparison between conditions receiving consistent security attachment primes (Group SS) and a condition receiving a one-off security attachment prime followed by repeated neutral attachment primes (Group SN). Moreover, the study analysed data with both an ITT sample (reducing withdrawal selection bias) and a PP sample (allowing for sensitivity analyses) (Woolard, et al., 2004).

Limitations and Future Research Directions

When considering the generalisability of the study's findings, it is important to consider the aforementioned global pandemic. In this regard, it has been postulated that during an unprecedented time of health and economic anxiety, participants may respond differently to interventions than when compared to a non-pandemic period (Peyton et al., 2020). However, following the replication of previous studies, Peyton and colleagues ultimately concluded that the pandemic has not significantly changed

participants' (including students') responses to intervention (Peyton et al., 2020). Nevertheless, as it is not clear how the pandemic may have affected participant responses to remote security attachment primes, caution should be applied when generalising the findings outside of its context. In addition, the sample was relatively homogenous in that participants were predominantly white British, female, undergraduate students, with high levels of baseline perceived social support and low on both dispositional attachment avoidance and anxiety, which may further limit the generalisability of the findings. As such, it may be pertinent for future studies to investigate the impact of remote security attachment priming outside of the pandemic, with participant samples which include more ethnic diversity, more even gender distributions and who have more varied perceptions of perceived social support by drawing upon participants with higher levels of dispositional attachment avoidance and anxiety (i.e., clinical samples; Carnelley et al., 1994; McDermott et al., 2015; Reis & Greyner, 2004; Wei et al., 2005).

To reduce participant burden and the possibility of a high attrition rate during the week of the experiment, brief daily measures were chosen in the form of the SPS-5 and a VAS. However, the brevity of these scales may have made it difficult to find interpretable effects with the additional possibility of a ceiling effect occurring on the SPS-5. Moreover, although the SPS-5 has a strong correlation with previous measures of the SPS and good internal reliability, it is a relatively new measure of perceived social support with no available test-retest reliability coefficients. As such, it may not be an accurate measure of state perceived support and thus future studies may wish to replicate the findings of this study with more detailed measures (i.e., as opposed to the VAS) and with an alternative measure of state perceived social support.

Lastly, it is important to note that as the manipulation check (i.e., state felt security) during Phase 2 (i.e., remote repeated priming phase) did not demonstrate significant differences between conditions, observed differences, or lack of difference, between conditions may not be attributed to changes in state felt security. Thus, results within this phase should be interpreted with caution. Moreover, although the study was powered to detect a small to medium effect size, it may be beneficial for future studies to repeat the study over a longer period of time (e.g., two weeks of remote primes), addressing aforementioned methodological limitations, with a larger sample size powered to detect a small effect (i.e., $f = 0.1$). In this regard, it has been argued that modest effect sizes can have significant consequences and if interventions are relatively inexpensive (e.g., repeated remote priming), they are worth investigating (Lakens, 2013).

Conclusion

The current study investigated the online delivery of one-off, and repeated, security attachment primes compared to neutral attachment primes. Findings support the utility of remote security attachment primes in experimentally manipulating felt security outside of the laboratory and of the possible value of repeated security attachment primes in reducing students' perceived state stress. Findings draw into question the ability of remote repeated security attachment primes to maintain the effects (i.e., increased state felt security) of an initial, remote, security attachment prime during a global pandemic. Future research is required to determine whether the findings of this study hold true, or whether aforementioned methodological and contextual limitations have affected its findings.

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Appendices

Appendix A: Ethical Approval

Application ID: **eCLESPsy001469 v6.1**
Title: **The Effects of Attachment Priming and Repeated Attachment Priming upon Perceptions of Social Support in a Student Sample**

Your e-Ethics application has been reviewed by the CLES Psychology Ethics Committee.

The outcome of the decision is: **Favourable**

Potential Outcomes

Favourable:	The application has been granted ethical approval by the Committee. The application will be flagged as Closed in the system. To view it again, please select the tick box: View completed
Favourable, with conditions:	The application has been granted ethical approval by the Committee **conditional** on certain conditions being met, as detailed below.
Provisional:	You have **not** been granted ethical approval. The application needs to be amended in light of the Committee's comments and re-submitted for Ethical review.
Unfavourable:	You have **not** been granted ethical approval. The application has been **rejected** by the Committee. The application needs to be amended in light of the Committee's comments and resubmitted / or you need to complete a new application.

Appendix B: G*Power

The target sample size was based on a-priori power calculation using G*Power (Faul, et al., 2009). Previous studies utilising secure, and repeated, attachment primes upon similar variables (Carnelley, et al., 2016; Oehler & Psouni, 2018; Otway, et al., 2014), have reported medium effect sizes. However due to publication bias, it is possible for true effect sizes to be overestimated (Joober et al., 2012). As such, the study sought to explore a small-to-medium effect size (f=0.175) and analyses were calculated for 80% power with an alpha error rate of 0.05 as follows. To investigate Hypothesis 1, estimations were calculated for a 3 (conditions) × 2 (Time 1 to Time 2) mixed-ANOVA, indicating that a total of 84 participants were required (Phase 1). For both Hypotheses 2a and 2b, estimations were calculated for a 3 (conditions) × 6 (Time 1 to Time 6) mixed-ANOVA, indicating that 38 participants were required (Phase 2). As the sample size for Hypotheses 1 were the largest, it was found sufficient to also answer both Hypothesis 2a and 2b. Due to the longitudinal nature of the study, a 10% attrition rate was accounted for.

Appendix C: PHQ-8

Over the **last 2 weeks**, how often have you been bothered by any of the following problems?
*(circle **one** number on each line)*

How often during the past 2 weeks were you bothered by...	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3

Appendix D: ECR-RS

Questionnaire items

1. It helps to turn to this person in times of need.
2. I usually discuss my problems and concerns with this person.
3. I talk things over with this person.
4. I find it easy to depend on this person.
5. I don't feel comfortable opening up to this person.
6. I prefer not to show this person how I feel deep down.
7. I often worry that this person doesn't really care for me.
8. I'm afraid that this person may abandon me.
9. I worry that this person won't care about me as much as I care about him or her.

The questionnaire is answered four times, for each of the following relationships:

- Mother or a mother-like figure
- Father or a father-like figure
- Dating or marital partner. Note: If you are not currently in a dating or marital relationship with someone, answer these questions with respect to a former partner or a relationship that you would like to have with someone.
- Best friend

Appendix E: MSPSS

Multidimensional Scale of Perceived Social Support

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

		Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree	Very Strongly Agree
1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2.	There is a special person with whom I can share joys and sorrows.	1	2	3	4	5	6	7
3.	My family really tries to help me.	1	2	3	4	5	6	7
4.	I get the emotional help & support I need from my family.	1	2	3	4	5	6	7
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6.	My friends really try to help me.	1	2	3	4	5	6	7
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7

Appendix F: PSS

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

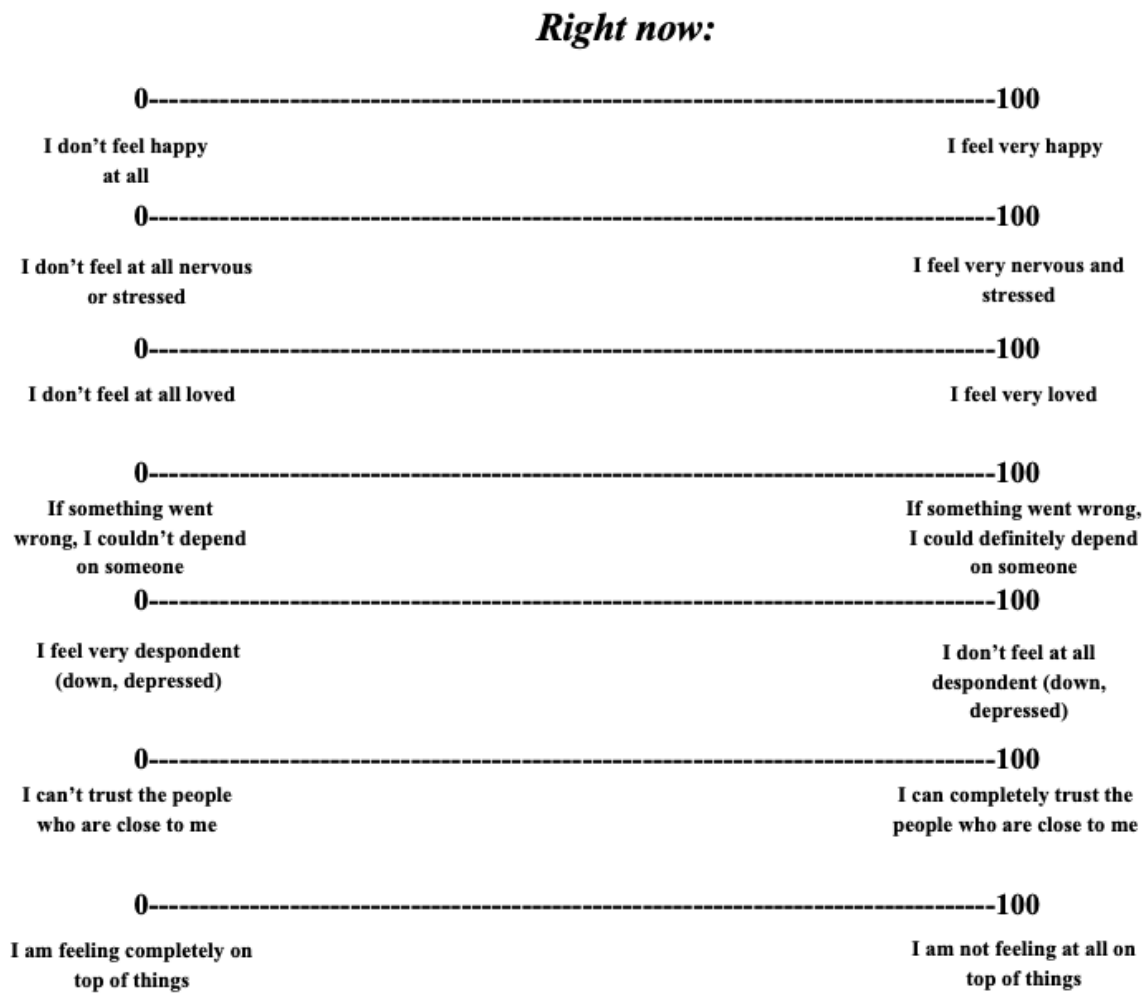
Name _____ Date _____

Age _____ Gender (*Circle*): **M F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	**0**	**1**	**2**	**3**	**4**
2. In the last month, how often have you felt that you were unable to control the important things in your life?	**0**	**1**	**2**	**3**	**4**
3. In the last month, how often have you felt nervous and "stressed"?	**0**	**1**	**2**	**3**	**4**
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	**0**	**1**	**2**	**3**	**4**
5. In the last month, how often have you felt that things were going your way?	**0**	**1**	**2**	**3**	**4**
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	**0**	**1**	**2**	**3**	**4**
7. In the last month, how often have you been able to control irritations in your life?	**0**	**1**	**2**	**3**	**4**
8. In the last month, how often have you felt that you were on top of things?	**0**	**1**	**2**	**3**	**4**
9. In the last month, how often have you been angered because of things that were outside of your control?	**0**	**1**	**2**	**3**	**4**
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	**0**	**1**	**2**	**3**	**4**

Appendix G: VAS



Appendix H: SPS-5

Instructions

In answering the following questions, please think about your **current** relationship with friends, family members, community members, and so on. Please indicate to what extent each statement describes your current relationships with other people, based on how you feel right now. Use the following scale to indicate your opinion.

Strongly Disagree	Disagree	Agree	Strongly Agree
1	2	3	4

		Rating
1	I feel part of a group of people who share my attitudes and beliefs.	
2	I have close relationships that provide me with a sense of emotional security and well-being.	
3	There is someone I could talk to about important decisions in my life.	
4	I have relationships where my competence and skills are recognized.	
5	There are people I can count on in an emergency.	

Appendix I: Attachment Priming Material

Security Attachment Prime

We now want you to complete a visualisation task.
Please think about a relationship you have had in which you have found that it was relatively easy to get close to the other person and you felt comfortable depending on the other person. In this relationship, you didn't often worry about the other person getting too close to you. It is crucial that the nominated relationship is important and meaningful to you.

What is the nature of the relationship (e.g., romantic partner, friend, parent, roommate)?
How long have you known this person? Please indicate in years and (if applicable) months.

Now take a moment and try to get a visual image in your mind or this person. What does this person look like? What is it like being with this person? You may want to remember a time when you were actually with this person. What would they say to you? What would you way in return? What does this person mean to you? How do you feel when you are with this person? How would you feel if this person was here with you now?

Please write down your thoughts in the space provided below. You will have 10 minutes to complete this task. There are no right or wrong answers. Please note that nothing you write will be included as part of the write up of the study. You are therefore encouraged to write freely. Please continue to think about the relationship and write down anything else which comes to mind until the 'Next' button appears (after 10 minutes).

Neutral Attachment Prime

We now want you to complete a visualisation task.

We are interested in how people feel after thinking about particular topics. We would like you to write for 10 minutes about a supermarket scenario. Try to think of a particular time that you visited a supermarket to do a large, or a weekly, shop and give information about the sequence of events that you completed as you moved around the store. For example, you may have selected a trolley and walked down the first aisle, picking up items as you went. Please try to give as much detail as possible about what you picked up or looked at e.g., did you have to weigh an item, or did you have to reach up to a top shelf?

Please write down your thoughts in the space provided. You will have 10 minutes to complete this task. There are no right or wrong answers. Please note that nothing you write will be included as part of the write up of the study. You are therefore encouraged to write freely. Please continue to think about the scenario and write down anything else which comes to mind until the ‘Next’ button appears (after 10 minutes).

Appendix J: Repeated Attachment Primes

Repeated Security Attachment Primes

1. Please spend 3 minutes thinking about the person you previously visualised and how they make you feel safe and secure. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

2. Please spend 3 minutes thinking about a time when the person you visualised made you feel loved and valued. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

3. Please spend 3 minutes thinking about a time when the person you visualised made you feel supported and good about yourself. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

4. Please spend 3 minutes thinking about a time when the person you visualised made you feel comforted and protected. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

Repeated Neutral Attachment Primes

1. Please spend 3 minutes thinking about the route you take from home to university. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study

2. Please spend 3 minutes thinking about the route you take from your home to the supermarket. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

3. Please spend 3 minutes thinking about the route you take from university to home. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

4. Please spend 3 minutes thinking about the route you take from the supermarket to home. Continue to think about this until the ‘Next’ button appears (after 3 minutes). If you would like to document your thoughts, feel free to utilise the space below. Please note that nothing you write will be included as part of the write up of the study.

Appendix K: Participant Information Sheet

Participant Information Sheet (version 4, 25/09/2020)

Title of Project: Emotional processing and social support

Researcher name: Stephanie Kelsey
Supervisors: Professor Anke Karl and Dr Nick Moberly

Invitation and brief summary:
Thank you for your interest in the current study. This study aims to explore emotional processing and social support. In particular, we are interested in how different people cope with day-to-day stress and what we can learn from this to better support them. This project will form the basis of a Doctor of Clinical Psychology thesis. The Principal Researcher is Stephanie Kelsey, a Trainee Clinical Psychologist.

Please take time to consider the information carefully and to discuss it with family or friends if you wish, or to ask the researcher questions.

What would taking part involve?
If you choose to take part, you will be asked to read and sign a consent form prior to completing some short screening questionnaires. If eligible, you will be asked to rate your mood, prior to spending time engaging in a visualisation task. This exercise may be perceived as pleasant, boring or neutral. Subsequently, you will be asked to rate your mood again.

Following this, you will receive a link (via email), on four consecutive days. Via this link, you will be asked to engage in a short (3 minute) visualisation task and to complete two short questionnaires.

Overall the study will take up no more than 1.5 hours of your time, over a period of five days.

Please note that you are free to withdraw from the study at any point without giving reasons and without negative consequences for you.

What are the possible benefits of taking part?
Your participation within the study will help the researchers to add to an existing and developing field of research investigating the processes involved with the emotional processing of day-to-day stress and how this may be further supported.

What are the possible disadvantages and risks of taking part?
There are no known disadvantages associated with taking part in the study. However, as part of the study you will be asked to reflect on your current stress levels which may be temporarily unpleasant. In the unlikely event that you experience strong distress or if you continue to experience it after the study has finished, we recommend that you speak to your GP or contact one of the helpline numbers at the bottom of this information sheet. The project has been approved by the University of Exeter Ethics Board who are satisfied that the research is ethical.

Reimbursement and compensation
If you choose to take part in this research, you will be reimbursed for your time. Students will receive credit for taking part (up to 1.5 credits) and will receive £5 Amazon voucher following completion of the study. In order to provide the Amazon voucher, you will be required to provide your name and email address. This personal information will be stored separately from the data (see further details below).

How will my information be kept confidential?
The University of Exeter processes personal data for the purposes of carrying out research in the public interest. The University will endeavour to be transparent about its processing of your personal data and this information sheet should provide a clear explanation of this. If you do have any queries about the University's processing of your personal data that cannot be resolved by the research team,

further information may be obtained from the University's Data Protection Officer by emailing dataprotection@exeter.ac.uk or at www.exeter.ac.uk/dataprotection.

All data collected will be kept confidentially and each participant will be allocated a code number. In this regard, your name and personal details will not be associated with the data. This data will be stored on a password protected network that only the researcher has access to. In accordance with British Psychological Society research guidelines, the data for the study will be securely stored for 20 years and will be destroyed after this time. Personal information (e.g., your email address) will be stored securely on a password protected network, separately from the data. Personal data will be deleted following completion of the study (May 2021). In order to comply with HMRC regulations, your name and the value of the voucher (£5) you received will be kept for 7 years.

What will happen to the results of this study?
This project will be written up as part of the researcher's Doctorate in Clinical Psychology and it is possible that the findings will be subsequently prepared for publication in an academic journal. If the project is published, the researcher will provide you with details so you may access the article.

Any publication would not include any personal or identifiable details.

Who is organising this study?
The study is being organised by Stephanie Kelsey (Trainee Clinical Psychologist) and it is being supervised by Professor Anke Karl and Dr Nick Moberly

Who has reviewed this study?
This project has been reviewed by the Research Ethics Committee at the University of Exeter (Reference number: [TBC]).

Further information and contact details
If you wish to take part in this research, or if you have any further questions, please contact the researcher, **Stephanie Kelsey** at sp706@exeter.ac.uk, or alternatively **Professor Anke Karl** (primary supervisor) at a.karl@exeter.ac.uk.

If you have any concerns or complaints about this research, please contact **Professor Anke Karl** a.karl@exeter.ac.uk, or **Nick Moberly** (Chair of Psychology Ethics), n.j.moberly@exeter.ac.uk.

Thank you for your interest in this research project.

Support contact details and numbers

University of Exeter Student Wellbeing Service

The Wellbeing Services offer appointments on both Streatham and St Luke's Campuses, as well as some appointments in the City Centre. Please specify when you make an appointment if you have a preferred location. Telephone appointments can also be offered where appropriate. Please be aware that waiting times may differ between locations.

- Phone: 01392 724381
- Email: wellbeing@exeter.ac.uk and we can help you.

Samaritans

Samaritans provides confidential listening and emotional support, 24 hours a day. Here you can talk through your troubles feely in a non-judgmental space. Samaritans are there if you're worried about something, feel upset or confused, or just want to talk to someone.

- Telephone (24 hours): 116 123
- Text: 07725 909 090
- Website: http://www.samaritans.org
- Visit: 10 Richmond Road, Exeter, EX4 4JA

Papyrus

Papyrus provide confidential help and advice around mental health and suicide to young people (under the age of 35) and anyone worried about a young person. They are open 10am-10pm weekdays and 2pm-10pm on the weekend. On bank holidays they are open between 2pm-5pm.

- Call: 0800 068 41 41
- Text: 07786 209 697
- Email: pat@papyrus-uk.org

SANEline

SANEline is a national out-of-hours mental health helpline. They offer specialist emotional support and guidance for anyone affected by mental illness. They are open 365 days of the year from 4.30pm to 10.30pm. To receive support via text message, fill in the form on this link http://www.sane.org.uk/what_we_do/support/textcare/

- Telephone: 0300 304 7000.
- Text care: visit http://www.sane.org.uk/SANEmail
- Website: http://www.sane.org.uk/SANEline

Appendix L: Consent Form

Project Title: Emotional processing and social support

Name of Researcher: Stephanie Kelsey

Supervisors: Professor Anke Karl and Dr Nick Moberly

1. I confirm that I have read the information sheet dated 25 September 2020 (version no. 4) for the above project. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

Yes

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without my legal rights being affected.

Yes

3. I understand that relevant sections of the data collected during the study, may be looked at by members of the research team and individuals from the University of Exeter (i.e., the research supervisors) where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

Yes

4. I understand that taking part in this research involves providing responses to questionnaires for five consecutive days. I understand that my responses to these will remain anonymous.

Yes

5. I understand that this research is being written up as part of the researcher's Doctorate in Clinical Psychology (DClinPsy). I understand that the research may also be written up for publication in an academic journal.

Yes

Yes, I Consent

No, I do not consent

Appendix M: Ineligibility Sheet

Thank you very much for participating in this research study, investigating emotional processing and day-to-day stress.

Unfortunately, initial questions indicate that you are not eligible to continue with the study.

To take part, all participants must be:
- Over the age of 18
- A student
- Fluent in English

Although you are unable to participate further in this study, please note that there is other research being carried out in the department which may be appropriate.

If you have any specific questions or concerns, please contact me at sp706@exeter.ac.uk, and I or my supervisor will be happy to provide further advice and guidance.

Kind regards,

Stephanie Kelsey
Trainee Clinical Psychologist

Appendix N: Exclusion Message and Mental Health Numbers

Hello,

You are receiving this message as you were participating in a research study, completing a series of online questionnaires designed to investigate emotional processing and social support. Thank you very much for your participation.

On one of the questionnaires, the depression severity measure, you scored above a particular threshold score. This indicates that you may currently be experiencing symptoms of depression. Due to this, it would not be appropriate for you to continue with the study. Although you are unable to participate further in this study, please note that there is other research being carried out in the department which may be appropriate.

The questionnaire does not unequivocally diagnose depression; instead it just gives an indication that you are currently experiencing a high number of thoughts and feelings which can be a sign of depression. We understand that you may not be interested in receiving any information about depression or that you may already be managing or seeking help for your feelings or difficulties. Alternatively, the questionnaires may have exaggerated how distressed you were feeling (which can sometimes happen, especially during stressful time periods, since questionnaires only have limited response options). If any of the above is the case, please feel free to disregard this message.

However, if you are experiencing difficulties and not currently receiving help and feel you may benefit from some support, or if you are simply interested in receiving some more information about depression, you may find the following information helpful.

Firstly, there is a PDF document attached to this message that provides useful information on depression (Depression information and guidance).

Secondly, if you are experiencing depression or suicidal thoughts and you are not currently receiving treatment, it is strongly recommended that you make an appointment with your GP to talk about how you are feeling and to consider treatment options. Your GP is there to support you and can either directly provide treatment (e.g., by prescribing medication, if that is appropriate and your choice), or can support you to access other treatments (e.g., psychological therapy).

Thirdly, if you would like immediate support or advice for any difficulties, we recommend you contact the following:

Samaritans
Samaritans provides confidential emotional support, 24 hours a day, for people who are experiencing feelings of distress or despair. Samaritans are there if you're worried about something, feel upset or confused, or just want to talk to someone.

Telephone (24 hours): 08457 90 90 90
E-mail: jo@samaritans.org
Website: http://www.samaritans.org
Address: Chris, P.O. Box 9090, Stirling, FK8 2SA

Depression Alliance
Depression Alliance is a charity which aims to assist people who are affected by depression. Depression Alliance offer information, a range of publications, self-help and support groups for people with depression.

Telephone (to request an information pack): 0845 123 23 20
E-mail: information@depressionalliance.org
Website: http://www.depressionalliance.org
Address: Depression Alliance, 20 Great Dover Street, London, SE1 4LX

SANEline
SANEline is a national out-of-hours telephone helpline, offering emotional support and information for people affected by mental health problems. They also offer e-mail support through SANEmail, their e-mail service.

Telephone (6pm – 11pm, daily): 0845 767 8000
E-mail: visit http://www.sane.org.uk/SANEmail
Website: http://www.sane.org.uk/SANEline
Address: 1st Floor Cityside House, 40 Adler Street, London E1 1EE

Other useful websites for information about depression:

NHS choices: http://www.nhs.uk/Conditions/Depression/Pages/Introduction.aspx
Mind: http://www.mind.org.uk/help/diagnoses_and_conditions/depression
Depression Alliance: http://www.depressionalliance.org/
University of Exeter: http://www.exeter.ac.uk/mooddisorders/

If you have any specific questions or concerns, please contact me at sp706@exeter.ac.uk, and I or my supervisor will be happy to provide further advice and guidance.

Kind regards,

Stephanie Kelsey
Trainee Clinical Psychologist

Appendix O: Depression PDF

The Royal College of Psychiatrists

Help is at Hand: Guidance for the General Public

Depression

About this leaflet

This leaflet is for anyone who is troubled by feelings of depression. We hope it will also be useful for the friends and relatives of anyone who is feeling like this.

It describes what it feels like to be depressed, how you can help yourself, how to help someone else who is depressed, and what help you can get from professionals. It mentions some of the things we don't know about depression. At the end of the leaflet there is a list of other places where you can get further information.

Introduction

We all feel fed up, miserable or sad at times. These feelings don't usually last longer than a week or two, and they don't interfere too much with our lives.

Sometimes there's a reason, sometimes they just come out of the blue. We usually cope with them ourselves. We may have a chat with a friend but don't otherwise need any help. We say that someone is significantly depressed, or suffering from depression, when these feelings don't go away quickly and/or when they are so bad that they interfere with our life.

What does it feel like to be depressed?

The feeling of depression is much more powerful and unpleasant than the short episodes of unhappiness that we all experience from time to time. It goes on for much longer. It can last for months rather than days or weeks. Most people with depression will not have all the symptoms listed here, but most will have at least five or six.

You:

- Feel unhappy most of the time (but may feel a little better in the evenings)
- Lose interest in life and can't enjoy anything
- Find it harder to make decisions
- Can't cope with things that you used to
- Feel utterly tired
- Feel restless and agitated

- Lose appetite and weight (some people find they do the reverse and put on weight)
- Take 1-2 hours to get off to sleep, and then wake up earlier than usual
- Lose interest in sex
- Lose your self-confidence
- Feel useless, inadequate and hopeless.
- Avoid other people
- Feel irritable
- Feel worse at a particular time each day, usually in the morning
- Think of suicide

We may not realise how depressed we are, because it has come on so gradually. We may be determined to struggle on and can blame ourselves for being lazy or feeble. Other people may need to persuade us that it is not a sign of weakness to seek help.

We may try to cope with our feelings of depression by being very busy. This can make us even more stressed and exhausted. We will often notice physical pains, constant headaches or sleeplessness. Sometimes these physical symptoms can be the first sign of a depression.

Why does it happen?

As in the everyday depression that we all experience from time to time, there will sometimes be an obvious reason for becoming depressed, sometimes not. There is usually more than one reason, and these are different for different people.

The reason may seem obvious. It can be a disappointment, frustration, losing something or someone important. Sometimes it isn't clear why we feel depressed. We're just 'in a mood', 'have got the hump', 'feel blue,' 'got out of bed the wrong side'. We really don't know why. Either way, these feelings can become so bad that we need help.

Things that happen in our lives

It is quite normal to feel depressed after a distressing event, such as bereavement, a divorce or losing a job. We may spend time over the next few weeks or months thinking and talking about it. After a while we seem to come to terms with what's happened. But some of us get stuck in a depressed mood, which doesn't seem to lift.

Circumstances

If we are alone, have no friends around, are stressed, have other worries or are physically run down, we are more likely to become depressed.

Physical Illness

Depression often strikes when we are physically ill. This is true for life-threatening illnesses like cancer and heart disease, but also for illnesses that are long and uncomfortable or painful, like arthritis or bronchitis. Younger people may become depressed after viral infections, like 'flu' or glandular fever.

Personality

Anyone can become depressed, but some of us seem to be more likely to than others. This may be because of the particular make-up of our body, because of experiences early in our life, or both.

Alcohol

Many people who drink too much alcohol become depressed. It often isn't clear as to which came first – the drinking or the depression. We know that people who drink too much are more likely to kill themselves than other people.

Gender

Women seem to get depressed more than men do. This is probably because men are less likely to admit their feelings, bottle them up or express them in aggression or through drinking heavily. Women may be more likely to have the double stress of having to work and, at the same time, look after children.

Genes

Depression can run in families. If you have one parent who has become severely depressed, then you are about eight times more likely to become depressed yourself..

What about manic depression?

About one in 10 people who suffer from serious depression will also have periods when they are elated and overactive. This used to be called manic depression, but is now often called Bipolar Affective Disorder. It affects the same number of men and women and tends to run in families (see Help is at Hand leaflet on Manic Depression.

Isn't depression just a form of weakness?

It can seem to other people that a person with depression has just 'given in', as if they have a choice in the matter. The fact is, there comes a point at which depression is much more like an illness than anything else. It can happen to the most determined of people, and calls for help, not criticism. It is not a sign of weakness – even powerful personalities can experience deep depression. Winston Churchill called it his 'black dog'.

When should I seek help?

- When your feelings of depression are worse than usual and don't seem to get any better.
- When your feelings of depression affect your work, interests and feelings towards your family and friends.
- If you find yourself feeling that life is not worth living, or that other people would be better off without you.

It may be enough to talk things over with a relative or friend, who may be able to help you through a bad patch in your life. If this doesn't seem to help, you probably need to talk it over with your family doctor. You may find that your friends and family notice a difference in you and are worried about you.

Helping Yourself

1. Don't keep it to yourself

If you've had some bad news, or a major upset, try to tell someone close to you, and tell them how you feel. It often helps to go over the painful experience several times, to cry about it, and to talk things over with someone. This is part of the mind's natural way of healing..

2. Do something

Get out of doors for some exercise, even if only for a walk. This will help you to keep physically fit, and you may sleep better. You may not feel able to work, but it is always good to try to keep active. This could be housework, do-it-yourself (even as little as changing a light bulb) or any part of your normal routine. It can help take your mind off painful thoughts which make you more depressed.

3. Eat well

Try to eat a good, balanced diet, even though you may not feel like eating. Fresh fruit and vegetables are particularly good. Depression can make you lose weight and run short of vitamins, which only makes matters worse.

4. Beware alcohol!

Resist the temptation to drown your sorrows with a drink. Alcohol actually makes depression worse. It may make you feel better for a few hours, but will then make you feel worse again. Too much alcohol stops you from seeking the right help and from solving problems; it is also bad for your physical health.

5. Sleep

Try not to worry about finding it difficult to sleep. It can be helpful to listen to the radio or watch TV while you're lying down and resting your body, even if you can't sleep. If you can occupy your mind in this way, you may feel less anxious and find it easier to get off to sleep.

6. Tackle the cause

If you think you know what is behind your depression, it can help to write down the problem and then think of the things you could do to tackle it. Pick the best things to do and try them.

7. Keep hopeful

Remind yourself that:

- You are suffering from an experience which many other people have gone through. You will eventually come out of it, although you may find it hard to believe at the time.
- Depression can be a useful experience – you may come out of it stronger and better able to cope. It can help you to see situations and relationships more clearly.
- You may be able to make important decisions and changes in your life, which you were avoiding before.

What kind of help is available?

Most people with depression are treated by their family doctor. Depending on your symptoms, the severity of the depression and the circumstances, the doctor may suggest some form of talking treatment, antidepressant tablets, or both.

Psychotherapy/counselling

Simply talking about your feelings can be helpful, however depressed you are. Your GP may have a counsellor at the surgery who you can talk to.

If your depression seems connected with your relationship with your partner, then RELATE may be most helpful in enabling you to sort out your feelings – RELATE is an organisation that specialises in this area.

If you have become depressed while suffering from a disability or caring for a relative, then sharing experiences with others in a self-help group may give you the support you need.

If you are not able to get over the death of someone close to you, it is particularly helpful to talk about it with someone.

Sometimes it is hard to express your real feelings even to close friends. Talking things through with a trained counsellor or therapist can be easier. It can be a relief to get things off your chest. If you can have another person's undivided attention for a while, you are likely to feel better about yourself. There are many different sorts of psychotherapy available, some of which are very effective for people with mild to moderate depression.
Cognitive therapy helps people overcome the negative thoughts that can sometimes be the cause of depression. *Interpersonal and dynamic therapies* can be helpful if you find it difficult to get on with other people.

Talking treatments do take time to work. Sessions usually last about an hour and you might need anywhere from five to 30 sessions. Some therapists will see you weekly, others every two to three weeks.

How do talking treatments work?

It depends on what form of therapy you have. Just sharing your worries with someone else can help – you feel less alone with your troubles and feel supported. Cognitive therapy helps you to look at and change the ideas you have that make you depressed. Counselling can help you to be clearer about how you feel about your life and other people. Dynamic therapies help you to see how your past experiences may be affecting your life here and now. Talking in groups can be helpful in changing how you behave with other people. You get the chance, in a safe and supportive environment, to hear how people see you and the opportunity to try out different ways of behaving and talking.

Problems with talking treatments

These treatments are usually very safe but they can have side-effects. Talking about things may bring up bad memories from the past and this can make you low or distressed. Others have reported that therapy can change their outlook and the way they relate to friends and family. This can put strains on relationships. It is important to make sure that you can trust your therapist and they have the necessary training. If you are concerned about having therapy, talk it over with your doctor or therapist. Unfortunately, talking treatments are in short supply. In some areas, you may find yourself waiting for several months if you are referred for psychotherapy.

Alternative remedies

St John's Wort is a herbal remedy available from chemists. It is widely-used in Germany and there is evidence that it is effective in mild to moderate depression. There are now one-tablet per day preparations available. It seems to work in much the same way as some antidepressants, but some people find that it has fewer side-effects. If you are taking other medication, you should consult your family doctor.

Antidepressants

If your depression is severe or goes on for a long time, your doctor may suggest that you take a course of antidepressants. These are not tranquillisers, although they may help you to feel less anxious and agitated. They can help people with depression to feel and cope better, so that they can start to enjoy life and deal with their problems effectively again.
It is important to remember that, unlike many medicines, you won't feel the effect of antidepressants straight away. People often don't notice any improvement in their mood for two or three weeks, although some of the other problems may improve more quickly. For instance, people often notice that they are sleeping better and feeling less anxious in the first few days.

How do antidepressants work?

The brain is made up of millions of cells which transmit messages from one to another using tiny amounts of chemical substances called neurotransmitters. Upwards of 100 different chemicals are active in different areas of the brain. It is thought that in depression two of these neurotransmitters are particularly affected –Serotonin, sometimes referred to as 5HT, and Noradrenaline. Antidepressantsincrease concentrations of these two chemicals at nerve endings and so seem to boost the function of those parts of the brain that use Serotonin and Noradrenaline.

Problems with antidepressants

Like all medicines, antidepressants do have some side-effects, though these are usually mild and tend to wear off as the treatment goes on. The newer antidepressants (called SSRIs) may make you feel a bit sick at first and you may feel more anxious for a short while. The older antidepressants can cause a dry mouth and constipation. Unless the side effects are very bad, your doctor is likely to advise you to carry on with the tablets.

As with any group of medicines, different antidepressants have different effects. Your doctor can advise you on what to expect, and will want to know about anything that worries you. Make sure your pharmacist gives you an information leaflet with the tablets. Many people wonder if these tablets will make them drowsy. Generally, tablets which make you sleepy are taken at

night, so any drowsiness can then help you to sleep. However, if you feel sleepy during the day, you should not drive or work with machinery till the effect wears off.

You can eat a normal diet while taking most of these tablets (if not, your doctor will tell you) and they don't cause problems with pain-killers, antibiotics or the Pill. You should avoid alcohol, though. It can make you very sleepy if you drink while you are taking the tablets.

Your GP, not a psychiatrist, will usually be the one who prescribes an antidepressant. At first, he or she will probably want to see you for regular appointments to make sure the tablets agree with you. If they do help then it is advisable to stay on them for at least four months after you feel better. Sometimes it is necessary to stay on them for longer than this. When it is time to stop, you should come off them slowly with the advice of your doctor.

People often worry that antidepressants are addictive. You may get withdrawal symptoms if you stop an antidepressant suddenly – these can include anxiety, diarrhoea and vivid dreams or even nightmares. This can nearly always be avoided by slowly reducing the dose before stopping. Unlike addictive drugs such as Valium (or nicotine or alcohol), you don't have to keep taking an increasing amount to get the same effect and you will not find yourself craving an antidepressant.

You might like to read the College's leaflet on antidepressants for further information about them..

Which is right for me –Talking or Tablets?

It depends on how your depression has developed and how severe it is. On the whole, talking treatments have been found to be effective in mild and moderate depression. If your depression is severe, you are more likely to need antidepressant medication, usually for a period of 6-9 months.

People often find that it is useful to have some form of psychotherapy after their mood has improved with antidepressants. It can help you to work out some of the things in your life that may make you more likely to get depressed again.

So, it may not be a case of one treatment or the other, but what is most helpful for you at a particular time. Both talking treatments and antidepressants are about equally effective in helping people get better from mild to moderate depression. (see references). Many psychiatrists believe that antidepressants are more effective in treating severe depression.

Some people just don't like the idea of medication, some don't like the idea of psychotherapy. So, there is obviously a degree of personal choice. This is limited by the fact that proper counselling and psychotherapy are not readily available in some areas of the country.

When you are low it can be difficult to work out what you should do. Talk it over with friends or family or people you trust. They might be able to help you decide.

Will I need to see a psychiatrist?

Probably not. Most people with depression find the help they need at their GP surgery. A small number of people don't improve and need more specialist help. They are likely to be referred to a psychiatrist or a member of the Community Mental Health Team for more specialised help. A psychiatrist is a medical doctor who specialises in the treatment of emotional and mental disorders. Community team members may be a nurse, psychologist, social worker or occupational therapist. Whichever profession they belong to, they will have specialist training and experience in mental health problems.

The first interview with a psychiatrist will probably last about an hour. You may be invited to bring a relative or friend with you if you wish. There is no need to feel nervous. The sort of questions asked are likely to be practical rather than deeply probing. The psychiatrist will want to find out about your general background and about any serious illnesses or emotional problems you may have had in the past. He or she will ask about what has been happening in your life recently, how the.depression has developed and whether you have had any treatment for it already. It can sometimes be difficult to answer all these questions, but they help the doctor to get to know you as a person and decide on what would be the best treatment for you.

This might be practical advice, or suggesting different treatments, perhaps involving members of your family. If your depression is severe or needs a specialised type of treatment, it might be necessary to come into hospital. This is only needed for about one in every 100 people with depression.

What will happen if I don't get any treatment?

The good news is that 4 out of 5 people with depression will get completely better without any help. This will probably take 4- 6 months (or sometimes more). So, why bother to treat depression?

1 in 5 people with depression will still be depressed 2 years later. As yet, we can't accurately predict who will get better and who will not. Even if you get better eventually, the experience can be so unpleasant that it is worth trying to get help. If you have a physical pain, no-one suggests that, because it will eventually get better, you should not have any pain-relief. Moreover, around half the people who have a first episode of depression will have another one in the future and 1 in 100 people who go to their doctor with depression will eventually kill themselves.

Taking up some of the suggestions in this leaflet may help it go away sooner. If you can overcome it by yourself, then that will give you a feeling of achievement and confidence to tackle such feelings again if you feel low in the future. However, if the depression is severe or goes on for a long time, it may stop you from being able to work and enjoy life.

How can I help someone who is depressed?

Be a good listener. This can be harder than it sounds. You may have to hear the same thing over and over again. It's usually best not to offer advice unless it's asked for, even if the answer seems perfectly clear to you. Sometimes the depression may be brought on by an identifiable problem. If so, you may be able to help the person find a solution or at least a way of tackling the difficulty.

It's helpful just to spend time with someone who is depressed. You can encourage them, help them to talk, and help them to keep going with some of the things they normally do.

Someone who is depressed will find it hard to believe that they can ever get better. You can reassure them that they will get better, but you may have to repeat this over and over again.

Make sure that they buying enough food and eating enough.

Help them to stay away from alcohol.

If they are getting worse and start to talk of not wanting to live or even hinting at harming themselves, take them seriously. Make sure that they tell their doctor.

Try to help them to accept the treatment. Don't discourage them from taking medication, or seeing a counsellor or psychotherapist. If you have worries about the treatment, then you may be able to discuss them first with the doctor.

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Randomised controlled trial of problem solving treatment, antidepressant medication, and combined treatment for major depression in primary care.
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(www.bmj.com).
Natural history and preventative treatment of recurrent mood disorders.
Thase FE. Annual Review of Medicine (1999); 50:453-468.

Effectiveness of antidepressants: evidence based guidelines for treating depressive disorders with antidepressants.
Anderson IM et al. (2000); Journal of Psychopharmacology 14 (1): 3-20.
Problems stopping: antidepressant discontinuation reactions

British Medical Journal; (1998) 316:1105-1106.

Other Organisations

Association for Post Natal Illness
25 Jerdan Place
Fulham
London SW6 1BE
Tel: 020 7386 0868
www.apni.org
Provides information and offers one to one support from mothers who have been through postnatal depression as well.

Aware
72 Lower Leeson Street
Dublin 2
Ireland
Helpline: 00 353 1 67661666
Tel: 00 353 1 661 7211
www.aware.ie
Provides information and support to people affected by depression in Ireland and Northern Ireland.

Depression Alliance
35 Westminster Bridge Road
London SE1 7JB
Tel: 020 7633 0557
Fax: 020 7633 0559
www.depressionalliance.org.uk

Depression Alliance Scotland
3 Grosvenor Gardens
Edinburgh EH12 5JU
Tel: 0131 467 3050.

Depression Alliance Cymru (Wales)
11 Plas Melin
Westbourne Road
Whitchurch
Cardiff CF4 2BT
Tel: 02920 692891
Information, support and understanding for people who suffer with depression and for relatives who want to help.

Fellowship of Depressives Anonymous
Box FDAI
c/o Self-Help Nottingham
Ormiston House
32-36 Pelham Street
Nottingham NG1 2EG

Tel: 01702 433 838
A national mutual support group for people suffering from depression.

Manic Depression Fellowship
Castle Works
21 St George's Road
London SE1 6ES
Tel: 020 7793 2600
Fax: 020 7793 2693
www.mdf.org.uk

Manic Depression Fellowship Wales
1 Palmyra Place
Newport
South Wales NP20 4EJ
Tel: 01633 244244
Fax: 01633 244 111
www.manicdepressionwales.org.uk

Manic Depression Fellowship Scotland
Studio 1019
Mile End
Mill Abbey
Seedhill Road
Paisley PA1 1JJ
Tel: 0141 560 2050
Fax: 0118 670 3666
Works to enable people affected by manic depression to take control of their lives through self-help groups and information on all aspects of the condition.

National Association for Premenstrual Syndrome
41 Old Road
East Peckham
Kent TN12 5AP
Tel: 0870 7772178
Helpline: 0870 7772177
www.pms.org.uk
Medical charity providing information, advice and support to women affected by PMS, their partners and families.

RELATE
Herbert Gray College
Little Church Street
Rugby CV21 3AP
Tel: 01788 573241
Fax: 01788 535007
www.relate.org.uk
UK's largest and most experienced relationship counselling organisation.

The Samaritans
The Upper Mill
Kingston Road
Ewell
Surrey KT17 2AF
Tel: 020 8394 8300
Fax: 020 8394 8301
Helpline: 0345 90 90 90
Helpline (Ireland): 1850 60 90 90
www.samaritans.org.uk
National organisation offering support to those in distress who feel suicidal or despairing and need someone to talk to. The telephone number of your local branch can be found in the telephone directory..

This leaflet was produced by the Public Education Committee of the Royal College of Psychiatrists.

'Depression' is part of a series of Help is at Hand leaflets on common mental health problems. Details of other Help is at Hand leaflets can be obtained from:
The Royal College of Psychiatrists
17 Belgrave Square
London SW1X 8PG
Tel: 020 7235 2351 ext. 259
Fax: 020 7245 1231
E-mail: rcpsych@rcpsych.ac.uk
Website: www.rcpsych.ac.uk.

Series Editor Dr Philip Timms

Royal College of Psychiatrists.
Registered charity number 228636.

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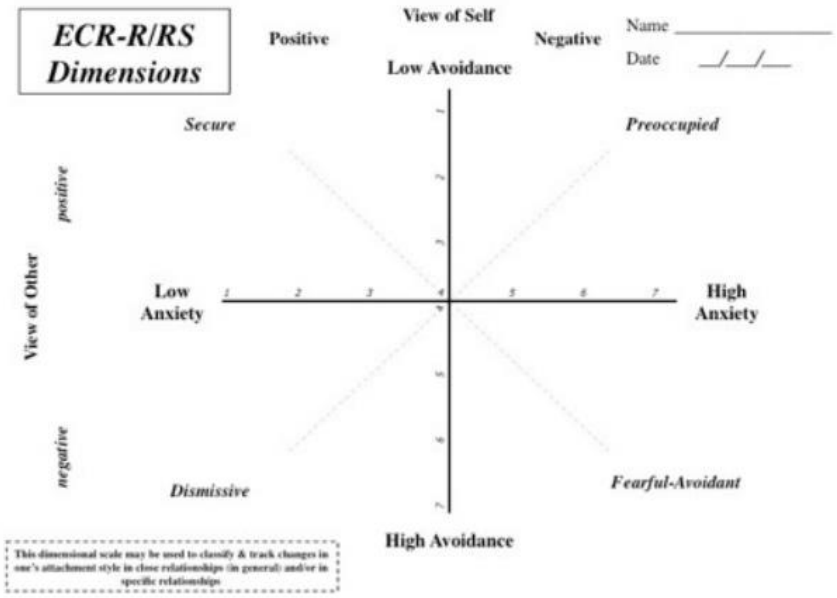
Appendix P: Random Stratification Groups

Based on the global attachment style scores on the ECR-RS, participants were split into one of four groups (Figure 9; Fraley et al., 2011). The two-dimensional figure is defined by the two dimensions commonly used to conceptualise the IWM, attachment-related anxiety (the horizontal axis) and avoidance (the vertical axis).

Figure 9

Four Random Stratification Groups (based on ECR-RS global scores)



Within normative samples (i.e., non-clinical samples) approximately two thirds of adults are reported to be securely attached (Mickelson et al., 1997) and thus despite the randomisation of participants, it was felt important to ensure that attachment styles, across the three conditions (Group SS, SN and NN), were evenly distributed.

Appendix Q: Debrief Sheet

Title of Project: Emotional processing and social support
Principal Researcher: Stephanie Kelsey
Supervisors: Professor Anke Karl and Dr Nick Moberly

Thank you for participating in this study, your time and effort has been incredibly appreciated.

You have taken part in a study which investigates secure attachment priming and its effects upon perceptions of social support. We politely request that you do not discuss the specifics of the study with your peers until its conclusion (04/05/2021). The study will continue to recruit over the following months and if prospective participants are inadvertently made aware of its details, their responses may be impacted and the validity of the study impacted.

Attachment Priming
As part of the study, you will have completed a 10-minute task. This would have either been a secure, or a neutral, priming task. The secure priming task would have asked you to think of a security-inducing attachment figure whereas the neutral task would have asked you to think of a visit to the supermarket. Previous research exploring the impact of secure priming have demonstrated its ability to influence a variety of variables including improvements in mood; relationship expectations; attachment security; prosocial feelings; positive affect; compassion and altruism; felt security and a decrease in symptoms of mild PTSD.

Perceived Social Support
Perceived social support has been described as the cognitive assessment of support, focusing upon an individual's subjective judgment surrounding the availability or adequacy of support. There exists a large evidence base documenting the relationship between perceived social support and well-being. In this regard, research has found that perceived social support is important for coping with stressful or challenging life events and that it can contribute to the self-regulation of distress.

Purpose of the study:
The current study aimed to investigate whether secure attachment primes could increase perceptions of social support. In addition to this, it sought to explore whether regular repetitions of secure priming were able to maintain any effects.

Research has demonstrated that attachment styles and perceived social support are related and that chronic working models of attachment are linked to differences in perceived social support. Although experimental research has been conducted

exploring attachment and its links to perceived support, to date, no study has investigated attachment priming, or repeated attachment priming, and perceived social support. Therefore, the primary aim of this research project was to investigate attachment priming and repeated attachment priming and its impact upon perceptions of social support. If effective, secure attachment primes could prove to be a promising and inexpensive adjunct to supporting students' well-being.

Groups:
You will have been allocated to one of three groups:

Experimental group: Secure prime followed by four days of repeated secure primes
Experimental group: Secure prime followed by four days of repeated neutral primes
Control group: Neutral prime followed by four days of repeated neutral primes

As above, two of the three groups completed a secure attachment prime and one group completed a neutral prime. One group then went onto receive a series of repeated secure primes whereas the other groups received a series of repeated neutral primes. Due to the hypothesised benefits of secure attachment primes, if you were in the control group, you will be offered the opportunity to complete the secure attachment prime (on the next page).

Contact Details:
If you have any questions, or if you would like your data to be removed from the study, please get in touch with either the Principal Researcher, or the chair of the University of Exeter Psychology Research Ethics Committee (REC):

Principal Researcher:
Stephanie Kelsey
Doctorate in Clinical Psychology programme
Washington Singer Laboratories
Perry Road
Exeter
EX4 4QG
Email: sp706@exeter.ac.uk

University of Exeter REC chair:
Dr Nick Moberly
University of Exeter
Washington Singer Laboratories
Perry Road
Exeter
EX4 4QG
Email: n.j.moberly@exeter.ac.uk

Support contact details and numbers
If following the study, you experienced very strong distress, we recommend that you speak to your GP or contact one of the helpline numbers below:

University of Exeter Student Wellbeing Service
The Wellbeing Services offer appointments on both Streatham and St Luke's Campuses, as well as some appointments in the City Centre. Please specify when

you make an appointment if you have a preferred location. Telephone appointments can also be offered where appropriate. Please be aware that waiting times may differ between locations.
Phone: 01392 724381
Email: wellbeing@exeter.ac.uk and we can help you.

Samaritans
Samaritans provides confidential listening and emotional support, 24 hours a day. Here you can talk through your troubles freely in a non-judgmental space. Samaritans are there if you're worried about something, feel upset or confused, or just want to talk to someone.
Telephone (24 hours): 116 123
Text: 07725 909 090
Website: http://www.samaritans.org
Visit: 10 Richmond Road, Exeter, EX4 4JA

Papyrus
Papyrus provide confidential help and advice around mental health and suicide to young people (under the age of 35) and anyone worried about a young person. They are open 10am-10pm weekdays and 2pm-10pm on the weekend. On bank holidays they are open between 2pm-5pm.
Call: 0800 068 41 41
Text: 07786 209 697
Email: pat@papyrus-uk.org

SANEline
SANEline is a national out-of-hours mental health helpline. They offer specialist emotional support and guidance for anyone affected by mental illness. They are open 365 days of the year from 4.30pm to 10.30pm. To receive support via text message, fill in the form on this link
http://www.sane.org.uk/what_we_do/support/textcare/
Telephone: 0300 304 7000.
Text care: visit http://www.sane.org.uk/SANEmail
Website: http://www.sane.org.uk/SANEline

To download the helpline numbers above, please click here.

Appendix R: Missing Data

No missing data were found within Phase 1 of the study, however missing data were found within Phase 2. It was observed that no participants had partially completed any of the time points (each day included a prime and state measures). In this regard, participants were found to have either completed a day, missed it in its entirety or to have completed it more than 24-hours after receiving the email. The latter two were deemed as 'missing'. Missing days were coded using a separate variable (e.g., 0 = present, 1 = missing). Table 3 shows the percentage of participants who completed each day. T-tests were utilised to compare groups across each variable and significant differences were found in that participants higher in dispositional attachment avoidance and dispositional attachment anxiety completed significantly less of day 4 (p = .015 and p = .025 respectively).

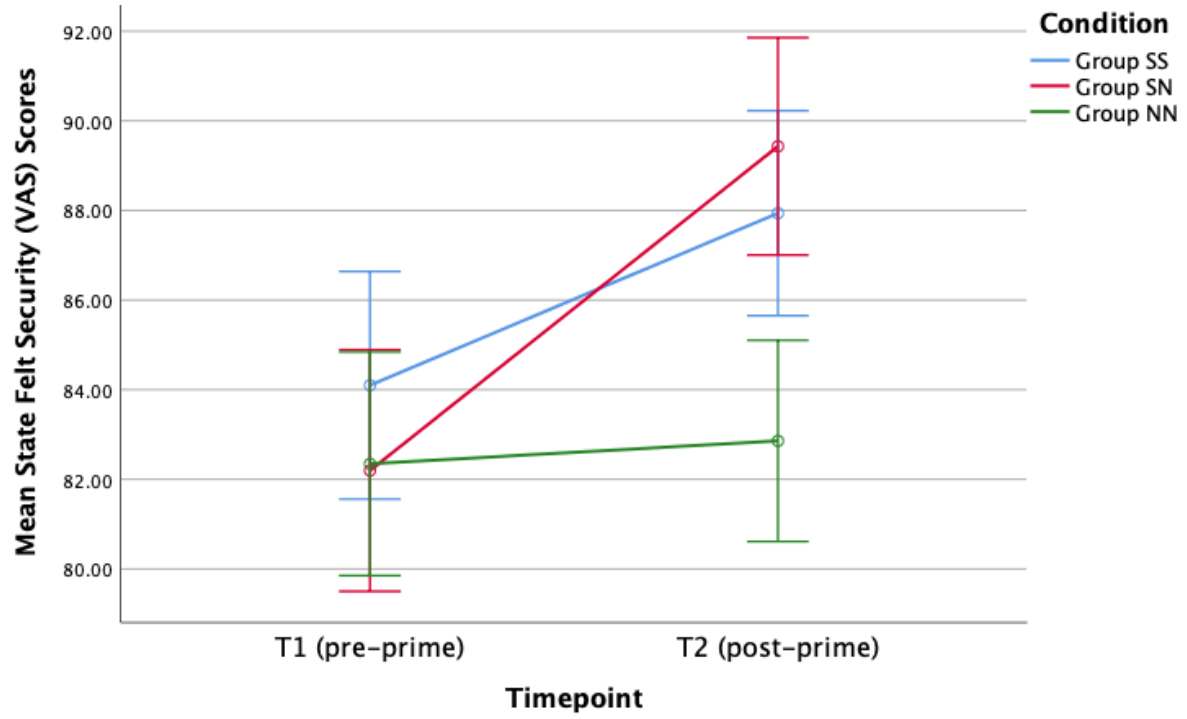
Table 3

Completed Participant Time Point Percentages

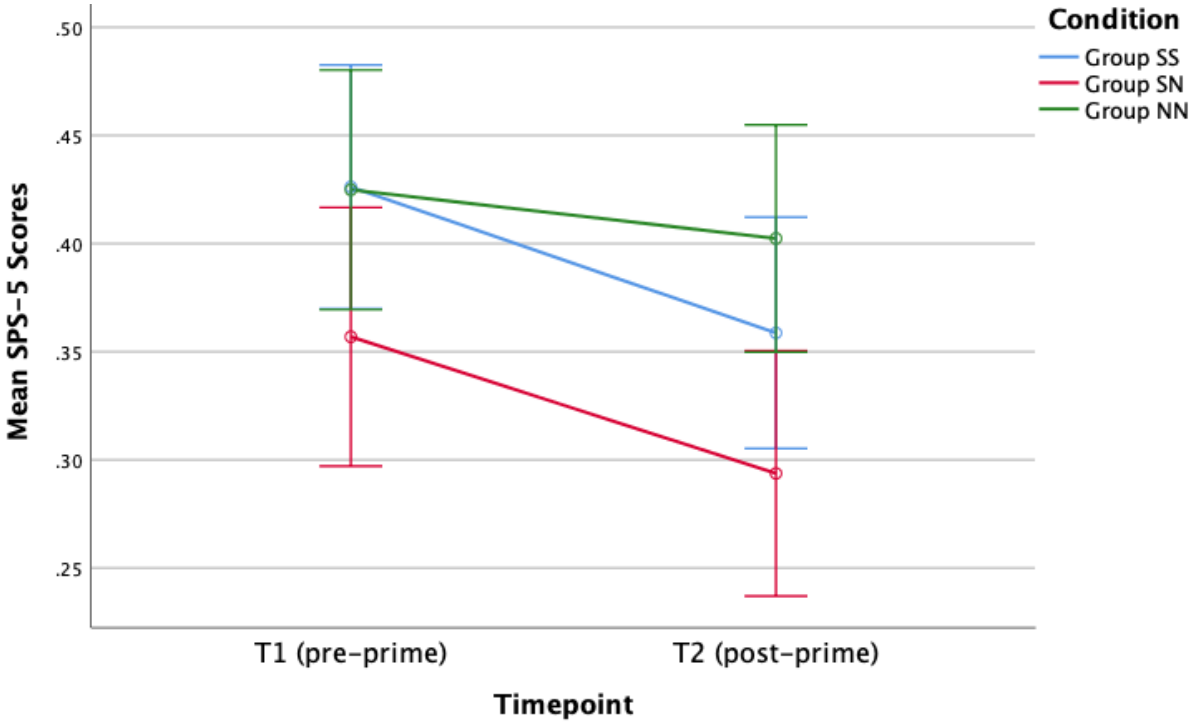
Phase 2 time points	Percentage of participants who completed the timepoint
Time point 3 (day 2)	84%
Time point 4 (day 3)	80%
Time point 5 (day 4)	74%
Time point 6 (day 5)	83%

Appendix S: Phase 1 PP Sample Analyses

State Felt Security (Manipulation Check)

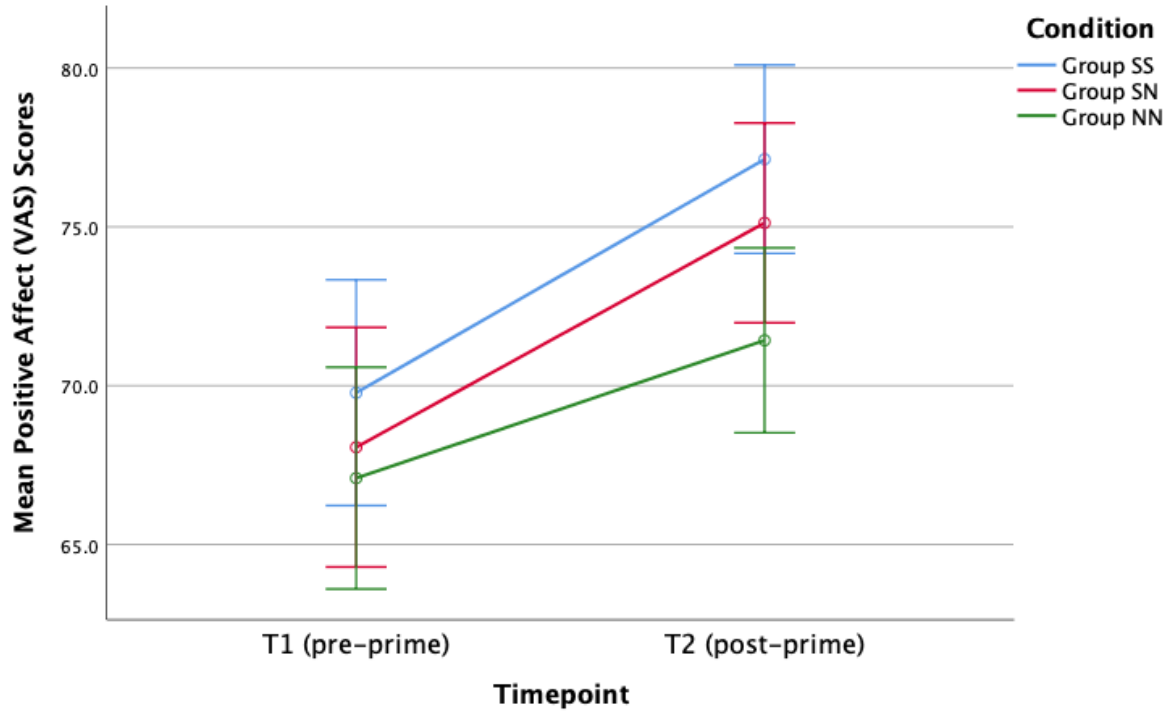


Perceived Social Support

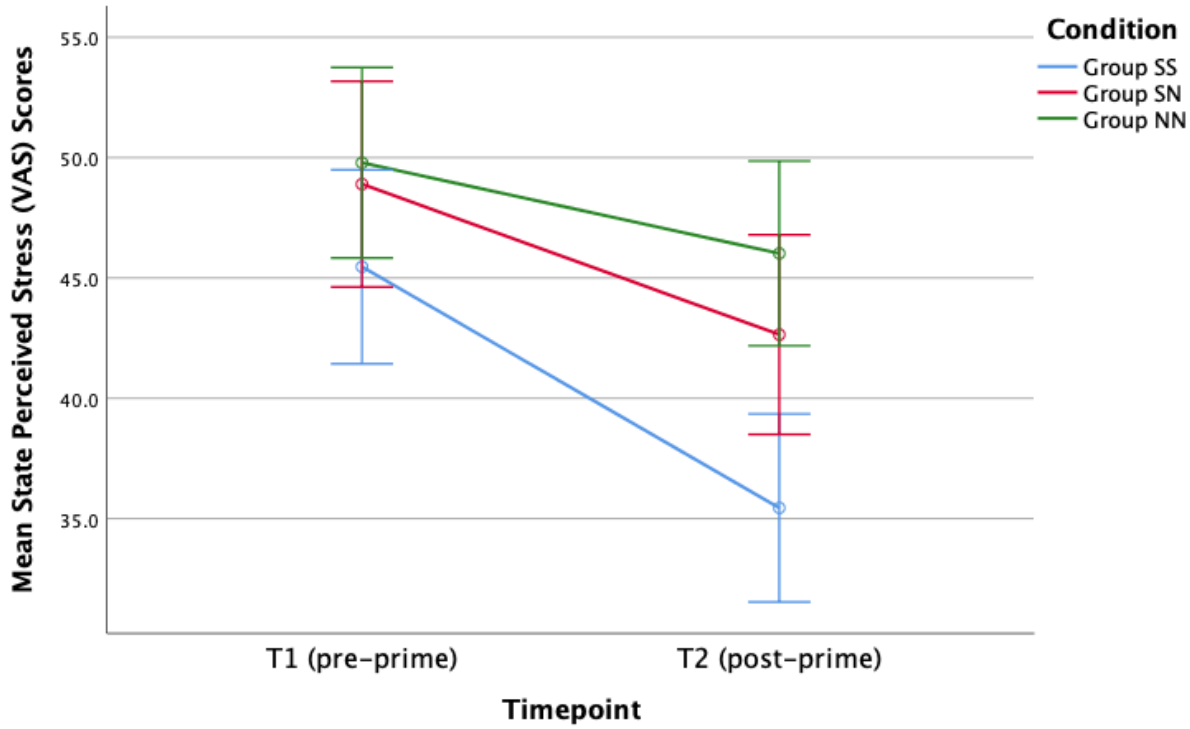


* Please note scores were reflect and logarithmic transformed due to non-normal data (i.e., left skewed), the means are therefore reversed.

State Positive Affect

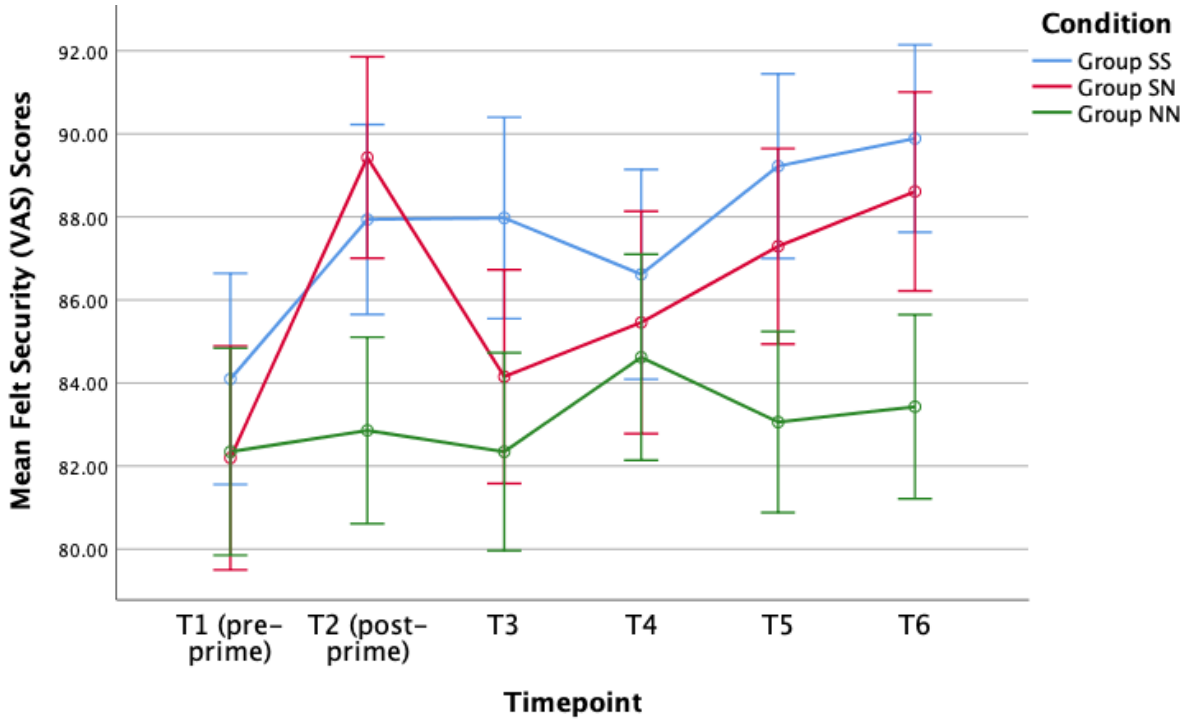


State Stress

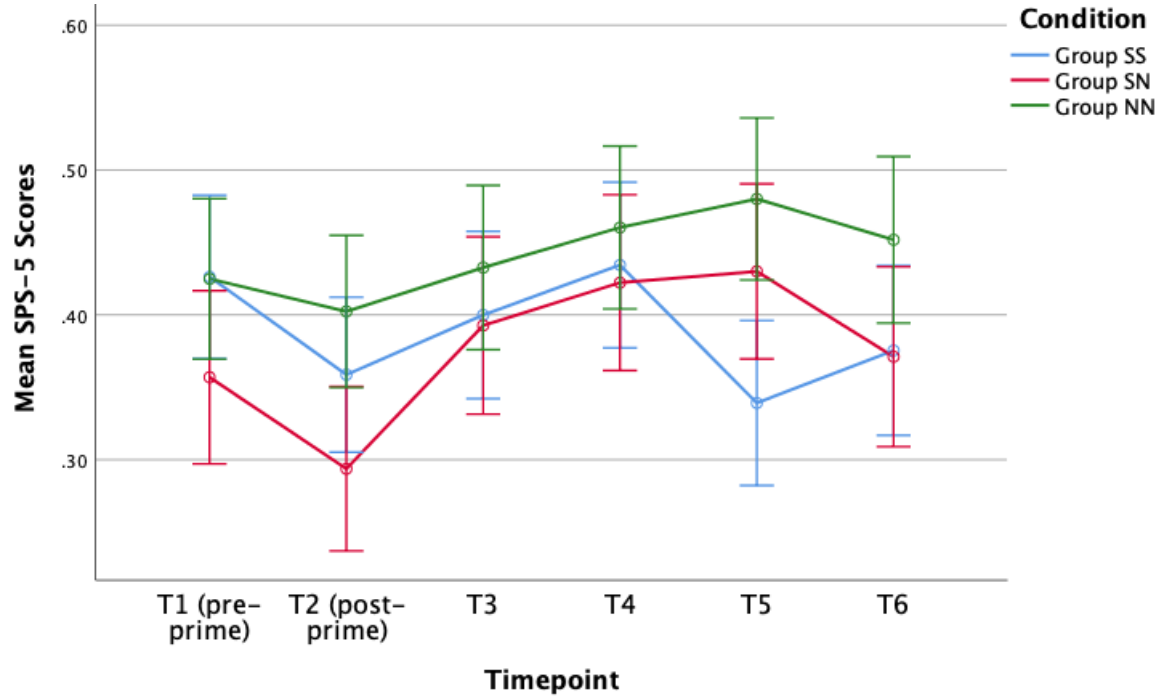


Appendix T: Phase 2 PP Sample Analyses

State Felt Security (Manipulation Check)



Perceived Social Support



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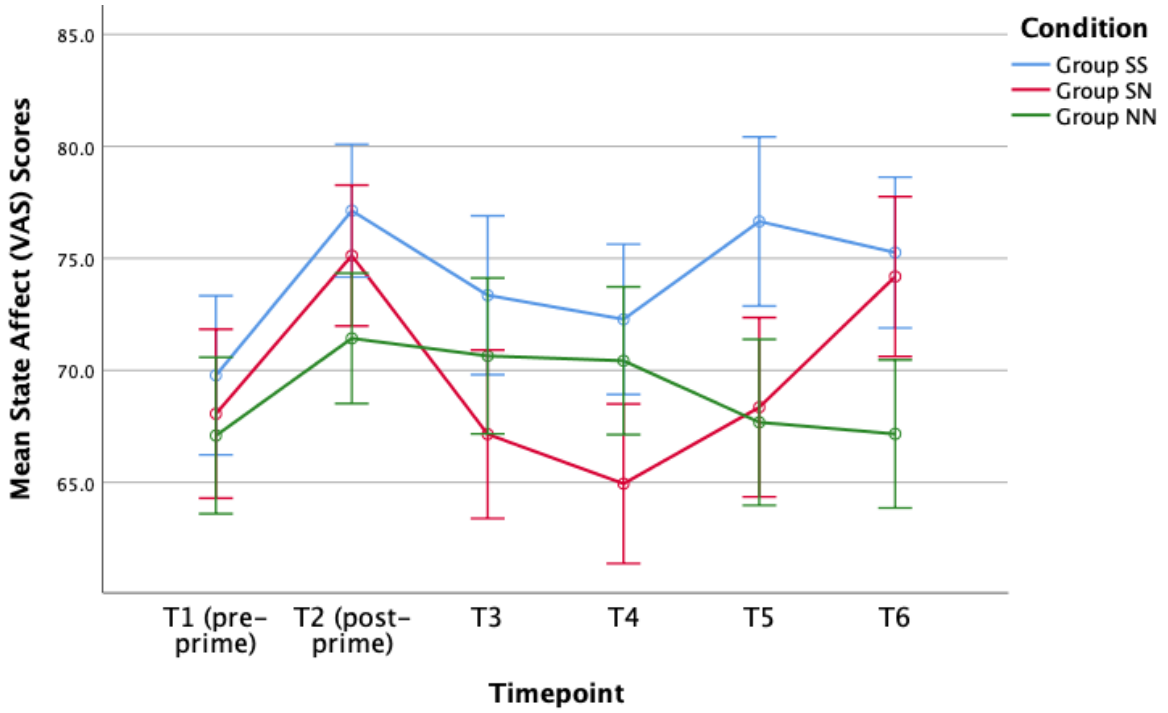
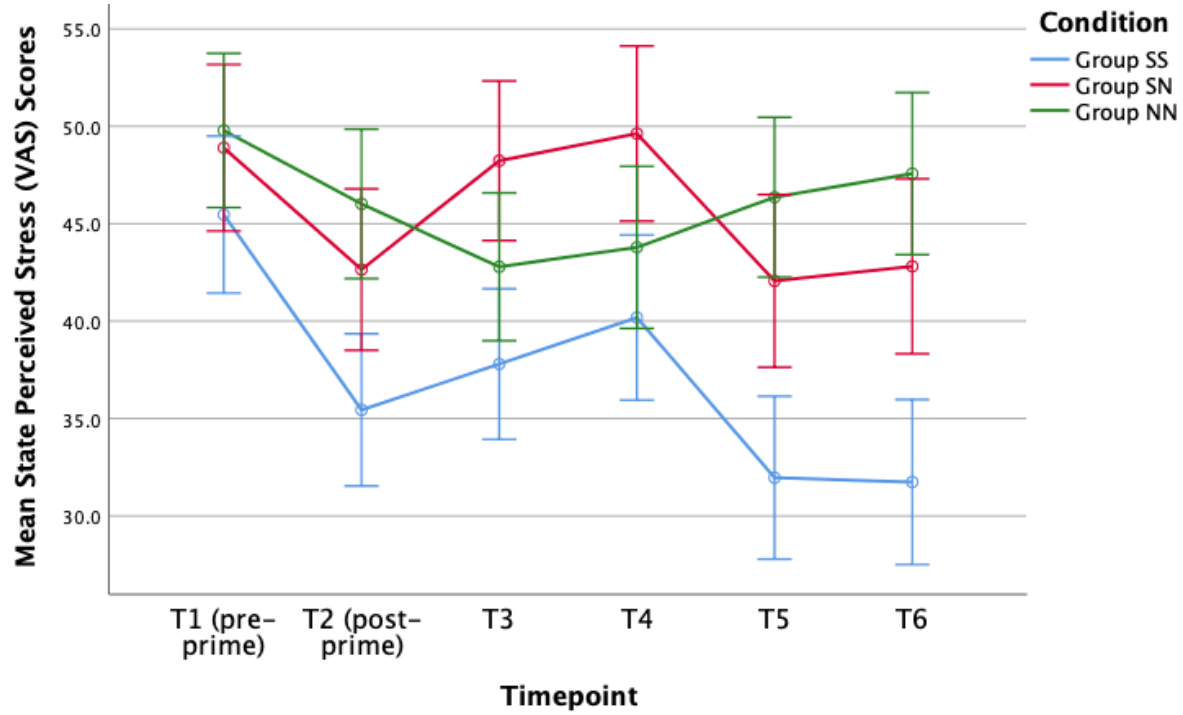
State Positive Affect



State Stress



Appendix U: Dissemination Statement

The results of this study will be disseminated to interested parties via presentation and journal publication.

Presentation

On 7th June 2021, the findings will be presented to an academic audience, for peer review, as part of the Doctorate in Clinical Psychology at the University of Exeter.

Journal Publication

Following shortening and preparation for publication, it is expected that the study will be submitted for publication with the Journal of Attachment and Human Development.

As stated on the participant information sheet, if the paper is accepted for publication, participants will be contacted and provided with the relevant details to access the article.