

**ATTACHMENT SECURITY AS A BASIS
FOR GRATITUDE: AN EMPIRICAL
INVESTIGATION**

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A thesis submitted for the degree of Doctor of Philosophy (in Clinical Psychology)
from the Australian National University

April 2016

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DECLARATION

I declare that this thesis reports my original work, that no part has been previously accepted and presented for the award of any degree or diploma from any university, and that, to the best of my knowledge, no material previously published or written by any other person is included, except where due acknowledgement is given.

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ACKNOWLEDGEMENTS

The completion of this thesis could not have been achieved without the help and support of many significant others. I would like to acknowledge the invaluable input of my primary supervisor, Associate Professor Ross Wilkinson. I am enormously grateful to him for his advice and guidance throughout the candidature. I could not have completed the thesis without his help. I am grateful to my advisers, Dr Jay Brinker, Prof Michael Platow, and Prof Elinor McKone, for their expertise and advice on my thesis research projects. It was reassuring to know that I had a panel of amazing advisors to assist me with thesis issues. I would like to thank the school of psychology's administrative and IT staff for their support and assistance, especially Caroline Twang and Shane Pozzi. They were always organised and ready to help and made the practical aspects of my candidature smooth and easy. Thank you to my colleagues at the school of psychology who shared their experiences with me, helping to normalise my own experience. Their presence made the journey more enjoyable and meaningful. Thank you to Tegan Cruwys, Daphne Goh, Jodie Burchell, Danielle Clout, Sarah Walker and Paul Campbell for taking the time to talk thesis with me.

Lastly, I am grateful to my family and friends for their support and understanding and especially grateful to Adam who has always been there for me and supported me every step of the way. I would never have considered embarking on this journey without his encouragement. More importantly, thank you for being my secure base.

ABSTRACT

Gratitude is a positive, higher order affect with significant links to well-being. Research has shown that an attitude of gratitude increases well-being and life-satisfaction and is a protective factor against mental health problems. However, little is known about how trait gratitude is developed or what mechanisms are involved in the link between gratitude and well-being. While there are a number of extant theories of gratitude they tend to be limited in scope, are not well tested, and lack an empirical support base. This thesis proposes that attachment theory can address some of the current theoretical limitations in the field and provide a framework for studying gratitude. A critical overview of the gratitude and attachment literature is presented as well as an analysis of how attachment processes may relate to gratitude.

A research program with five studies (N = 837) is presented across four empirical chapters. These test the viability of an attachment theory framework for gratitude and examined the hypothesis that attachment security facilitates gratitude arousal and relates to trait gratitude. A cross-sectional study found that individual differences in attachment functioning significantly predicted state and trait gratitude, providing evidence for the validity of attachment as framework for the study of gratitude. Two experimental studies used affective subliminal priming methodology to explore the relationship between normative attachment function and gratitude at the cognitive processing level of experience. Together these studies provide tentative evidence that attachment security and gratitude are found within the same cognitive information network and that individual differences in attachment avoidance and anxiety inhibit information processing of gratitude information.

Two more studies examined the link between attachment security and gratitude using supraliminal affective priming at the affective level of experience. The first of these studies provided evidence showing that attachment security leads to more reports of gratitude than positive affect, attachment insecurity, and neutral condition. The second study replicated the results of the first in an independent sample. Implications of the findings for both theory and clinical applications are discussed in detail. Overall, the research presented provides evidence supportive of an attachment theory of gratitude, contributes novel information regarding gratitude in the context of attachment processes, and sets a foundation for future research inquiries regarding a theory of gratitude through the attachment framework.

TABLE OF CONTENTS

DECLARATION	2
ACKNOWLEDGEMENTS	3
ABSTRACT	4
OVERVIEW	11
Problem Statement	11
Thesis Aim	12
Overview and Structure.....	12
CHAPTER ONE: GRATITUDE	14
Construct Definition.....	15
Individual Differences in Gratitude	24
Relationship between Gratitude and Well-being	25
Well-being Causal Link	28
Theories of Gratitude	31
Conclusion	39
CHAPTER TWO: ATTACHMENT THEORY	40
Attachment System Functions and Normative Processes	40
Attachment Behavioural System.....	41
<i>Attachment hierarchy</i>	43
<i>Attachment transfer</i>	44
<i>Attachment bond markers</i>	45
Working Models of Attachment	45
Attachment System Strategies.....	48
<i>Security-based Strategies of Affect Regulation</i>	53
<i>Secondary attachment strategies of Affect Regulation</i>	55
Attachment System and Affect Regulation.....	58

Attachment System and the Broaden-and-build Cycle of Attachment Security...	60
Individual Differences in Attachment Functioning	62
Individual Differences in Infant Attachment	63
Individual Differences in Adult Attachment.....	64
<i>Developmental and clinical research contributions to attachment theory</i>	<i>66</i>
<i>Social and personality research contributions to attachment theory.....</i>	<i>69</i>
<i>Attachment dimensions and the measurement divide</i>	<i>74</i>
Conclusion	77
CHAPTER THREE: ATTACHMENT AND GRATITUDE.....	79
An Attachment Perspective of Gratitude	79
Research Evidence for Gratitude and Attachment Link	86
Research Design and Scope	91
CHAPTER FOUR: STUDY 1 EXPLORATION OF THE RELATIONSHIP BETWEEN INDIVIDUAL DIFFERENCES IN ATTACHMENT AND GRATITUDE	94
Abstract	96
Methodology	109
Results	112
Discussion	118
Conclusion	127
References	128
CHAPTER FIVE: STUDY 2 INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY ON GRATITUDE USING THE LEXICAL DECISION TASK	139
Methodology	143
Results	148
Discussion	156
Conclusion	162

CHAPTER SIX: STUDY 3 INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY AND GRATITUDE USING THE STROOP COLOUR NAMING TASK	163
Methodology	168
Results	173
Discussion	178
Conclusion	186
CHAPTER SEVEN: STUDY 4 AND 5 INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY AND GRATITUDE AT THE AFFECTIVE LEVEL	188
Abstract	190
Study 1	199
Methodology	200
Results	204
Discussion	206
Study 2	209
Methodology	209
Results	212
Discussion	214
General Discussion.....	216
CHAPTER EIGHT: GENERAL DISCUSSION	236
Review of Thesis Aims and Objectives	236
Summary of Empirical findings	238
Implications.....	242
Conclusion	267
REFERENCES.....	270
APPENDICES	292

LIST OF TABLES

Table 1.	<i>Factor loadings from principal components analysis with oblimin rotation for 28 items from the short version of the Gratitude, Resentment, and Appreciation Test (GRAT) and the Appreciation Scale (AS) (N=608).....</i>	135
Table 2.	<i>Pearson's Correlations</i>	136
Table 3.	<i>Step-wise Hierarchical Regression of Attachment Variables on Trait Gratitude controlling for the effects of Gender, Age, and Trait Positive and Negative Affect.</i>	137
Table 4.	<i>Step-wise Hierarchical Regression of Attachment Variables on State Gratitude controlling for the effects of Gender, Age, and State and Trait Positive and Negative Affect.</i>	138
Table 5.	<i>Study One, Frequencies of Gratitude Related Words by Condition</i>	232
Table 6.	<i>Study One, Frequencies and Percentages of Participants Employing Gratitude Related Words by Condition</i>	232
Table 7.	<i>Study Two, Frequencies of Gratitude Related Words by Condition.....</i>	233
Table 8.	<i>Study Two, Frequencies and Percentages of Participants Reporting Gratitude Related Words by Condition</i>	233
Table 9.	<i>Study Two, A Descriptive table of Means, Standard Deviations, and Sample Size for Gratitude Ratings Scale (Dependent Variable) and Covariates by Prime condition.....</i>	234
Table 10.	<i>Study Two, The Effect of Individual Differences on report of Gratitude Related Words – Likelihood Ratio Tests.</i>	235

LIST OF FIGURES

<i>Figure 1.</i> Shaver and Mikulincer's (2002) model of attachment system activation and dynamics.....	50
<i>Figure 2.</i> Bartholomew and Horowitz (1991) model of adult attachment based on models of self and others.	71
<i>Figure 3.</i> Estimated marginal means of reaction time by prime and target.....	151
<i>Figure 4.</i> Interaction between avoidance and target in the neutral condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait gratitude = 4, ESL= 1.	153
<i>Figure 5.</i> Interaction between avoidance and target in the positive condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait gratitude = 4, ESL = 1.	154
<i>Figure 6.</i> Interaction between avoidance and target in the secure condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait gratitude = 4, ESL = 1.	155
<i>Figure 7.</i> Avoidance Beta parameter estimate by target and condition.....	156
<i>Figure 8.</i> Estimated marginal means plot of Target and Prime on RTs.	174

OVERVIEW

Problem Statement

Gratitude is a positive higher order affect with strong links to multiple indicators of well-being evidenced by correlational (e.g., Wood, Joseph, & Maltby, 2009), experimental (e.g., Froh, Sefick, & Emmons, 2008; McCullough, Tsang, & Emmons, 2004), and intervention studies (e.g., Froh et al., 2008; Lambert, Green, Fincham, & Stillman, 2009; Otsuka, 2012) making it a construct worth studying due to the potential benefits of gratitude on clinical and well-being psychology (Emmons & Mishra, 2011; Wood, Froh, & Geraghty, 2010). However, little is currently known about how trait gratitude develops, or the mechanisms linking trait gratitude or gratitude interventions to well-being (Emmons & Mishra, 2011; Wood et al., 2010). Although some theories have been proposed (see Emmons & McCullough, 2006; Watkins, 2014), the literature lacks an empirically validated theory of gratitude and thus is unable to account for the “how” of the gratitude phenomenon. This thesis proposes that attachment theory (Bowlby, 1969, 1973, 1980), a social cognitive theory of interpersonal functioning containing an account of personality that encompasses affective, behavioural, social, and cognitive processes, can provide a useful framework to study gratitude and help to address this gap in the literature.

It is proposed that attachment processes are linked to gratitude and may play a role in trait gratitude development.

Thesis Aim

The primary aim of this thesis is to help address the uncertainty surrounding the development and origin of the gratitude by using attachment theory as a framework and empirically testing the premises provided by an attachment account of gratitude.

Overview and Structure

The thesis begins with a literature review of what is known about gratitude. Chapter 1 describes what is known about the construct including definitions of gratitude as an emotion and as a trait. It presents a review of the research evidence associated with gratitude and well-being and discusses the current limitations in the field regarding trait gratitude. Finally it makes an argument for the need to study the development of trait gratitude and suggests approaching this study using a theory of interpersonal functioning, particularly Attachment Theory.

Chapter 2 details Attachment Theory and describes how it relates to interpersonal functioning. This chapter focuses on attachment theory and describes basic premises, working models, attachment strategies, attachment measures, affect regulation, and the broaden-and-build cycle of attachment security. The chapter provides a review of the evidence base for attachment theory and the account of interpersonal functioning.

Chapter 3 provides an analysis of the theoretical link between attachment processes and gratitude and reviews the available research evidence for the association between the two constructs. This is followed by articulation of the research design, aim, hypotheses, methodology, and the sample of the research program.

Chapters 4 to 7 presents the empirical investigations conducted to address the research questions and hypotheses of the research program. Chapter 4 details the cross-sectional analysis of the relationship between individual differences in attachment processes and state and trait forms of gratitude, providing a test for the viability of the attachment framework of gratitude. Chapters 5 and 6 contain two experimental studies that test the causal link between attachment security and gratitude using subliminal affective priming technique focused at the cognitive information processing level. Specifically, Chapter 5 presents a Lexical Decision Task paradigm in a within subjects design where participants were exposed to all experimental conditions. Chapter 6 presents a different paradigm, the computerised Stroop Task with a between subjects design where participants were randomly assigned to one of three experimental conditions. Chapter 7 presents two studies with independent samples that tested the causal link between attachment security and gratitude using an affective priming technique at the affective level of experience.

Chapter 8 revisits the aims and hypotheses of the research program, integrates the findings from the thesis and discusses the implication of the research.

It should be noted that the empirical chapters consists of two formats with Chapter 4 and Chapter 7 diverging from the typical thesis format and rather presented in APA manuscript form in preparation for the submission for publication. As manuscripts prepared for publication, these manuscripts are written so that they can be stand-alone documents and as such, some repetition of the information covered in the literature review sections is present.

CHAPTER ONE

GRATITUDE

“Gratitude is not only the greatest of virtues, but the parent of all others.”

Cicero

Gratitude is widely considered to be a key personal and interpersonal virtue (Emmons & Crumpler, 2000). Historically it has predominantly been considered in theological and philosophical teachings and is perceived to be a positive state that is highly desirable and worth pursuing. Given this, it is surprising to find that gratitude has been largely neglected in the psychology literature. It was not until the 20th century with the rise of the positive psychology movement that we have begun to explore the construct itself (Emmons & Crumpler, 2000; Howells, 2012; McCullough, Emmons, Kilpatrick, & Larson, 2001; McCullough et al., 2004).

Prior to the positive psychology movement, psychology was predominantly concerned with improving functioning through understanding and mastering psychopathy and dysfunction. However, we now understand that improved functioning does not necessarily equate to well-being, happiness, or life-satisfaction. Indeed, research indicates that positive and negative affect are not opposite states and are not mutually exclusive (Cacioppo & Gardner, 1999), and well-being is not the absence of mental-illness (Ryan & Deci, 2001). In fact, it appears that the "good life" is characterized by the presence of positive psychological attributes.

The positive psychology movement has brought about a paradigm shift in psychology on the understanding of human functioning. Importantly, it facilitated the shift in

understanding that well-being involves not only the absence of dysfunction but also a presence of positive elements in one's life (Seligman & Csikszentmihalyi, 2000; Seligman, Steen, Park, & Peterson, 2005). Positive psychology attempts to strengthen understanding of all positive elements of human functioning providing an added pathway towards achieving well-being (Seligman & Csikszentmihalyi, 2000; Seligman et al., 2005; Vella-Brodrick, 2013). Researchers have found that gratitude is consistently linked with well-being and life-satisfaction, and is a protective factor against mental health deterioration (see Wood, Froh, & Geraghty, 2010). It has been established that gratitude is a construct that is unique and different from other studied traits (e.g., McCullough et al., 2004; Wood, Maltby, Stewart, & Joseph, 2008), and that it offers value in the study of positive and clinical psychology (Wood et al., 2010). The following section will review and detail what is currently known about the psychology of gratitude including construct definition, trait and personality, well-being, research on interventions, and current theories of gratitude.

Construct Definition

Gratitude is a positively valenced emotion that is experienced as a mixture of admiration, joy (Ortony, Clore, & Collins, 1988), contentment, pleasant surprise (Emmons & McCullough, 2003), appreciation and thankfulness (Adler & Fagley, 2005; Emmons & Crumpler, 2000). Research has shown that gratitude is elicited when there is a perception that a positive outcome has occurred to the self which was bestowed by an external source that is well intentioned (e.g., Tesser, Gatewood, & Driver, 1968). As such, the determinants of the gratitude emotion are attribution based and embedded within the interpersonal context.

Contextual Determinants of Gratitude

Contextual determinants of gratitude have been consistently identified as involving the interplay between a benefactor, a beneficiary and a gift, (e.g., Emmons & McCullough, 2006; Ferrucci, 2006; Tesser et al., 1968; Tsang, 2007; Wood, Maltby, Stewart, Linley, & Joseph, 2008). Researchers have shown that the intention of the benefactor, value of gift, and cost to the benefactor for providing the gift influence whether feelings of gratitude are elicited and the degree of gratitude experienced (Tesser et al., 1968; Wood et al., 2010). Research indicates that feelings of gratitude are positively correlated with the value of the gift, cost to the benefactor, and genuine intentions of the benefactor. In other words, the higher the value of the gift, the higher the cost to the benefactor, and the more genuine the intentions of the benefactor, the more intense the feelings of gratitude.

Subsequent research findings indicate that the benefactor can be an abstract impersonal entity, such as god (Solomon, 1977) or a nonhuman entity such as animals (Teigen, 1997). Additionally, the gift may be either material or nonmaterial (Emmons & McCullough, 2003). In fact, some research findings show that individuals still experience grateful emotions towards an external source for the attempt to provide a benefit, even if the attempt is unsuccessful and no benefit is received (Emmons & McCullough, 2006). Overall, there is consensus among gratitude researchers that the gratitude emotion is influenced by these specific contextual factors. However, contextual factors are inferior to individual attribution styles in eliciting feelings of gratitude (Wood et al., 2008).

Individual attributions and perceptions of contextual factors have been found to be pivotal in determining feelings of gratitude. Tesser and colleagues (1968) found that feelings of gratitude varied depending on the individual's attribution of the intention of the

benefactor, the perceived cost to the benefactor, and the perceived benefit to the self. Wood and colleagues (2008) found that personal appraisal of contextual factors explained 83% of variability in feelings of gratitude. They found that individual attribution styles significantly influence interpretation of contextual factors and impact on the arousal of feelings of gratitude. Specifically, their findings indicate that people who tended to feel grateful had an attribution style that increased the perception of cost to the benefactor, value of gift, and genuine intentions of the benefactor, leading the individual to be more likely to feel grateful than typical individuals. Thus, feelings of gratitude seem primarily dependent on the individual's perception of the context rather than the context itself. In particular, the perception of a benefit received from an external source with genuine intention is required to elicit feelings of gratitude. In summary, evidence suggests that gratitude is a positive emotion that is attribution dependent and is embedded within an interpersonal, external context.

Gratitude as a Higher Order Affect

Emotion

A number of studies have shown that the gratitude emotion is a higher order affect containing three levels of experience, as conceptualised by Rosenberg (1998): Trait, Mood, and Emotion (McCullough, Emmons, & Tsang, 2002; McCullough et al., 2004; E. L. Rosenberg, 1998). According to Rosenberg, an emotion, when activated, overwhelms consciousness and occupies the foreground of mental awareness. The gratitude emotion constitutes the pure mixture of positive emotional experience described earlier, such as joy and pleasant surprise. The state level of emotional experience (Also referred to as

"emotion") is characterized by "acute, intense, and typically brief psychophysiological changes that result from a response to a meaningful situation in one's environment" (Rosenberg, 1998, p.250). Like other emotions, gratitude is elicited from appraisals which can be quick, automatic and non-conscious assessments of the relevance of a stimulus situation (Lazarus, 1999). Emotions, such as gratitude, tend to demand one's attention, motivating specific action to deal efficiently with life-relevant situations (Ekman, 1992; Lazarus, 1991; Levenson, 1994). Accordingly, McCullough and colleagues (2001) posited that the gratitude emotion may be associated with motivating action towards "contributing to the welfare of the benefactor (or other third party) in future" (p.252).

There is evidence to suggest that gratitude acts to motivate prosocial behaviour to create benefit for others (Bartlett & DeSteno, 2006; Tsang, 2006). For instance, Tsang found that participants who received a favour from another reported feeling more gratitude and exhibited more helping behaviour than participants who received a chance positive outcome. Over three experimental studies, Bartlett and DeSteno examined the effect of feelings of gratitude on prosocial behaviour using interpersonal emotion inductions and request for assistance. They demonstrated that feelings of gratitude increased participants' efforts to assist the benefactor even when such efforts were costly (Bartlett & DeSteno, 2006). Furthermore, this effect was uniquely due to the effect of gratitude rather than positive affect in general.

Mood

The mood level of affective experience is defined by Rosenberg (1998) as "affective states that occupy an intermediate terrain between the affective traits and emotion states"

(p. 250). Moods are "transient states" which "wax and wane, fluctuating throughout or across days" (p.250) (Clark, Watson, & Leeka, 1989; Hedges, Jandorf, & Stone, 1985) and generally last longer than emotion states. McCullough, Tsang, and Emmons (2004) described mood as comprising of "a stable component that is attributable in part to individual differences among persons" but "also varies across days as a function of the events that occur to people each day and their discrete emotional reactions to those events."

(p. 296). McCullough and colleagues conducted two studies (Study 1: N = 96; Study 2: N=112) to explore gratitude in daily mood and assess how the different levels of the gratitude affect interact. Participants were asked to complete a daily mood diary for 21 days where the amount of gratitude was measured based on participants average score on three gratitude-related emotion words (grateful, thankful, and appreciative). One month after completing the 21-day diary, participants were asked to complete the Gratitude Questionnaire 6-item Scale (McCullough et al., 2002) to measure their trait gratitude. The researchers found that daily gratitude mood was associated with a number of positive affective traits and for those who reported having gratitude moods (gratitude levels higher than typical of their own personal experience), they experienced more episodes of gratitude emotions, more intense gratitude per episode, and more people that they were grateful to, compared to their normal state. McCullough and colleagues (2004) explained that moods "have broad, pervasive effects on consciousness that emotions cannot because of their relatively short duration." Moods are also known to exert a threshold influence on emotion elicitations (Rosenberg, 1998). Therefore, when one is in grateful mood, one is more likely to experience feelings of gratitude than when one is not in a grateful mood.

Trait

The trait form of gratitude has received a significant amount of attention due to its association with a variety of factors associated with well-being. Rosenberg (1998) proposed that affective traits are "stable predispositions toward certain types of emotional responding" and are "enduring aspects of our personalities" (pg. 249). Affective traits tend to "predispose one to emotions that are congruent with that trait and not to trait-incongruent emotions" (pg. 249). Thus, deriving from what is known about gratitude emotion, a trait form of gratitude would be associated with more positive emotional experiences and prosocial behaviours. Evidence suggests that a trait form of the gratitude affect does exist. For example, McCullough and colleagues (2002) found that people who experienced gratitude frequently and intensely for long periods tended to experience more gratitude in the future. Further, they reported that gratitude uniquely accounted for a host of constructs related to well-being, prosociality and spirituality after controlling for variance explained by the Big Five personality taxonomy. A number of studies report evidence indicating that trait gratitude is distinct but related to other trait-like measures of emotions such as dispositional happiness, vitality, optimism, hope, depression, anxiety, and envy (Adler & Fagley, 2005; McCullough et al., 2002; Watkins, Woodward, Stone, & Kolts, 2003).

Trait construct

There are currently three lines of research on trait gratitude, each with their own definition, operationalisation of the construct, and corresponding measurement scales. Watkins, Woodward, Stone, and Kolts (2003) defined trait gratitude as the "predisposition to experience gratitude" where gratitude refers to "a feeling of thankful appreciation for

favours received" (p. 432). McCullough, Emmons and Tsang (2002) defined trait gratitude as "a generalised tendency to recognise and respond with grateful emotion to the roles of other people's benevolence in the positive experiences and outcomes that one obtains." (p. 112). Adler and Fagley (2005) defined trait appreciation as "acknowledging the value and meaning of something (such as) an event, a person, a behaviour, an object, and feeling a positive emotional connection to it." (p. 81). Even though these are different definitions, with Adler's and Fagley's (2005) definition as the broadest among the three, all three definitions are rather similar and largely overlap. Specifically, all three definitions describe a trait tendency to experience grateful emotions that derive from perceiving a positive outcome arising from an external source.

The approaches differ mainly in their construct operationalization and corresponding measurement scales. Watkins and colleagues (2003) posited that three factors characterised trait gratitude: appreciation of people; appreciation of life; and absence of feelings of deprivation (also known as sense of abundance); They developed the Gratitude, Resentment, and Appreciation Test (GRAT) containing items that measured these factors to capture trait gratitude. McCullough and colleagues instead argued that trait gratitude is characterised by the span, frequency, intensity and density in which individuals experience gratitude. That is, gratefully inclined persons would feel more intensely grateful than someone less disposed in the same situation (intensity), report more gratitude experiences in a day compared to someone less disposed (frequency), and report gratitude for more life circumstances (span) and more people that they feel grateful for (density). They subsequently developed the Gratitude Questionnaire 6 item Scale (GQ6) which reflected these elements. In contrast, Adler and Fagley (2005) examined trait appreciation and

classified it as a multidimensional construct involving the contribution of eight dimensions: awe, ritual, present moment, self/social comparison, gratitude, focusing on what we have ("have" focus), loss/adversity, and interpersonal. Adler and Fagley developed a measure of trait appreciation, the Appreciation Scale, which contained items that corresponded to these eight dimensions. Even though the characteristics outlined for trait gratitude and appreciation by each operationalisations are varied, they appear to represent different dimensions of a higher order gratitude construct. For instance, McCullough and colleagues' characterisation focuses on the dimension of experience, whereas Watkins and colleagues' operationalisation focus on the content or object of appreciation. Adler's and Fagley's operationalisation appear to overlap with the other two and also contain added dimensions such as behavioural repertoire (e.g., ritual), and cognitive style (e.g., present moment, "have" focus).

Wood and colleagues (2008) conducted factor analyses on the three measurement scales and found results suggesting that the scales each tap into a higher order gratitude construct. They found that the higher order construct encompassed the complete breadth of the people and events with which people report feeling gratitude towards. More importantly, the pattern of results from all three conceptualisations has been almost identical, providing convergent evidence for the existence of the higher order gratitude construct. Specifically, gratitude, represented via all three scales, was shown to be correlated positively with extraversion and agreeableness, and negatively with neuroticism (Wood et al., 2008). Research indicates that people high on trait gratitude report higher positive affectivity and well-being and differ from the normal population on prosociality and spirituality (Wood et al., 2010). Given the results indicating that these measures appear

to represent a higher order gratitude construct, there is a general consensus among gratitude and appreciation researchers that these measures tap into a higher order construct and as there are more studies using the gratitude term, “gratitude” has won out as the typical term used to refer to the underlying gratitude/appreciation construct.

After reviewing the research evidence of the higher order gratitude construct, Wood, Joseph, Lloyd, and Atkins (2009) argue for a "life orientation" definition of gratitude where trait gratitude reflects a "worldview towards noticing and appreciating the positive in the world." (p.443). They explained that the gratitude "life orientation" uniquely orients attention to noticing and appreciating the positive in life which contrasts from other positive life orientations. For example, optimism orients one to expecting positive future outcomes and hope orients attention to pathways where positive outcomes can be achieved (Geraghty, Wood, & Hyland, 2010). Wood and colleagues (2009) pointed out that well-being is dependent on how people interpret situations and evidence indicates people low on well-being attribute their successes to causes that are uncontrollable, short-lived, and due to external factors (Abramson, Seligman, & Teasdale, 1978). A life orientation formulation of gratitude better explains the link between gratitude and well-being because the explanation of trait gratitude reflecting an appreciation of others would suggest an external locus of control where positive outcomes are attributed to external factors and not under one's control. This is less compatible with well-being than the life-orientation formulation of trait gratitude (Wood et al., 2010).

The "life orientation" conceptualisation of trait gratitude not only accounts for the higher order gratitude construct identified by Wood and colleagues (2008) but also addresses the limitations of the narrower definitions of trait gratitude. For example,

Watkins and colleagues' (2003) and McCullough and colleagues' conceptualisations do not account for feelings of gratitude that arise from nontangible sources such as feeling grateful "to be alive". Graham and Barker (1990) found results that indicate people can also feel grateful for internal sources like one's ability. Further, other researchers found that feelings of gratitude extend beyond interpersonal appreciation of others (Veisson, 1999; Weiner, Russell, & Lerman, 1979). Overall, there is evidence to support the "life orientation" approach of trait gratitude.

Individual Differences in Gratitude

Research on individual differences in trait gratitude can be broadly divided into four domains: personality, wellbeing, social relationships, and physical health. A large body of evidence has amassed indicating a strong positive relationship between gratitude and all aspects of well-being (Wood et al., 2010)

Personality Trait

Trait gratitude has consistently been shown to be related to a host of positive personality traits. With regard to the Big Five, grateful people are more extroverted, agreeable, open, conscientious, and less neurotic (McCullough et al., 2002, 2004; Wood, Maltby, Gillett, Linley, & Joseph, 2008; Wood, Maltby, Stewart, & Joseph, 2008). Additionally, Wood, Joseph, and Maltby (2008, 2009) found that gratitude correlated with traits associated with positive emotional functioning, lower dysfunction, and positive social relationships. Grateful people tended to be less angry, hostile, depressed or emotionally vulnerable, and experienced positive emotions more often. Further, trait gratitude is correlated with traits associated with gregariousness, positive social functioning, activity

seeking, trust, emotional warmth, altruism and tender-mindedness (McCullough et al., 2004). Additionally, grateful people were higher on openness to feelings, ideas, and values, had greater competence, dutifulness, and achievement striving (Wood et al., 2010). Overall, research shows that gratitude is linked to traits that are adaptive, facilitative of positive relationships, and associated with well-being and positivity.

Relationship between Gratitude and Well-being

The gratitude research literature abounds with studies linking gratitude to well-being factors. For example, gratitude has been shown to be robustly related to emotional functioning (also known as subjective well-being) which is characterized by high positive affect, low negative affect and high life satisfaction (e.g., Froh et al., 2008; Gallup, 1999; Joseph & Wood, 2010; Kashdan, Uswatte, & Julian, 2006; McCullough et al., 2004). Gratitude is negatively associated with psychopathology, particularly depression, (Fredrickson, Tugade, Waugh, & Larkin, 2003; Kendler et al., 2003; Wood, Maltby, Gillett, et al., 2008), generalized anxiety disorder, nicotine dependence phobia, alcohol dependence, drug "abuse" or dependence (Kendler et al., 2003), body image problems (Geraghty et al., 2010), Trauma and Post Traumatic Stress Disorder (e.g., Davis, Nolen-Hoeksema, & Larson, 1998; Frazier, Conlon, & Glaser, 2001; A. K. Gordon, Musher-Eizenman, Holub, & Dalrymple, 2004; Joseph & Linley, 2005; Kashdan et al., 2006; Linley & Joseph, 2004; Peterson & Seligman, 2003). Gratitude is positively linked to eudemonic well-being (the pursuit of personal growth and transcendence (Ryff, 1989; Waterman, 1993)) variables such as job satisfaction (L. Waters, 2012) increased engagement in learning, more fastidious use of time (Howells, 2004, 2012), autonomy, personal growth,

environmental mastery, life purpose, and self-acceptance (Wood, Joseph, & Maltby, 2009). Finally, gratitude is robustly linked to positive relationships (e.g., peer-report: Algoe, Haidt, & Gable, 2008; Emmons & McCullough, 2003; Self-report: Wood, Maltby, Gillett, et al., 2008) and the factors needed for the development and maintenance of positive relationships such as relationship intimacy (Murray & Hazelwood, 2011), perceived social support (Froh, Yurkewicz, & Kashdan, 2009; Kashdan, Mishra, Breen, & Froh, 2009), conflict resolution (Baron, 1984), increased reciprocity (Tsang, 2006), willingness to forgive (DeShea, 2003), low levels of narcissism (Farwell & Wohlwend-Lloyd, 1998) and the absence of psychopathic traits (Maltby et al., 2008).

Gratitude Interventions

Apart from the plethora of correlational studies exploring the association between gratitude and well-being, there is also evidence from experimental methodologies showing that gratitude interventions lead to increased well-being both in the clinical (Duckworth, Steen, & Seligman, 2005; Froh et al., 2008; McCullough et al., 2004; Seligman, Rashid, & Parks, 2006) and normal (e.g., Froh et al., 2008; McCullough et al., 2004) population.

Interventions in general are fundamentally based on reframing techniques involving participants doing daily or weekly exercises that encourage participants to count their blessings. Gratitude interventions fall under three broad categories: daily listing of things that one is grateful for; grateful contemplation; and behavioural expressions of gratitude. The most popular and widely used intervention is the gratitude lists. They are the "classic" gratitude intervention and are the easiest to use and administer. Participants often report enjoying the exercise, finding it self-reinforcing, and often choose to continue the exercise

afterwards (Seligman, 2005; Wood et al., 2010). Evidence suggests that, in the on-line, self-help domain, gratitude list interventions are as effective as cognitive therapy techniques but with significantly better retention rates (see Wood et al., 2010 for review). Further, research has shown that the positive effects of the lists can last as long as six months from two weeks of treatment (Seligman et al., 2005).

Evaluation of Gratitude Interventions

Gratitude has been promoted as arguably the most successful positive psychology intervention to date and it is one that can be applied widely, even on a national scale (G. Bono, Emmons, & McCullough, 2004; Duckworth et al., 2005; Seligman et al., 2006, 2005; Wood et al., 2010). However, it should be noted that the gratitude intervention studies are not gold-standard treatment studies. There is a lack of randomised controlled trials for gratitude interventions and the existing studies use varying types of controls, complicating interpretations of treatment effects. For example, control groups across studies differ. They include listing hassles, listing five events that have impact, listing events that one was unable to do in summer, writing about typical things that occurred in the day. Further, some studies showed that the gratitude effect was only different from the hassles condition but no other conditions (Emmons & McCullough, 2003; Froh et al., 2008; Sheldon & Lyubomirsky, 2008). In fact, only a small number of studies have shown that gratitude was effective compared to genuine controls. Of note, Sin and Lyubomirsky (2009) conducted a meta-analysis of positive psychology interventions and found that the interventions were most effective against no-treatment controls, less effective compared to "treatment as usual controls", and less effective than conditions labelled as placebo. These limitations reduce

the level of confidence with which one can interpret the findings regarding gratitude interventions.

Nevertheless, gratitude is strongly related to well-being and because gratitude interventions are easy to administer, easy to complete and enjoyable to participate in, the intervention is viewed as a strong candidate for use in the clinical setting (Wood et al., 2010).

Well-being Causal Link

Although there is robust evidence linking gratitude and well-being, the direction of causality between gratitude and well-being is still relatively unclear because the majority of the research into gratitude has been cross-sectional. Moreover, some critics are cautious about the results of gratitude intervention studies and argue that it is not clear from these studies whether the observed increase in well-being is related to gratitude or to common mechanisms related with psychosocial interventions (Kirsch, 2005; Wampold, 2007). That being said, there is increasing evidence from experimental designs that suggests gratitude leads to well-being (e.g., Froh et al., 2008; Seligman et al., 2005). Some longitudinal studies have provided evidence that gratitude is a precursor of well-being. For example, Wood, Maltby, Gillett et al., (2008) studied the relationship between gratitude and well-being in first year undergraduate students over a period of 3 months, from the start and end of their first term. They examined four possible models: 1. Gratitude leads to well-being; 2. Well-being leads to gratitude. 3. Mediated effects and 4. Reciprocal models where gratitude leads to well-being and well-being leads to gratitude. They conducted two studies and only the first model was supported. People with higher gratitude levels were less stressed, less

depressed, and had higher perceived social support at the end of the first term. They concluded that the gratitude trait may contribute to resilience in life transitions. Of note, gratitude levels did not change over the three month period and this was interpreted to mean individual differences in gratitude represent stable phenomena like schematic processing (Baldwin, 1992; Wood, Maltby, Gillett, et al., 2008). More recently, in an attempt to examine how gratitude treatments work, Watkins, Uher, and Pichinevskiy (2015) conducted a randomized controlled trial to test how gratitude lists enhanced well-being. They found that the gratitude list condition significantly outperformed comparison treatments (memory placebo and pride listing). Further, the authors found that people in the gratitude condition continued to report increases in well-being beyond the treatment week. Additionally, the study found that people in the gratitude condition showed greater accessibility of positive memories than the comparison conditions. The researchers argued that the results suggest that gratitude intervention may lead to well-being through by the training of cognitive biases facilitative of subjective well-being.

Theory of link between Gratitude and Well-being

Wood and colleagues (2010) observed that the link to well-being may be different for trait gratitude and gratitude interventions. They noted that the positive impact of gratitude interventions on well-being is well documented but it is not known what mechanisms are at work that causes gratitude interventions to have the positive effect on well-being. Further, we cannot make the conclusion that gratitude interventions that lead to increased well-being are directly related to increases in gratitude levels because these are not specifically measured. One exception was Emmons and McCullough (2003; study 3) who demonstrated

that increases in positive affect associated with gratitude list intervention (relative to no-treatment controls) were mediated by changes in average daily gratitude across the intervention period. Further, decreases in negative affect found in the gratitude condition, relative to the no-treatment condition, were not mediated by gratitude levels. This suggests that well-being factors that are affected by gratitude interventions are not linked to gratitude emotion levels. It is possible that the mechanisms are related to non-specific common therapy factors (Wampold, 2007; Wood et al., 2010) or perhaps general changes in life outlook (Wood et al., 2010). The lack of certainty about the effective ingredient in gratitude interventions does not negate the value of gratitude interventions on clinical outcomes. Further research is needed to determine the exact reason gratitude interventions are effective

Incremental Validity of Gratitude

A number of studies have shown that the relationship between gratitude and well-being remains when other variables are controlled for. For example, Froh and Kashdan et al., (2009) and Froh and Yrkewicz et al. (2009) found a unique relationship between gratitude and well-being in youths after general positive affect was controlled. Further, gratitude has been shown to be uniquely related to well-being and social relationships, controlling for the Big Five traits. These result suggests that trait gratitude captures unique variability in well-being (McCullough et al., 2002, 2004; Wood, Maltby, Stewart, Linley, et al., 2008). More specifically, Wood, Joseph, and Maltby (2008) found that gratitude predicted 8% of individual differences in satisfaction with life ($r = .28$) controlling for the 30 facets of the Big Five. Gratitude predicted between 2% to 6% of personal growth ($r =$

.16 and .25), positive relationships with others, self-acceptance, and purpose in life (Wood, Joseph, & Maltby, 2009).

An incremental validity of $>.15$ indicates a "reasonable contribution" to the field (p.451) (Hunsley & Meyer, 2003). Additionally, often effect sizes reported in the literature contain shared variance. Because the effect sizes reported for gratitude above are unique, this suggests that the effect size is of a substantial magnitude for subjective and eudemonic well-being. These results indicate that the relationship between gratitude and well-being is unique and worth consideration and further research.

Theories of Gratitude

Thus far, the gratitude literature has developed an understanding of the emotional component of gratitude, the contextual determinants of gratitude and has begun to develop an understanding of the profile of trait gratitude. The empirical literature on the description and measurement of gratitude has been very useful in developing our understanding of this important social emotion. However, there is little research investigating the origins and development of the grateful disposition, despite some speculation in the literature (e.g., Algoe, 2012; Emmons & McCullough, 2006; Fredrickson, 2004; Watkins, 2014; Wood, Maltby, Stewart, & Joseph, 2008; Wood, Maltby, Stewart, Linley, et al., 2008). Specifically, we do not know how trait gratitude is linked to well-being, or what mechanisms are involved in increasing well-being for those who complete the simple gratitude interventions. We have very limited understanding because there are few empirically validated theories of gratitude and we lack empirical research and information on this matter.

There are currently five known theories of gratitude that have some empirical data for support, two of which focus on the function of gratitude and the rest focused on explaining the link between gratitude and well-being. They are the find-remind-and-bind theory of gratitude (Algoe, 2012), the Broaden-and-Build Hypothesis (Fredrickson, 2004), the Schematic Hypothesis (Wood, Maltby, Stewart, Linley, et al., 2008), the Coping Hypothesis (Wood, Maltby, Stewart, & Joseph, 2008), and the Positive Affect Hypothesis. These hypotheses have only been proposed relatively recently and thus lack rigorous empirical support.

Schematic Hypothesis

Wood, Maltby, Stewart, Linley and colleagues (2008) found results that suggest grateful people have schematic biases in viewing help as more beneficial to them leading to increased gratitude. They suggested that specific schema biases influence how grateful people interpret help giving situations and that gratitude is related to well-being through schematic processing. They found that grateful people perceived the help as of higher cost to the benefactor, that the help was more valuable to them and that the benefactor was more altruistic and genuine than did non-grateful people. This perception bias fully mediated the relationship between trait gratitude and state gratitude (the amount of gratitude experienced following help). These findings were replicated in two other studies including an experimental study which examined whether the determinants of gratitude were directly manipulated (i.e. cost, value, and altruism). The other study involved participants keeping a daily diary of real events that occurred to them for 14 days. The authors concluded that the results indicate that grateful people have characteristic schemas which influence their

interpretations of the help giving situations. These results were consistent with those of Markus, Smith, and Moreland's (1985) who found that people generally have biases towards interpreting other people's intentions and behaviours as similar to their own. A limitation of this approach is that it does not offer an explanation for how grateful people develop these schema biases.

Coping Hypothesis

Wood and colleagues (2007) proposed that coping strategies preferred by grateful people may explain the link between gratitude and well-being. Specifically, grateful people use positive coping strategies that lead them to have better well-being. In their study, they found that gratitude was related to three categories of coping. Specifically, grateful people are more likely to seek out instrumental and emotional support in times of stress; they tend to approach problems rather than avoid them and attempt to deal with the problem. Finally, grateful people are less likely to disengage and use maladaptive coping strategies such as substance abuse. These strategies relate to lower self-blame, proactive problem solving strategies, effective reframing, and personal growth. These coping strategies mediated 51% of the relationship between gratitude and stress. This is consistent with the finding that stress levels relate to the interaction between perceived situational threat and perceived coping resources/abilities (Lazarus & Folkman, 1984).

Evidence suggests that grateful people make more positive coping appraisals which lead to lower stress levels (Lazarus & Folkman, 1984). However, coping did not mediate the relationship between gratitude and happiness, depression or life satisfaction. These findings indicate that coping mechanisms provide a partial explanation for the relationship

between gratitude and well-being through the impact of stress but that other mechanisms may explain the relationship between gratitude and other aspects of well-being. Therefore, the coping hypothesis is only a partial explanation of the relationship between gratitude and well-being.

Positive Affect Hypothesis

This approach proposes that gratitude is linked to well-being due to its positive valence. Specifically, it is argued that people who experience gratitude are habitually exposed to more positive emotions which is protective against mental illness and that grateful people tend to be more satisfied with life and happy because they experience more positive emotions than negative emotions (Diener, 1984). A number of studies have shown that habitual experiences of positive emotions are protective factors in mental disorders (Watson & Naragon-Gainey, 2010). There is also a large body of evidence that shows gratitude is a positively valenced emotion (Gallup, 1999) which is strongly associated with habitual experiences of positive emotion (e.g., Baron, 1984; Froh, Kashdan, et al., 2009; Naito, Wangwan, & Tani, 2005). Further, gratitude is a positive emotion which is pleasant to experience. The more gratitude one experiences, the more often one experiences positive emotion, and the hedonic balance of positive affect compared to negative affect which leads to more life satisfaction (Wood et al., 2010). Finally, gratitude also arises from a positive experience and therefore tips the balance of emotional state to a positive emotional state and thus increasing life satisfaction (Diener, 1984).

This hypothesis is limited because a number of studies have shown that the relationship between gratitude and well-being extends beyond positive emotions. In other

words, gratitude may overlap with positive emotions due to its positive valence, but it is distinct from positive emotions. Indeed, evidence shows that positive affect is consumed by the Big Five trait agreeableness whereas gratitude is still linked with well-being variables even after controlling for agreeableness (McCullough et al., 2002; Wood, Joseph, Lloyd, et al., 2009; Wood, Maltby, Gillett, et al., 2008; Wood, Maltby, Stewart, Linley, et al., 2008). Infact, positive affect is not linked and does not account for the relationship between gratitude and life satisfaction or eudemonic well-being. Further Additionally, negative affect did not influence the relationship between gratitude and well-being (Wood, Joseph, & Maltby, 2009; Wood, Maltby, Stewart, & Joseph, 2008), indicating that affective valence may offer only a partial link between gratitude and well-being.

Due to interpersonal nature of gratitude, many hypotheses have been proposed relating to gratitude's function in interpersonal relationships (Emmons & Mishra, 2011; Wood et al., 2010). Two dominant theories exist that offer an account of the relationship between gratitude and interpersonal relationships within context of the function of the gratitude emotion.

Broaden-and-Build Hypothesis

The broaden-and-build theory of emotions (Fredrickson, 1998, 2001) suggests that each emotion has a unique evolutionary purpose and discrete function, that negative emotions serve to narrow the focus of attention to facilitate specific problem solving and that positive emotions broaden thought and the scope of attention to foster activities that build resources which can be utilized in future stressful situations (Kashdan & Rottenberg, 2010). Proponents of the broaden-and-build hypothesis of gratitude suggest that gratitude

functions to build social bonds during stress free periods (Fredrickson, 2004). These bonds become additional resources that one could use in times of stress. This is compatible with the schematic and coping hypothesis. A limitation of this approach is that it is not clear how gratitude relates to well-being, although it does point towards social relationships being a mediator.

Find-remind-and-bind theory of Gratitude

This evolutionary theory proposes that gratitude has evolved to strengthen the relationship with a responsive partner (Algoe, 2012) and is important for forming and maintaining significant relationships. Algoe and colleagues argue that the expression of gratitude helps to signal communal relationship norms and facilitate an upward spiral of mutually responsive behaviours between the recipient and the benefactor. Research conducted by Gordon et al., (2012) supports the position that gratitude helps to maintain significant relationships. They found that the expression of gratitude lead to enhanced relationship intimacy and satisfaction. People who were appreciative of their partners were more attentive to their needs and were observed to be more responsive and committed in dyadic interactions with their partner. Some limitations of this theory should be noted. The theory has not yet been tested directly or systematically and lacks the empirical support base. Further, it is not different from the broaden-and-build hypothesis of gratitude which also states that gratitude functions to build social bonds. Where they differ seems to be that the broaden-and-build hypothesis speaks more generally to the social bonding effect of gratitude expression, whereas the find-remind-bind theory focuses on the function of gratitude on significant others and explains the dyadic dynamic processes involved between

the recipient and the benefactor. Lastly, both of these theories only account for the function of the gratitude emotion and but neglect to account for trait gratitude. Overall, the theories presented tend to be a little narrow in scope and only account for specific aspects of gratitude. With applications of gratitude for clinical interventions on the rise, it is important that we improve our understanding of how gratitude is developed and what mechanisms are involved in the relationship between gratitude and well-being.

Need for an Interpersonal Functioning Perspective of Gratitude

The empirical evidence reviewed, shows that feelings of gratitude are determined by the individual's appraisal of the situation and the individual's attribution relating to the intention of the source of the gift (e.g., Tesser et al., 1968; Wood et al., 2008). This indicates that interpersonal attribution styles influence gratitude. As such, it is argued that a theory of interpersonal functioning would then logically be an appropriate start in exploring how gratitude develops. It is further argued that, given that gratitude is an emotion that is grounded in the interpersonal context and is dependent on person attributions (Wood, Maltby, Stewart, Linley, et al., 2008), it may be linked to close interpersonal bonds and processes which are accounted for by attachment theory.

The idea that attachment processes may be linked to gratitude has been touched upon by a number of researchers including Buck (2004), Mikulincer, Shaver, and Slav (2006) and Watkins (2014). Buck conceptualised a developmental-interactionist model of gratitude that he claims is underpinned by attachment to others. He reasoned that gratitude as inherently dyadic and that the authentic experience of gratitude requires attachment because trust, mutual respect, reciprocity, and fairness are required to elicit gratitude. Although

Buck's model seems reasonable and logical, there is not yet empirical data to support it. Similarly, in his review of the gratitude literature, Watkins (2014) showed that there is preliminary evidence suggesting that secure attachment may be important to the development of gratitude (A review of these research findings are presented in Chapter 3). Consequently, Watkins presented the view that attachment security might lead to gratitude because secure individuals are confident in the good will of others and trust that others can meet their needs. He emphasised the importance of attachment security in focusing the individual on the recognition that the goodness of the giver which he thought was the mechanism that leads to the development of gratitude. As with Buck's model, this hypothesis has not been directly empirically tested.

Like Buck (2004), Mikulincer, Shaver, and Slav (2006), and Watkins (2014), this thesis offers that attachment processes likely play an important role in the development of gratitude and is worth investigating further. Attachment processes, in particular the working models of attachment, can account for the presence of the schema biases observed by Wood and colleagues (2008) in grateful people and account for how the biases may have developed. Further the positive coping mechanisms observed in grateful people are typical of those with what are described as 'secure' attachment patterns, suggesting a possible link between attachment and both state and dispositional differences in gratefulness. A more detailed exposition of the hypothesised relationship between attachment and gratitude will be presented in Chapter 3.

Conclusion

This chapter provided a review of what is known of the gratitude construct; a higher order affect that has state, mood, and trait levels. Importantly, it was argued that gratitude is an attribution dependent emotion that is aroused depending on the person's attribution of elements in the situational context, namely the intention of the external source, the value of the gift, and the cost of providing the gift to the benefactor. Gratitude is a positive emotion which is strongly linked to well-being and has been used successfully as an intervention to improve well-being. However, much of what is known about gratitude relates to correlational associations with other constructs and little is known about how trait gratitude develops. Currently there is no satisfactory empirically validated explanation that can account for why there are individual differences in trait gratitude, how trait gratitude is linked to well-being, and how gratitude interventions impact on well-being. This limitation relates to the lack of an empirically validated theory of gratitude. Given gratitude is attribution based and embedded within the interpersonal context, researchers should consider a theory of interpersonal functioning as a framework to study gratitude. It is proposed that attachment theory, a 'grand' theory of interpersonal functioning, is a useful and valid framework to explore the development of gratitude in depth. The next chapter (Chapter 2) presents information on the fundamentals of attachment theory and the evidence base for attachment relating to interpersonal functioning. The following chapter (Chapter 3) will detail the theoretical link between attachment and gratitude and review the related available empirical evidence.

CHAPTER TWO

ATTACHMENT THEORY

Attachment theory is a cognitive behavioural theory of interpersonal functioning originally proposed by John Bowlby (1969/1982, 1973, 1980), extended by Mary Ainsworth (Ainsworth, 1973) and further developed by a growing number of theoreticians and researchers (for examples see Cassidy & Shaver, 2008). The collective works of attachment researchers have formed an extensive theory of interpersonal functioning that encompasses both normative and individual differences in functioning and provides a rich account of processes at work within individual and interpersonal experiences including cognitive, emotional, social and behavioural domains (N. L. Collins & Feeney, 2013). Of particular relevance to the study of gratitude, is the attachment social-cognitive account of emotion regulation and interpersonal functioning. This chapter provides an in-depth review of attachment theory and is divided broadly into two sections. The first covers the fundamentals and normative processes of attachment, particularly detailing the attachment system and how it functions, the attachment system as an emotion regulation system, and the broaden-and-build cycle of attachment functioning. The second section focuses more specifically on the research and evidence base related to individual differences in attachment functioning.

Attachment System Functions and Normative Processes

The following section presents the normative aspect of attachment theory. This part of the theory accounts for attachment processes which applies to everybody. The aim of

presenting this section is to provide a thorough explanation of how attachment works and how it influences our emotion, cognition, and behaviour. Attachment theory originated from John Bowlby's work with children to explain his observations of a pattern of behaviour that he thought reflected an adaptive behavioural system which enhanced survival likelihood and was normative (present within all individuals) (Bowlby, 1969/1982). This section addresses why attachment exists, how it is developed, and how attachment processes work. Specifically it will cover basic concepts in attachment as well as the attachment behavioural system, working models of attachment, attachment system strategies and emotion regulation, and the broaden-and-build cycle of attachment security.

Attachment Behavioural System

Bowlby conceptualised attachment as an evolved, adaptive behavioural system, naturally selected for its ability to enhance the likelihood of survival (Bowlby, 1969). Behavioural systems function to organise and activate behaviours in response to specific cues to achieve set system goals (Bowlby, 1969; Mikulincer & Shaver, 2007a) and the system is deactivated when the goals are met. Attachment is a behavioural system that is activated by the presence of perceived threat or danger and the goal of the system is to seek safety and security by attempting to gain close proximity to caregivers to gain their protection and care (Bowlby, 1969/1982). Once safety and security have been achieved, the system is deactivated, allowing for behavioural systems such as affiliation or exploration to activate (Bowlby, 1969/1982, 1980). The attachment system is present from birth, at a time when humans are highly vulnerable and require significant attention from caregivers for physical protection and basic needs such as nourishment for survival. At this time,

prolonged periods of separation from caregivers can be dangerous and is considered a significant source of threat (Bowlby, 1969/1982).

The attachment system motivates infants to attach or seek proximity to their primary caregiver in order to achieve a sense of security and feelings of safety. Overtime, the child forms an attachment bond to the caregiver which increases its chances of survival by instilling in the caregiver a sense of responsibility and concern for the welfare of the child, and ensures that the infant maintains proximity to the adult. The attachment bond is a special emotional bond that is persistent and emotionally significant. Attachment bonds are argued to be a specific class of affectional tie that reflects a bond between one individual and another (an attachment figure) who is seen as "stronger and/or wiser" (Bowlby, 1973), p.292). The attachment figure is seen as unique and not replaceable with any other (Ainsworth, 1967). The bond is formed over time and is characterised by 4 phases; *preattachment*, *attachment-in-the-making*, *clear-cut-attachment*, and *goal-directed partnership* (Ainsworth, 1973; Bowlby, 1969/1982). *Preattachment* is the first phase in the attachment bonding process and is observed between birth and 2 months of age. In this phase, infants do not have preferences in terms of caregivers and will socially interact and accept care and attention from most people. From 2 to 6 months, the *attachment-in-the-making* phase is active and infants are observed to show preferences for specific caregivers through directing more smiles and vocalisations towards their caregivers. They also settle more quickly in the presence of their caregivers. The *Clear-cut-attachment* phase, active between 6 to 24 months, is characterised by a preference towards caregivers with direct attachment-related behaviours targeted at caregivers such as proximity seeking and separation protest. Infants at this phase, show clear signs of distress and anxiety when

separated from their caregivers. The final phase, *goal-directed partnership*, children, now around 2 years old, are less vulnerable, have developed more skills, become more autonomous and independent and have less need for actual proximity (Hazan, Gur-Yaish, & Campa, 2004; Marvin & Britner, 2008). In this phase, children can tolerate increasing periods of separation and have adapted their attachment behaviours to match with the needs and preferences of their attachment figures. Although attachment bonding formation was first observed in infancy (and described in that context here), the same phases occur in adulthood and across the lifespan (Hazan & Zeifman, 1999; Mikulincer & Shaver, 2007a).

The following subsections describe in further detail the particulars of attachment bonds including how different attachment bonds exist within an attachment hierarchy, how the nature of attachment bonds change with age and developmental phases, and how to recognise the existence of an attachment bond through behavioural markers.

Attachment hierarchy

Within the network of caregivers, there is typically a hierarchy of attachment figures arranged in order of importance, with one *primary attachment figure* at the top who is preferred above all and is relied on first to meet attachment needs (Bretherton, 1985; Mikulincer & Shaver, 2007a) followed by secondary caregivers who are called upon if the primary attachment figure is unavailable. The attachment hierarchy reflects the degree of availability and responsiveness of caregivers to the needs of the child, with the primary attachment figure being the person who most reliably provides care and support and is most responsive to the child's distress (Bennett, 2003; Hazan & Shaver, 1994). The infant shows clear preference for the primary attachment figure and directs attachment behaviours

towards this figure in times of distress (Ainsworth, 1973, 1982). This is referred to as *monotrophy* (Bowlby, 1969/1982), thought to be evolutionarily adaptive because it ensures that one attachment figure assumes primary responsibility for the infant allowing for an efficient and effective response in the presence of environmental threats (Cassidy, 2008).

Attachment transfer

According to Bowlby (1969/1982), changes to the composition and structure of the attachment hierarchy is a developmentally normative process of attachment functioning across the lifespan. As children mature, parents penetrate fewer domains in their life (Ainsworth, 1982; Allen & Land, 1999) and others, such as, peers in adolescence and romantic partners in adulthood, become increasingly more involved, relied on and available to the individual. Consequently individuals adapt by using different attachment figures for different attachment needs, with the majority of people reporting romantic partners being primary attachment figures by adulthood (Doherty & Feeney, 2004; Hazan & Zeifman, 1994).

It is important to note the differences in an attachment relationship between a child and parent and between adults. There are two distinct roles in the child-parent attachment relationship; the caregiver engages in the role of the wiser and more knowledgeable individual who provides the care to the child and the child is the vulnerable individual who requires the care and support; the attachment bond is one-directional. In adult attachment relationships, typically present in romantic relationships, the attachment bond is argued to be bi-directional and reciprocal; both parties can occupy the role of the caregiver and the role of needing care and protection (Hazan & Shaver, 1994). This difference aside, the

attachment system is thought to function in the same way for both childhood and adulthood attachment processes (e.g., Ainsworth, 1985a; Bowlby, 1969)

Attachment bond markers

The attachment relationship is characterised by four markers: *proximity seeking*, *separation protest*, *safe haven*, and *secure base* (Doherty & Feeney, 2004; Hazan & Zeifman, 1994; Mikulincer & Shaver, 2007a). Individuals within an attachment relationship are seen to engage in proximity seeking to be closer to the other (attachment figure) particularly in times of need. They are also seen to protest real or anticipated separation from their attachment figure. The idea of separation from the other, particularly in times of distress, causes feelings of distress and anxiety, and these feelings are soothed by proximity to the other. Attachment figures are also used as a *safe haven*, a third marker of an attachment relationship, as they reliably provide protection, comfort, support and consequently provide the individual with feelings of safety and security. The fourth marker of an attachment relationship relates to the attachment figure acting as a *secure base* where the individual knows that they can go to as a safe haven when distressed. This knowledge allows the individual to feel secure and so they can confidently engage in non-attachment related goals such as exploration (Bowlby, 1969; Mikulincer & Shaver, 2007b).

Working Models of Attachment

As a social cognitive model of interpersonal behaviour, attachment theory describes all modes of experience in the context of attachment including motivation, emotion, cognition, and behaviour. The previous section described the purpose of attachment and the characteristics of attachment bonding. The following section details the cognitive aspect of

attachment, covers the link between cognition and behaviour, and introduces how individual differences in behaviour begin and are maintained.

There are individual differences in the evolution and manifestation of behavioural systems which is a function of the adaptive and responsiveness of the systems to variations in individual environments. Consequently individuals driven by the same behavioural system can behave in different ways in response to the same basic problem (Bartholomew & Horowitz, 1991; Main, 1990). The ability of the attachment system to be adaptive to the environment relies extensively on the functions of stable cognitive representations called 'working models' (Bowlby, 1969). Working models are purported to be the mechanisms that perpetuate attachment patterns of behaviour and maintain attachment continuity from infancy into adulthood. Specifically, working models provide scripts for what to expect in attachment related interactions, and act as an aid to judge and guide behaviour in the social environment (Mikulincer & Shaver, 2007a). Novel attachment experiences are interpreted and processed against expectations created from previous attachment relationships. These are the process in which mental representations contribute to the continuity of attachment patterns of behaviour (Holmes, 1993). Continuity is achieved through a complex transactional process (Lyddon & Sherry, 2001) where models continually undergo the schematic processes of assimilation and accommodation of new information and experiences. Working models formed from early attachment relationships tend to persist into adulthood if they are confirmed by the same encounters of attachment relationships as in infancy (Bowlby, 1973).

Bowlby (1969) argued that attachment experiences are organised into two broad working models: the model of self and the model of others. The model of self contains

information regarding the self in attachment interactions and provides a basis for the evaluation of self-worth and self-efficacy. The model of others encodes the behaviour and responses of others in attachment related interactions. This model contains expectations of how others behave in attachment related interactions, which allows the individual to prepare a behavioural repertoire to best achieve felt security. These models contain information relating to the responsiveness and trustworthiness of attachment figures and perception about self-worth. Importantly it is these working models that manifest individual variability, and form the basis of attachment continuity (Bowlby, 1977; Mikulincer & Shaver, 2007a).

There is substantive evidence demonstrating that working models manifest in attachment related patterns of behaviour. For example, Bretherton and Munholland (1999) and Main and colleagues (1985) were able to demonstrate that working models were directly linked to the three attachment styles identified by Ainsworth and colleagues (1978). Specifically, they found that working models guided general expectations about self-worth and supportiveness of others. That is, secure children were found to expect that others are responsive and available and that they are worthy of love and support. Those with an insecure internal representation more often felt undeserving of comfort and closeness, and perceived the world as a hostile and unwelcoming environment.

The following section describes how the attachment system is activated and deactivated and details the thoughts, emotions, and behaviours that are elicited depending on a person's perceived environmental and interpersonal context. This section helps to explain the scope of attachment behaviour that is available depending on the attachment strategies taken and illustrates the emotional environment associated with each strategy.

Attachment System Strategies

The attachment system is a dynamic, adaptive system that is activated when a threat to self is perceived. The goal of the attachment system is to seek a sense of safety or feelings of security in times of physical or psychological threat through proximity seeking (Bowlby, 1969). According to Shaver and Mikulincer (2002), once the system is activated an individual proceeds through a series of decisions leading to the selection of an appropriate coping strategy that matches the context they find themselves and which depends on the availability and responsiveness of attachment figures in supporting them in times of need (see Figure 1). The following section details the dynamics of how the attachment system operates and how these translate to observable individual differences in interpersonal functioning.

Shaver and Mikulincer (2002) detailed three stages of attachment system activation (see Figure 1). The first involves monitoring and appraising the environment for threatening events. If a threat is perceived and distress is felt, the attachment system is activated, moving the individual into the second stage where the goal is to achieve feelings of security. The second stage contains security-based strategies where one seeks proximity to attachment figures who can provide support and relief when feeling threatened and thus satisfy attachment needs. Attachment figures can also facilitate the building of internal resources and broaden thought-action repertoires. In this stage, individuals monitor and appraise the availability and responsiveness of attachment figures with regard to their bids for proximity and support. Available and responsive attachment figures are able to respond to these bids, provide support and a sense of security. If this occurs, security is achieved, the attachment system is deactivated, and the person moves back to stage one (see Figure

1). If attachment figures are appraised as unavailable or unresponsive, resulting in failure to meet the goal of security, the individual moves towards the third stage of attachment system activation. In this stage, the person deploys a second set of attachment strategies depending on their appraisal of the viability of further proximity-seeking attempts given unavailable and unreliable attachment figures. Individuals are left to select either a hyperactivating or deactivating strategy to regulate their affect. Repetitive use of particular strategies gradually bias the monitoring of threatening events and attachment figure availability through the feedback of excitatory and inhibitory neural circuits. This component creates individual differences in attachment strategies and thus attachment patterns of behaviours.

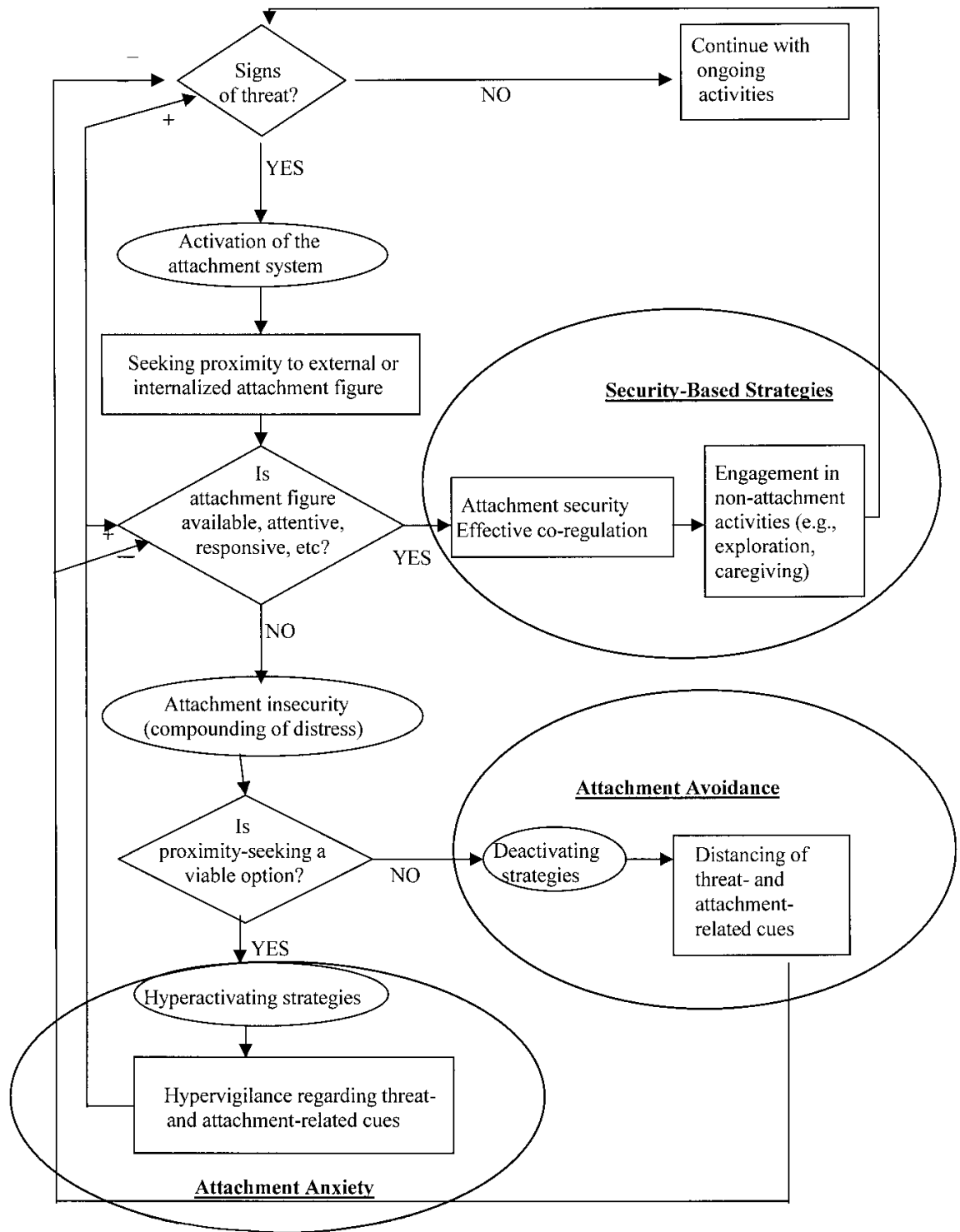


Figure 1. Shaver and Mikulincer's (2002) model of attachment system activation and dynamics.

There is extensive empirical support for this model of attachment activation. For example, when in need, infants engage in proximity seeking behaviour, show preference for their primary caregiver, and are measurably soothed by the caregiver's presence (e.g., Ainsworth, 1973; Heinicke & Westheimer, 1966). In adults, departure of a relationship partner elicits overt proximity seeking behaviours (Fraley & Shaver, 1998), and experience of stressful events lead people to seek others for support and assistance (e.g., Kobak & Duemmler, 1994; Lazarus & Folkman, 1984).

More recently, advances in experimental psychology methods have allowed for the direct testing of the activation of attachment processes stipulated by attachment theory at the cognitive level of analysis. Research stemming from experimental priming techniques have provided important causal evidence demonstrating the validity of the attachment theory of interpersonal functioning (e.g., Baldwin, Fehr, Keedian, Seidel, & Thomson, 1993; Banse, 1999; Mikulincer, Gillath, Sapir-lavid, & Yaakobi, 2010). Studies have shown that thoughts related to proximity seeking and mental representations of internalized attachment figures are often activated in marginally threatening situations. For example, Mikulincer, Gillath, and Shaver (2002) found that subliminal priming of threat words increased accessibility of the names of attachment figures, whereas names of friends and acquaintances were not different from control and less accessible than attachment figure names. Mikulincer, Birnbaum, Woddis, and Nachmias (2000) found subliminal priming of threat word increased cognitive accessibility of attachment related thoughts shown by the faster response time to proximity-related words such as love and closeness.

Consistent with the premises of attachment theory, researchers have shown that when a threat is encountered, attachment related schemas are activated (e.g., Mikulincer et al.,

2002), the accessibility of mental representations of attachment figures is increased (e.g., Ein-Dor, Mikulincer, & Shaver, 2011; Gillath et al., 2006; Mikulincer et al., 2000, 2002; Pierce & Lydon, 1998), and attachment related goals become salient (e.g., Gillath et al., 2006).

More importantly, priming techniques have provided evidence for the secure-based strategies shown in Figure 1, which has shown that contextual activation of attachment security is possible. A sense of security can be induced using priming techniques and this sense of security induces effects that are consistent with the broaden-and-build model of functioning (e.g., Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Mikulincer & Shaver, 2001). Induction of security is related to increased positive affect, positive expectations of relationships (Rowe & Carnelley, 2003), increased self-esteem, a reduction in anxiety (Carnelley & Rowe, 2007), promotion of empathic responses (Mikulincer, Hirschberger, et al., 2001), and promotion of endorsement of self-transcendent values (Mikulincer et al., 2010).

Overall, each attachment strategy has unique goals of emotion regulation and contains its own cognitive and affective responses. Security-based strategies act to alleviate distress, build resources and broaden perspective. Secondary strategies (Figure 1, Deactivating and Hyperactivating Strategies) function to manage attachment-system activation and manage the pain and distress arising from having unavailable attachment figures. Within secondary strategies, hyperactivation or deactivation of attachment system becomes the goal. Hyperactivating strategies involve chronic activation of the attachment system and are associated with constant alert for threats, separations, and betrayals.

Deactivating strategies act to suppress the attachment system and have serious consequences for cognitive and emotional openness.

The following section details the emotional and behavioural consequences of specific attachment strategies and the evidence base related to research for each strategy.

Security-based strategies of affect regulation

Maintaining proximity, either literally or symbolically with an attachment figure who is available, helps alleviate distress and facilitates adaptive coping. This leads individuals to feel a sense of security (See Figure 1). Feelings of security create a "broaden-and-build" cycle of attachment security (Mikulincer, Shaver, & Pereg, 2003) which functions to build resources used to improve coping in times of stress and broadens ones perspectives and capacities. Security-based strategies include declarative and procedural knowledge about the self, others, and affect regulations (which are absorbed from interactions with attachment figures). The declarative knowledge contains optimistic beliefs about distress management, trust in other's goodwill, and a sense of self-efficacy in dealing with threats (Shaver & Hazan, 1993). These beliefs are the foundations of the sense of security and are developed as a consequence of positive interactions with attachment figures who are available and responsive. Individuals learn within the interactions that distress is manageable, obstacles can be overcome, that one can exert control over the course and outcome of threatening events, and that other people generally have good intentions.

The secure base script

The procedural knowledge of the secure-based strategies is contained in the "secure base script" (Waters, Rodrigues, & Ridgeway, 1998) for affect regulation. The script

contains three main coping strategies: acknowledgment and display distress, support seeking, and engagement in instrumental problem solving. The 'emotion-focused coping' functions to down-regulate distress to facilitate the 'problem focused coping'. This script is reinforced by recurrent positive experiences of protection, support, and distress relief resulting from proximity seeking. Thus, secure individuals have learned that acknowledging and displaying distress helps elicit supportive responses from others. They learn from experience that they are often able to reduce distress and remove obstacles and reaching out to others when threatened is an effective coping strategy. This strategy is consistent with those Epstein and Meier (1989) classify as constructive ways of coping, which consists of active attempts to remove the source of distress, manage the problematic situation, and restore emotional balance without negative socio-emotional side effects. The sense of security contributes to broadening one's perspective, capacities, and skills.

Secure based strategies facilitate the development of autonomy and self-actualisation. Bowlby (1982/1969) argued that disruption of feelings of security inhibits other behavioural systems such as exploration, affiliation, and caregiving. Further, moments of insecurity are marked by preoccupation with the distress-eliciting situation, leaving fewer resources available for other actions. It is only when security is attained that people can direct energy towards broadening their perspectives and skills. Importantly, Bowlby noted that knowing that support is available when needed allows room for taking calculated risks which promote self actualisation and autonomy.

Research evidence supports this position. Security-based strategies are typically associated with securely attached people who are characterised by low scores on anxiety and avoidance attachment measures. Further, securely attached people tend to have optimist

beliefs about distress management, positive views about self and others, and maintain mental health and effective functioning in times of stress (e.g., N. L. Collins & Read, 1994; Mikulincer & Florian, 1995, 1998). Low attachment anxiety and avoidance has been shown to be related to support seeking in times of need, constructive coping (see Mikulincer & Florian, 1998, for a review), acknowledgment and disclosure of emotions (Fuendeling, 1998), and exploration of novel environments (Mikulincer, 1997).

Secondary attachment strategies of affect regulation

Attachment insecurity results from attachment figure being unavailable which increases the distress experienced under threat (see Figure 1). Shaver and Mikulincer (2002) argued that insecurity leads people to either consciously and or unconsciously consider the viability of proximity seeking for self-regulation which is associated with the secondary attachment strategy. There are two distinct secondary strategies: hyperactivating and deactivating (Cassidy & Kobak, 1988) (see Figure 1). The first is the result of an affirmative appraisal of the viability of proximity seeking in the face of unavailable attachment figures. This manifests in high energy, insistent attempts to attain proximity, support and love from attachment figures. Those using hyperactivating strategies are characterised by an overly strong approach orientation towards loved ones and constant attempts to elicit involvement, care, and support through behaviours such as clinging. They often employ cognitive and behavioural strategies aimed at reducing distance from their relationship partners (Shaver & Hazan, 1993). They also tend to be over-dependent on relationship partners and perceive themselves to be helpless and incompetent at affect regulation (Mikulincer & Florian, 1998). Shaver and Mikulincer (2002) argued that

hyperactivating strategies activate cognitive pathways that increase the monitoring of threats to self and monitor attachment-figure unavailability. This results in a tendency to ruminate on threats and persistent activation of threat and attachment themes within the working memory. Consequently there is a tendency to detect threats in most transactions and experiences in the physical and social world. Research evidence supports this position and indicate that hyperactivating strategies are employed by people with high scores on the anxiety dimension. High attachment anxiety is associated with exaggeration of the appraisal of threat, negative views of self, and pessimistic, catastrophic beliefs about people and social transactions and the non-social world (e.g., Bartholomew & Horowitz, 1991; Mikulincer & Florian, 1998). Further, research has found that people with high attachment anxiety tend to react to stressful events with intense distress and rumination (Mikulincer & Florian, 1998), have ready access to painful memories, and evidence the automatic spread of negative emotion from one remembered event to another (Mikulincer & Orbach, 1995). Finally, research shows that for people with high attachment anxiety, representations of attachment figures and attachment related-worries are activated even when there is no external threat (Mikulincer et al., 2000, 2002).

Deactivating strategies (Cassidy & Kobak, 1988) result from the appraisal that proximity seeking is not a viable option (Mikulincer et al., 2003) (see Figure 1). The primary goal of these strategies is to prevent activation of the attachment system to avoid frustration and added distress created by attachment figure unavailability. These strategies involve inhibition of support seeking behaviour and active efforts to manage distress alone. Specifically, it is characterised by active inattention to threatening events, personal vulnerabilities and inhibition and suppression of thoughts and memories which evoke

distress and feelings of vulnerability. The strategies result in denial of attachment needs and emphasis on importance of self-reliance and independence and can include literal and symbolic distancing from distress for both attachment-related and unrelated situations. Mikulincer and Shaver (2002) characterised the strategies as either pre-emptive or post-emptive where the former involves avoidance and short circuiting of experiences of vulnerability and distress and the later involves the repression and suppression (minimisation) of threats and vulnerabilities that have occurred and have been encoded. Research evidence indicates that people who score high on the avoidance dimension tend to use deactivating strategies. People low on the avoidance dimension have low levels of intimacy, lack cognitive accessibility to negative-self representations, project negative self-traits onto others, fail to acknowledge negative emotions, and deny basic fears (e.g., Dozier & Kobak, 1992; Fraley & Shaver, 1997; Mikulincer, Florian, & Tolmacz, 1990; Mikulincer & Horesh, 1999; Mikulincer & Orbach, 1995; Mikulincer, 1995). High scores on attachment avoidance related to lack of mental access to attachment related worries (Mikulincer et al., 2000) and deactivation of representations of attachment figures after being reminded of separation (Mikulincer et al., 2002).

In summary, each attachment strategy has unique goals of emotion regulation and contains its own cognitive and affective responses. Security-based strategies act to alleviate distress, build resources and broaden perspective. Secondary strategies function to manage attachment-system activation and manage the pain and distress arising from having unavailable attachment figures. Within secondary strategies, hyperactivation or deactivation of attachment system becomes the goal. Hyperactivating strategies involve chronic activation of attachment system and are associated with constant alert for threats,

separations, and betrayals. Deactivating strategies act to suppress attachment system and have serious consequences for cognitive and emotional openness.

The following section reviews and presents information relating to attachment system as an affect regulation system.

Attachment System and Affect Regulation

The way in which the attachment system activation operates suggests that it is an affect regulation system. First, the attachment system is activated when a threat is perceived and is signalled by the arousal of negative affect, specifically feelings of anxiety and worry. Second, once activated, specific strategies are employed with the global goal of achieving feelings of safety and security. There is evidence to support the affect regulation function of attachment system strategies. Indeed, Pereg (as cited in Mikulincer et al., 2003) found that attachment styles moderated the link between negative affect and cognitions. Specifically, after a negative affect induction, people with a secure attachment style were more likely to experience mood-incongruent cognitions, people with an anxious attachment style experienced more mood congruent cognitions, and people with avoidant attachment styles exhibited no change in their patterns of memories and attributions compared to those in the neutral affect conditions. The evidence indicates that induced negative affect did not significantly change the recall and attribution patterns of people high on avoidance. This is expected as deactivating strategies weaken the link between negative affect and cognitions causing negative affect to lose power over cognitions. On the other hand, hyperactivating strategies heighten negative views of close others even when there is no objective signs of

rejection or abandonment. As such, induced negative affect lead people with an anxious attachment style to score higher on attachment anxiety compared to neutral condition.

Attachment researchers have only recently focused their attention to studying how attachment relates to positive affect. There is a large body of evidence from social psychological studies that demonstrates that induction of positive affect influences information processing (Isen, 1987) and increases the likelihood of broader mental categories. Mikulincer and Sheffi (2000) found that only people who scored relatively low on attachment anxiety and avoidance experienced the beneficial effects of positive affect induction on creative problem solving and category breadth. Whereas no significant difference in task performance were found for people with high avoidance scores in the control condition and the positive affect condition. No significant difference was found on task performance between the control and the positive affect condition for people who scored high on avoidance. For people with high attachment anxiety, positive and negative affective induction produced similar results; individuals performed with impaired creativity and a narrowing of mental categories. People high on avoidance tend to not regard affect, whether positive or negative, as important for information processing (e.g., Pereg, 2001; Dozier & Kobak, 1992).

In general, the research evidence shows that security based strategies are associated with an active and constructive approach to regulating negative affect and practical use of the enhanced creativity associated with positive affect. This approach may help secure people find innovative ways to solve problems, maintain a positive mood, and enjoy task performance. Deactivating strategies are associated with distancing from emotional experiences both negative and positive, thus averting the consequences of negative

emotion, but foregoing the beneficial effects linked with positive affect. Hyperactivating strategies are associated with cognitive responses that increase negative affect and exclude positive affect and the associated benefits.

The literature shows that attachment plays a significant role in moderating how affect influences functioning. This suggests that attachment processes may play an important role in general emotional functioning. We have gained some understanding of how attachment regulates negative affect and how attachment styles moderate how affect influences individual functioning. However, we do not know whether attachment plays a role in the arousal of affect. Increasing our knowledge of this connection can contribute to our understanding of emotional functioning and improve well-being interventions.

The section following details the broaden-and-build cycle of attachment security which is associated with skills development, positive emotions, and well-being.

The Attachment System and the Broaden-and-Build Cycle of Attachment Security

The ‘broaden-and-build’ theory of positive psychology proposed by Fredrickson (2001) stipulates that “experiences of positive emotions broaden people’s momentary thought-action repertoires, which in turn serves to build their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources” (p.218). There is good evidence to support this theory with studies showing the benefits of positive emotions on personal growth with regard to resources (Aspinwall, 2001; Fredrickson & Branigan, 2005; Fredrickson, 2001).

Bowlby assumed that human behaviour is organised by innate behavioural systems including attachment, exploration, caregiving and sexual mating (Bowlby, 1969; Mikulincer & Shaver, 2007a). According to attachment theory a stable sense of attachment security provides the foundation for optimal development of the exploration system (Mikulincer & Shaver 2007a). The exploratory system is considered to be the generator of curiosity and exploratory behaviour, and thus plays an important part in the broadening and building of resources. It facilitates the development of life-enhancing knowledge and skills such as social and emotional regulatory skills which are associated with well-being (Mikulincer & Shaver, 2007a). Having a sense of security allows one to focus on broadening and building one's skills and resources. This "broaden-and-build" stage is associated with positive functioning, and within the attachment process contains mental and behavioural experiences that enhance emotional stability, autonomous personal growth, personal and social adjustment, and satisfying close relationships (Mikulincer & Shaver, 2007a). Specifically, attachment figure availability results in effective distress management and emotional equanimity. Interactions with attachment figures who are available and responsive instil a pervasive sense of safety, relieves distress and arouses positive emotions such as relief, satisfaction and gratitude (Mikulincer & Shaver, 2007a). As a result, secure people tend to remain relatively calm in times of stress and have longer periods of positive affect, contributing to continued emotional well-being and mental health.

According to Mikulincer and Shaver (2002), the broaden-and-build cycle is part of stage 1 of the attachment activation process. Secure individuals are most effective and productive in this stage. Anxious individuals tend to be in stage 2 of the attachment system activation and spend less time broadening and building and more time proximity seeking.

Avoidant individuals tend to deactivate the attachment system and are arguably in the broaden-and-build cycle as often, if not more, than secure individuals. However, as mentioned earlier, they discount affect of both polarities and thus are closed to the benefits associated with positive affect including enhanced creativity, broader mental categories, and improved social functioning (Shaver & Mikulincer, 2002, 2007).

The previous attachment system strategies section described how individual differences in attachment behaviour can occur due to environmental circumstances. The following section details in chronological order the research evidence amassed on the study of individual differences in attachment, showing the observation of different attachment patterns of behaviour from infancy to adulthood. The review presents how knowledge of individual differences in attachment behaviour has been advanced through the years and details current limitations or gaps in knowledge related to attachment. The aim of this section is to provide a comprehensive review of the research literature on attachment individual differences for readers who would like to be up-to-date with the research.

Individual Differences in Attachment Functioning

Within the attachment behavioural system, the individual variations in system manifestation in response to context is known as attachment styles or attachment strategies. As detailed earlier within the attachment strategies section, these styles or strategies reflect individual's learned behavioural response to threat cues to achieve security adapted to their specific interpersonal context. Work done by a large number of researchers including Ainsworth and colleagues (e.g., Ainsworth et al., 1978; Ainsworth, 1973), George, Kaplan

and Main (1985), Hazan and Shaver (1987), and Bartholomew and Horowitz (1991) have provided clear evidence of the existence of individual differences in attachment functioning, and established much of what is currently known regarding attachment functioning in adulthood. These works are reviewed in the section below.

Individual Differences in Infant Attachment

Ainsworth and her colleagues (1978) were the first to systematically explore individual differences in attachment and provide evidence for individual differences in infant attachment behaviour and its association to the availability and responsiveness of caregivers (Ainsworth, 1985a, 1985b, 1989). They used a laboratory paradigm known as the "Strange Situation" designed to assess infant attachment behaviours using eight specific episodes of separation and reunion with their primary caregiver for infants aged from 12 to 18 months. Through the assessment procedure, they were able to identify three distinct patterns of attachment behaviour that corresponded to differences in primary caregiver responsiveness and availability: secure (Group B), avoidant (Group A), and anxious-ambivalent (Group C) attachment behaviour (Ainsworth & Bell, 1970; Ainsworth et al., 1978). Securely attached infants (Group B) tended to use their primary caregivers as a secure base from which to explore the environment before separation. When they were separated from their caregiver, they displayed feelings of distress and ceased exploration. When their caregiver returned they engaged in attachment behaviours such as seeking proximity, comfort and contact from their caregiver. Avoidantly attached infants (Group A) displayed little overt signs of distress upon separation from their caregiver and when reunited with their caregiver, they ignored their caregiver or were seen to alternate between

avoiding and seeking proximity with their caregiver. Anxious-ambivalently attached infants (Group C) appeared distressed before separation, became highly distressed at separation, and when reunited with their caregiver, displayed ambivalence about their caregiver's presence, showing signs of seeking and resisting comfort from their caregiver. Through additionally observing the caregiver home behaviour, Ainsworth and colleagues (1978) found that responsive and available caregivers had infants who had secure attachment bonds, reflecting infant trust in the support and responsiveness of attachment figures. Unavailable and unresponsive caregivers had infants with avoidant patterns of behaviour indicating indifference toward attachment figures. Inconsistently available and responsive caregivers fostered infants that had anxious-ambivalent attachment, which corresponded to distress and ambivalence towards attachment figures. Ainsworth demonstrated that caregiver responsiveness and availability influenced infant attachment patterns of behaviour.

Individual Differences in Adult Attachment

Following from Ainsworth pioneering work which identified distinct individual differences in attachment patterns of behaviours in infants, other researchers began to consider exploring individual differences in attachment behaviours in adulthood. At the time, there were no established methods of observing or measuring individual differences in attachment behaviours beyond the strange situation paradigm developed by Ainsworth and colleagues (1978) which was limited to assessments of attachment behaviours in infants between 12-18 months. Researchers interested in individual differences in attachment functioning beyond infancy set out to simultaneously study and develop

measures to capture these differences using the theoretical framework laid out by Bowlby (1969/1982) and Ainsworth and colleagues (1978) as a foundation for their work.

Two distinct approaches to the study of individual differences in attachment emerged from this time. The approaches differ in the theoretical emphasis with regard to the conceptualisation of individual differences in attachment functioning and the way in which this is measured (Bernier & Dozier, 2002). One approach, taken by developmental psychologists, who were influenced by the observational techniques used by Ainsworth and her colleagues (1978), developed interview formats to use in the adult population.

Researchers from this approach were predominantly interested in a more applied and clinical understanding of attachment and studied "the intergenerational transmission of attachment" via child-caregiver attachment relationships (Fraley, 2002; Shaver & Mikulincer, 2002). This approach contributed to the understanding of individual differences in attachment through the development of the Adult Attachment Interview (Main et al., 1985) and subsequent findings arising from this measure. The second approach was influenced by social and personality psychologists who developed self-report measures to study categories of attachment patterns of behaviours, and examined dimensions of attachment processes underlying interpersonal functioning (Mikulincer & Shaver, 2002).

Well known measures of attachment differences in this second approach include Hazan and Shaver's (1987) Attachment Prototypes, Bartholomew and Horowitz's (1991) Relationships Questionnaire, and Brennan, Clark, and Shaver's (1998) Experience in Close Relationships Scale. The contribution of each of these notable works in building our understanding of attachment individual differences will be discussed below.

Developmental and clinical research contributions to attachment theory

Main and colleagues (e.g., George et al., 1985; George, C., Kaplan & Main, 1996; Main et al., 1985) considered individual differences in adult attachment to be influenced by internal representations of early attachment relationships between child and caregiver. In order to assess this they developed the Adult Attachment Interview (AAI; Main et al., 1985), a semi-structured interview where interviewees are asked about their childhood attachment experiences and the effects of these experiences on their development and personality. Analysis of the interview transcripts reveal distinct attachment classifications that are consistent with those identified by Ainsworth and colleagues (1978) in infant attachment: secure-autonomous, preoccupied with attachment, and dismissing attachment (Main & Goldwyn, 1985). Subsequent work by Main and Solomon (1990) showed that there were a significant number of maltreated infants who did not fit into the three categories identified by Ainsworth and colleagues (1978). The infants displayed behaviours in the *strange situation* that appeared disorganised and disorientated when their caregivers were present. Consequently a fourth category of infant attachment was proposed, Group D or Disorganised-disoriented attachment. Infants in this category were observed to freeze with a trance-like expression, hands in the air, or cling to the caregiver while leaning away from them (Main, 1996). Further work by Main and Goldwyn (1985-1994) with adults also revealed a fourth attachment type corresponding to the disorganised category found in infants referred to as unresolved-disorganised attachment representations (Main, 1996).

Main and colleagues found that adults with secure representations communicated in a consistent, clear, coherent, and balanced manner. Their presentation and evaluations of attachment experiences were internally consistent. Adults with the secure response style

were commonly found in low-risk samples and were rare in clinically distressed populations (Main 1996). Those classified as dismissing were found to be inconsistent with their reporting where they used positive terms to describe their parents but there was evidence that contradicted those descriptions. People in the preoccupied-entangled category displayed confused, angry, or passive preoccupation with attachment figures and tended to be non-collaborative (Main, 1996). The last group classified as unresolved-disorganised exhibited lapses in reasoning and communication while in interview. These lapses are marked in clinically distressed populations and can indicate trauma. Each of these classifications have been shown to correspond to the four categories of infant attachment identified in the strange situation (Van IJzendoorn, 1995). Psychometric studies across different countries have demonstrated that these categories are stable (e.g., Bakermans-Kranenburg & van IJzendoorn, 1993) and multiple studies have provided evidence for the link between parent attachment and child attachment (Fonagy, Steele, & Steele, 1991; Van IJzendoorn, 1995; Ward & Carlson, 1995).

Although the AAI is a useful tool to study individual differences in attachment functioning, there are a number of limitations associated with this method that need to be noted. First it requires a significant amount of time and effort to obtain information for each participant. Second, in-depth training is required to administer and score the interview (Kobak, 2002; E. Waters, Crowell, Elliott, Corcoran, & Treboux, 2002). Third, the coding and interpretation of information has an element of subjective judgment in coding of the narratives (Belsky, 2002). Some researchers have also criticised the construct validity of the AAI voicing concern that the measure may be capturing internal representations of caregiving in the adult rather than representations of their own attachment tendencies

(Allen & Manning, 2007; Shaver, Belsky, & Brennan, 2000). It has been noted that the AAI has been validated against infant attachment security but the adult interview component does not assess directly the adult's own attachment security or expectations in attachment relationships (Allen & Manning, 2007; Allen & Miga, 2010).

At around the same time as Main and her colleagues were investigating the internal representations of attachment, Hazan and Shaver (1987), from the social and personality psychology perspective, were conducting their own research into individual differences in attachment and attachment continuity beyond infancy. Hazan and Shaver considered adult romantic relationships to involve attachment functions and thought that individual differences in romantic experiences were influenced by early attachment history. They set out to determine whether the infant attachment patterns found by Ainsworth (1985b) could be found in adulthood as manifested via adult romantic relationships and to explore how attachment differences predicted people's relationship experience, their mental representations of themselves and others, and the quality of their relationship with their parents. Hazan and Shaver (1987) developed a single-item measure of adult attachment style - the Attachment Prototypes Questionnaire, based on the descriptions of secure, avoidant, and anxious/ambivalent attachment behaviours reported by Ainsworth and colleagues (1978). Participants were asked to choose the item that most closely described their own behaviour in relationships. They found that adult romantic affectionate styles roughly mirrored the three infant attachment styles categorised by Ainsworth (Ainsworth, 1985a, 1985b, 1989). Specifically, people who endorsed the secure description had romantic relationships that were marked by acceptance, trust, and happiness. Those with avoidant attachment reported jealousy, emotional highs and lows, and fear of intimacy.

People with anxious/ambivalent attachment reported jealousy, extreme sexual attraction, and obsession with the relationship. With regard to mental representations, secure individuals tended to have mental models of themselves as trusting and well-liked and mental model of others as generally well-intentioned and good-hearted.

Anxious/ambivalent individuals tended to report having internal representations of self that contained self-doubt, feeling misunderstood and underappreciated. They had mental representation of others as not as committed to the relationship than themselves. Hazan and Shaver found that avoidant individuals had some overlaps with both secure and anxious/ambivalent others on mental representations of self and others but that avoidant individuals tended to overlap more with the anxious/ambivalent group. With regard to relationship with parents, Hazan and Shaver found the same pattern of relationship quality as that identified by Ainsworth (1978). Secure individuals reported having respectful, affectionate, and responsive relationships with their parents. In contrast, avoidant individual's relationship with their parents were characterised by cold and rejecting behaviours. Anxious/ambivalent individuals engaged in protest related behaviours with their parents.

Social and personality research contributions to attachment theory

Hazan and Shaver's (1987) work provided compelling evidence for the continuity of attachment from infancy into adulthood and showed that individual differences in attachment functioning could predict both past and current interpersonal relationship quality and behaviour. A shortcoming of Hazan and Shaver's research is that their Attachment Prototypes questionnaire is a single-item categorical measure which is unable

to capture individual variability within each category (Crowell, Fraley, & Shaver, 2008). For example, the findings for the avoidant group seemed to be a little unclear, as there appears to be some variability of responses within the group but the categorical nature of the Attachment prototypes measure limits the ability to study the variability in detail. Other researchers have subsequently attempted to address this limitation by developing measures with more refined categories or designing scales that measured attachment individual differences on dimensions (Mikulincer & Shaver, 2007a). Notably, Bartholomew and Horowitz's (1991) developed the Relationship Questionnaire (RQ) which contains both categorical and dimensional representations of attachment individual differences.

Bartholomew (1990) and Horowitz (Bartholomew & Horowitz, 1991) were interested in understanding individual differences in attachment in adulthood and how this influenced interpersonal relationship functioning. Bartholomew (1990) noted that the avoidant prototype from Hazan and Shaver's (1987) study and the dismissing attachment identified by Main and colleagues (1985) appeared to differ in degree of avoidance. Considering this in the context of Bowlby's (1969) working models, they proposed that individual differences in attachment patterns are the result of the interaction of two factors, the working model of self and the working model of others, which can be conceptualised as two dichotomous dimensions, positive and negative models of self and others. As shown in Figure 2, the theoretical combinations of the two dichotomous dimensions generate four possible attachment prototypes (Bartholomew & Horowitz, 1991): Secure, Preoccupied, Dismissing, and Fearful. From this model, Secure individuals have both positive models of self and others, Preoccupied individuals have negative model of self and positive models of

others, Dismissing individuals have positive model of self and negative model of others, and Fearful individuals have negative models of self and others.

		MODEL OF SELF	
		(Anxiety)	
		Positive	Negative
MODEL OF OTHERS (Avoidance)	Positive	SECURE Comfortable with intimacy and autonomy	PREOCCUPIED Preoccupied with relationships
	Negative	DISMISSING Dismissing of intimacy counter-dependent	FEARFUL Fearful of intimacy socially avoidant

Figure 2. Bartholomew and Horowitz (1991) model of adult attachment based on models of self and others.

Bartholomew and Horowitz (1990) developed a corresponding measure, the Relationship Questionnaire (RQ) which operationalised their conceptualisation of the attachment dimensions and categories. In setting out to test the validity of their proposal, they asked participants to complete the RQ and interviewed them about their current relationship and feelings towards relationships in general. Participants' friends were also asked to complete the RQ about the participant. Independent assessors rated how well each individual met the criteria for each attachment prototype. The three methods were highly correlated and the results showed that attachment patterns are clustered into the four categories of attachment prototypes proposed. Specifically, they found that the 'secure' attachment style corresponded to a combined positive model of self and others. Those with this prototype tend to have high self-confidence and view others in a positive light. They tend to experience high levels of intimacy in relationships, demonstrate flexible coping strategies when problems arise, and do not have difficulties approaching others for help.

They are able to recognise the importance of relationships but do not rely on them heavily to enhance self-esteem. In contrast, the 'fearful' attachment style contains a negative model of self and model of others. People in this category tend to have low self-confidence, avoid intimacy due to intense fear of rejection and believe others are untrustworthy and rejecting. Fearful individuals depend heavily on relationships to validate their self-worth.

Bartholomew and Horowitz (1991) found that fearful individuals are more likely to report interpersonal problems and are concerned with their overly passive nature. The 'preoccupied' attachment style reflects a negative model of self and positive model of others. Individuals in this category tend to be preoccupied with relationships. They have little self-confidence and desperately seek closeness to others for attention and approval. While preoccupied individuals have the same personal insecurity and desire for external approval as fearful individuals, they seek proximity to others more intensely. The 'dismissing' attachment style contains a positive model of self and a negative model of others. Those of this prototype appear to have high self-confidence, tend to downplay the importance of others and relationships, and believe that others are negatively intentioned. The positive model of self is maintained by emphasising the importance of independence and personal achievement. People in this category often anticipate rejection from others but do not depend on external validation. Interpersonal problems of the dismissing group often revolve around issues of personal hostility and coldness in social interactions (Bartholomew & Horowitz, 1991; Bartholomew, 1993).

There is empirical support for the four attachment prototypes proposed by Bartholomew and Horowitz (1990; Bartholomew & Horowitz, 1991). The model has been validated using self-report questionnaires and semi-structured interviews (Dale W. Griffin

& Bartholomew, 1994; Scharfe & Bartholomew, 1994; Scharfe & Cole, 2006). This method and measure allowed researchers to explore in more depth the dynamics of working models, how it influences individual functioning, and how it contributes to individual differences. Griffin and Bartholomew (1994) found that people with positive models of self and model of others reported being comfortable with intimacy, had higher self-worth and assertiveness, and had more positive beliefs about others and their dependability. Those with negative self models reported lower self-confidence and those with negative models of others were less trusting of others and harboured generally pessimistic views of human nature. Importantly, this approach provided a logical and theoretical account of the presence of different patterns of attachment behaviours frequently identified and showed that individual differences in attachment is underpinned by working models of self and others.

A notable criticism of Bartholomew's and Horowitz's (1990; Bartholomew & Horowitz, 1991) attachment prototypes model is that the model indicates that attachment prototypes are mutually exclusive which is inconsistent with research findings that individuals can rate themselves similarly on opposing attachment prototypes (Crowell et al., 2008; Levy & Davis, 1988) and that a significant proportion of individuals have difficulty selecting one attachment category that they feel is representative of their attachment style (Davila, Burge, & Hammen, 1997; Mickelson, Kessler, & Shaver, 1997). Another criticism is that research is mixed with regard to the model that individuals classified as preoccupied actually hold positive models of others. Indeed, research from various perspectives, including clinical/developmental areas, using the AAI, suggest that preoccupied individuals can hold negative views of others,

which conflicts with the self-other distinction proposed by Bartholomew and colleagues (Kidd, Hamer, & Steptoe, 2011; Pietromonaco & Barrett, 2000).

Attachment dimensions and the measurement divide

The use of categorical measures has allowed significant progress in the study and understanding of individual differences in attachment functioning across the lifespan. However, because much variability in individual differences is lost when using categories, researchers have been increasingly moving away from this method and orientating towards dimensional measures of attachment. Further, there is evidence that dimensional measures are more psychometrically robust than categorical measures. For example, when comparing responses to categorical and dimensional measures of attachment, categorical measures were more vulnerable to response biases such as social desirability (Bradford & Feeney, 2000). Additionally, because dimensional measures contain multiple items, they have higher reliability and sensitivity (Feeney, 2002), and greater stability (Scharfe & Bartholomew, 1994) compared to categorical measures. More importantly, through their work and development of the Experience in Close Relationship Scale (ECR), Brennan and colleagues (1998) produced compelling evidence to support the use of dimensional measures of individual differences in attachment styles. Using a large sample, Brennan and colleagues conducted a factor analysis of items derived from 14 multi-item attachment measures extracted from an extensive literature search. They found that the items could be reduced to two orthogonal factors which they termed Anxiety and Avoidance, where Anxiety corresponded to anxiety and vigilance regarding abandonment and fear, and Avoidance reflected discomfort with closeness or dependency, and avoidance of intimacy

(Fraley & Shaver, 2000). Attachment security was indicated by low scores on both dimensions (Bifulco, 2002). Notably, the two factors identified recreated the two discriminant functions that predicted infant attachment styles identified by Ainsworth and colleagues (1978). Further, when subjects were clustered into four groups, these groups were consistent with the four attachment prototypes of Bartholomew and Horowitz (1990; Bartholomew & Horowitz, 1991). Using item response theory, Fraley and colleagues (2000) showed that the ECR had the best psychometric properties among the four self-report measures of attachment used in their study. Informed by their results, they concluded that the two factors underlying the ECR were best represented by Anxiety and Avoidance. They also created a revised version of the ECR to improve its discriminant ability- the Experiences in close Relationships Scale-Revised (ECR-R; Fraley, Waller, & Brennan, 2000). In line with Bartholomew and Horowitz's (1991) work, Brennan and colleagues' research demonstrated that attachment functioning can be represented by regions on a two-dimensional plane, with Anxiety and Avoidance capturing variability in individuals differences in attachment.

While it has been shown that categorical measures of attachment patterns of behaviour can be reduced to two latent factors (Brennan et al., 1998; Mikulincer & Shaver, 2007a), there remains some uncertainty as to what these factors represent. Bartholomew's and Horowitz's (1991) work suggests that the two dimensions underlying individual differences in attachment are working models of self and others. Bartholomew later reconceptualised these two underlying dimensions as "anxiety over abandonment" and "avoidance of intimacy" (Bartholomew & Shaver, 1998). In a similar way, Fraley, Waller, and Brennan (2000) considered these dimensions to represent attachment avoidance and

attachment anxiety, where the anxiety dimension concerns anxiety about separation, abandonment, and insufficient love, while the avoidance dimension represents avoidance of intimacy, dependency, and emotional expression. Mikulincer and Shaver (2007a) suggested that these two dimensions relate to their ‘secondary’ attachment strategies: deactivation and hyperactivation. There is a general consensus, however, that the dimensions broadly represent anxiety and avoidance, because the anxiety dimension underlies all aspects of attachment anxiety and the avoidant dimension underlies all aspects of avoidance of attachment and vulnerability.

The use of self-report categorical and dimensional measures of attachment have richly informed the attachment literature relating to individual differences in attachment. Categorisation of attachment behaviour is useful in that it is theoretically meaningful, easy to analyse and easy to generalise to specific attachment behavioural patterns. On the other hand, categorical measures are less informative than dimensional measures because the variability of individuals within a category is not captured, and thus important information may be lost (Fraley et al., 2000). This contrasts with dimensional measures, which are sensitive to all individual variability along the dimensions. That being said, dimensional measures may be too limited to the anxiety and avoidance dimensions and neglect to also include focus on the secure aspect of attachment functioning. Researchers using attachment anxiety and avoidance dimensions resort to inferring the presence of security by the absence of anxiety and avoidance. Indirectly measuring a construct is suboptimal and there are significant limitations to the information that can be gathered about a construct in this manner which affects confidence regarding inferences and conclusions relating to the construct (Mikulincer & Shaver, 2007a). Given the unique strengths and limitations of both

types of measures, it is clear that both add value and at this present time, neither can be dismissed wholly without negative consequences for collection of attachment related information.

Conclusion

Since Bowlby's initial articulation of attachment theory (1969/1982), a considerable body of evidence has amassed confirming the proposed tenets, providing support for the theory, and expanding the theory to a broad theory of interpersonal functioning. This chapter described the fundamentals of attachment theory and provided a review of the main research studies that have played a pivotal role in the development and understanding of attachment. Researchers have shown that attachment processes are normative and active from infancy and beyond (e.g., Ainsworth et al., 1978; Doherty & Feeney, 2004; Hazan & Zeifman, 1999; Marvin & Britner, 2008). Evidence demonstrates that there are distinct individual differences in attachment patterns of behaviour (e.g., Ainsworth et al., 1978; Brennan et al., 1998; Hazan & Shaver, 1987; Main et al., 1985) which relate to the internal representations of attachment experiences relating to self and others (e.g., Bartholomew & Horowitz, 1991; Main, 1990) and which predict interpersonal functioning in the past, present, and future (e.g., Griffin & Bartholomew, 1994; Main & Solomon, 1990; Van Ijzendoon, 1995). Thus, attachment theory enjoys extensive empirical support and is particularly relevant to the study of gratitude because the theory accounts for cognitive, social, behavioural, and emotional aspects of human functioning. However, research on attachment and gratitude is limited. The following chapter will present an analysis of the

theoretical link between attachment processes and gratitude drawing on the information presented in the two previous chapters.

CHAPTER THREE

ATTACHMENT AND GRATITUDE

This chapter begins by presenting an analysis of gratitude from an attachment perspective building on the information detailed in the previous chapters. This is followed by the description of the main aims and hypotheses derived from an attachment account of gratitude. Next, the chapter details the research design, scope and methodology used to examine the hypotheses. Finally, the samples used in the research are described and the structure of the empirical chapters explained.

An Attachment Perspective of Gratitude

Chapter 1 presented evidence to show that gratitude is a positive higher order affect with strong links to multiple indicators of well-being evidenced by both correlational associations and direct causal relationships established through intervention studies. This highlights the value of pursuing an in depth understanding of the gratitude construct given the potential benefits of gratitude on well-being psychology. It was further shown that the gratitude literature lacked an empirically validated theory of gratitude and as a result we cannot be certain about how individual differences in gratitude develop and what mechanisms underlie the link between gratitude and well-being. This chapter argues for the need to have an empirically tested theory of gratitude and proposes that the attachment framework can provide utility in the study of gratitude.

It is argued here that a theory of gratitude is important to research and development. A theory is a statement of a hypothesized relationship between and among variables (Gelso,

2006) involving a series of interrelated constructs, abstractions, concepts, variables, definitions, and propositions that have been hypothesized or assumed with a systematic view of a phenomena for the purpose of explaining and predicting the phenomena (Udo-Akang, 2012). A theoretical framework is important to research in that it provides a framework for analysis; it helps to logically structure information known about concepts; provides efficient methods for field development and a parsimonious explanation for the existence, purpose, and or function of a construct (Wacker, 1998). As shown in Chapter 1, current research on gratitude is limited to describing what gratitude is associated with and the effectiveness of gratitude intervention on well-being. Little is known about the purpose or function of gratitude or the development of trait gratitude. As described in Chapter 1, there are currently a number of theories of gratitude focused on explaining how gratitude is linked to well-being but these are not well researched and tend to be limited in scope in their account of the gratitude construct as they focus mainly on the gratitude to well-being relationship.

As detailed in Chapter 1, because gratitude is an emotion that is grounded in the interpersonal context (e.g., Tesser, Gatewood, & Driver, 1968) and is dependent on person attributions (Wood, Maltby, Stewart, Linley, et al., 2008), it may be accounted for by attachment theory through attachment processes which have been shown to impact on interpersonal functioning (e.g., Hazan & Shaver, 1987; Main & Goldwyn, 1985) and person attribution styles (Dykas & Cassidy, 2011; Mikulincer et al., 2003). Chapter 1 showed that a number of researchers have speculated on the link between attachment processes and gratitude (e.g., Buck, 2004; Mikulincer et al., 2006; Watkins, 2014) but that there is yet no thorough empirical investigation of an attachment account of gratitude (Watkins, 2014). As

reviewed in Chapter 2, Attachment theory describes how interpersonal experiences accumulate and form internal mental representations (Bowlby, 1969) which functions to aid our response to the environment to maximise our livelihood (Bartholomew, 1990; Shaver, Collins, & Clark, 1996). This model accounts for the chain of events linking past experiences to current interpersonal situations (Main, Hesse, & Kaplan, 1990; Rothbard & Shaver, 1994) eliciting internal appraisals that lead to emotional responses which motivate behavioural responses (Mikulincer & Shaver, 2007a; Shaver & Mikulincer, 2002). It has been shown that gratitude is a positive emotion that appears to have prosocial (Bartlett & DeSteno, 2006; Tsang, 2006) and positive behavioural tendencies that promote well-being (e.g., Bono & Froh, 2008). However, little is known concerning the processes involved that lead to the development of gratitude trait. Attachment theory could help shed light on the preceding processes that relate to the development of trait gratitude.

It is noted that the following analysis of the possible link between attachment processes and trait gratitude is built on what is currently known about the determinants of the gratitude emotional state and the assumption that a trait form of an emotion is related to an attributional tendency for the individual to make particular interpretations in situational contexts that lead to the arousal of that emotion. In the case of gratitude, it is assumed, based on the literature on trait development (e.g., Costa & McCrae, 1993; McCrae et al., 2002) and attributional theory (Weiner, 1985), that people with trait gratitude tend to perceive the factors related to the arousal of feelings of gratitude (receipt of a valued gift, genuine intention of benefactor, high cost to benefactor for provision of gift) in situations in the direction that elicits gratitude. Specifically, that people with trait gratitude have a tendency to perceive that a gift of value has been received from an external source that is

well intentioned, that is costly in some way to provide to the individual. These tendencies in perception can be considered as schema biases (Weiner, 1985; Wood, Maltby, Stewart, Linley, et al., 2008) and Attachment theory offers an explanation for the presence of the schema biases observed by Wood and colleagues (2008) in grateful people as well as an explanation for how the biases may have developed. The attachment approach would predict that trait gratitude likely develops through particular patterns of interpersonal experiences that have been internalised into mental representation of the world which biases or leads to the formation of a tendency to view the world with gratitude. The discussion of the link, both theoretical and empirical, between attachment processes and gratitude follows below.

There are a number of overlaps between attachment processes and gratitude that suggests that they are related and support the position that attachment processes may play a role in trait gratitude development. First, contexts associated with attachment security are similar if not analogous to contexts shown to lead to feelings of gratitude. Studies have demonstrated that gratitude arises when people receive aid that is perceived as costly, valuable, and well intentioned (e.g., Tesser et al., 1968; Wood, Maltby, Stewart, Linley, et al., 2008) This suggests that gratitude is in part an emotion that is directed towards appreciating the helpful actions of others (McCullough et al., 2001; Wood et al., 2010). Feelings of attachment security are associated with perceiving that one has support and is cared for by significant others who are available and responsive to one's needs. When the attachment security context is examined, it suggests that the elements of the contextual determinants of gratitude as outlined by Tesser and colleagues (1968) are contained within the attachment security experience. Tesser and colleagues found that feelings of gratitude

were determined by the perception of receipt of a gift, the value of the gift to the self, the perceived intention of the benefactor, and the cost to the benefactor for providing the gift. Although there is agreement regarding the formulation of the determinants of gratitude, since the Tesser and colleagues (1968) study, researchers have adopted a more inclusive definition of the two determinants, gifts and benefactor, due to findings that feelings of gratitude can be equally aroused by abstract, immaterial gifts from non-interpersonal sources such as *mother nature* or from events like “waking up in the morning” (Emmons & McCullough, 2003). With this in mind, the attachment security context contains elements of the gift, the external source, the intention of the source, and the value of the gift to the self, and the cost of the gift to the benefactor. Although the individual will likely not consciously frame their experience in these terms, it can be seen that the individual is given the gift of care, attention, support, time, and availability from an external source which is the significant others. The significant others are well intentioned and are concerned for the welfare of the receiver. The aid has high value to the individual and may be deemed invaluable, as such gifts cannot be bought. The cost for the benefactor depends on the task but there is a cost to the benefactor at least in terms of time spent and being available and reliable to the receiver. As such, because the contexts of secure attachment contain the elements that lead to gratitude arousal, it would be logical to expect that secure individuals would be more likely to experience feelings of gratitude and experience feelings of gratitude more often than those who are not feeling secure. Moreover, for those who are securely attached, this experience of support is repeated over and over throughout childhood and adulthood. Therefore, people who are secure would likely experience more gratitude than those who are not secure over time. Thus, secure attachment appears to

contain the determinants that would lead to more gratitude generation overtime, which likely results in a tendency towards feelings of gratitude. This suggests the possibility that attachment processes may act as a precursor for trait gratitude development.

Second, the attribution style associated with trait gratitude identified by Wood and colleagues (2008) may be explained by working models of attachment. Wood and colleagues found that personal appraisal of contextual factors explained 83% of variability in feelings of gratitude. Moreover, they found that people who tended to feel grateful had an attributional style that increased the perceived cost to the benefactor and the value of the gift to the self. Further, participants also perceived the intentions of the benefactor to be more genuine and altruistic. This indicates that feelings of gratitude are primarily dependent on the individual's perception of the context. Within attachment theory, working models reflect the history of attachment related interactions with primary attachment figures and act to maintain the patterns of behaviour associated with interpersonal functioning (Bowlby, 1969/1982b). Working models contain information about the interpersonal world and function as a mental representation of the world. These representations are adaptive because they model what could be expected given previous experiences and act to facilitate efficient information processing and behavioural responses (Bowlby, 1969/1982b, 1973, 1980). As such, individual differences in working models may account for variability in gratitude.

As previously, discussed there are two broad categories of working models (Bowlby, 1969), model of self and model of others. These models can be conceptualised as dichotomous with negative and positive ends (Bartholomew & Horowitz, 1991). Given that perceptions of the intention of the giver appear to be important in eliciting feelings of

gratitude, it is likely that a model of others is influential in appraisals in the gratitude context. A positive model of others would correspond to a general trust in others' intentions, whereas a negative model contains the perception that others are untrustworthy, unreliable, or unavailable (Bartholomew & Horowitz, 1991). Thus the attachment model would suggest that people with positive models of others are more likely to feel grateful and have trait gratitude than those with a negative model of others based on their positive perception of others.

A positive model of self may also be more predictive of gratitude than a negative model of self since a negative model of self is associated with low-self-esteem and perceptions that one is unlikable (Bartholomew & Horowitz, 1991; Mikulincer et al., 2003). This is associated with negative affect and the presence of negative affect would compete and deter the development of positive affect (e.g., Fredrickson & Branigan, 2005; Isen, 1987; Wood et al., 2010) therefore reducing the likelihood of gratitude arousal. Further negative feelings about the self could reduce the arousal of gratitude because it might lead one to question why a gift was given if one was unlikable and not deserving of a gift. Additionally, a negative model of self is linked to self-preoccupation (Mikulincer et al., 2006) reflecting an internal focus, which contrasts to feelings of gratitude and trait gratitude which are outwardly focused (Wood et al., 2010; Wood, Maltby, Stewart, Linley, et al., 2008). Based on Bartholomew and Horowitz's (1991) conceptualisation, working models of self and others combine to form four attachment prototypes or styles. Securely attached individuals have a positive model of others and positive model of self and the combination is associated with good self-esteem and general perception that others are trustworthy and

well intentioned. Given the working models combinations, secure attachment style is more likely to facilitate gratitude arousal than the insecure styles.

Finally, the characteristic coping style associated with trait gratitude appears to be consistent with those of securely attached individuals. Trait gratitude has been found to be linked to positive coping strategies such as help seeking behaviour in times of stress, proactive problem solving approach, and less escapism (Wood, Maltby, Gillett, et al., 2008). Secure individuals tend to employ support seeking strategies in times of stress (e.g., Mikulincer, Florian, & Weller, 1993), are less likely to avoid problems through escapism such as substance use (Howard & Medway, 2004), and tend to engage in instrumental constructive actions in problem solving (e.g., Bowlby, 1988; Kobak & Sceery, 1988; Ognibene & Collins, 1998; Shaver & Hazan, 1993). As can be seen, the coping strategies clearly overlap. It is possible that coping styles associated with trait gratitude may derive from the same source as coping styles of securely attached individuals, with these being gained through a history of interpersonal experiences that build a secure and positive sense of self and others.

Research Evidence for Gratitude and Attachment Link

Although research on the relationship between attachment and gratitude is limited, a small number of studies provide preliminary evidence to suggest that there is a link between these constructs. For example, Lavy and Littman-ovadia (2011) explored whether character strengths such as gratitude and hope, mediated the relationship between attachment and life-satisfaction. They hypothesized that the negative associations between insecure attachment and life satisfaction is mediated by low endorsement of character

strengths. They had 394 participants complete measures of attachment (ECR), character strengths (VIA-IS measure) and life satisfaction (SWLS measure). The researchers found love, zest, gratitude and hope to completely mediate the association between avoidance and lower life satisfaction. Additionally, they found that hope, curiosity, and perspective partially mediated the relationship between attachment anxiety and life satisfaction. Interestingly they did not find a mediating relationship between gratitude, attachment anxiety and life satisfaction. The authors suggested that the mechanisms underlying life satisfaction are different for avoidant and for anxious individuals. Although this study is informative and indicates a relationship between attachment and gratitude, the relationship is in the context of life-satisfaction. The study does not focus directly on the relationship between gratitude and attachment.

More directly, Lystad, Watkins, and Sizemore (2005) examined how attachment related to gratitude and found that people with secure attachment predicted the highest level of trait gratitude and people with avoidant attachment reported the lowest gratitude. Mikulincer and colleagues (2006) conducted two studies that examined how attachment variables predicted trait gratitude direct. In the first study, Mikulincer and colleagues found that attachment avoidance was significantly and uniquely related to trait gratitude ($r = -.38$, $p < .01$) beyond the impact of self-esteem and trust, but that attachment anxiety was not significantly related to trait gratitude ($r = .07$, $p > .05$) when self-esteem and trust were controlled. The researchers reported that these results were replicated in a second sample consisting of married couples. The results show that attachment insecurity is related to trait gratitude levels such that the higher the attachment avoidance levels, the lower the gratitude levels. Attachment anxiety was found to be not directly related to trait gratitude but the

authors proposed that attachment anxiety may have an impact on trait gratitude through clouding the emotional experience with negative emotions such as anxiety and affecting the quality of feelings of gratitude. Thus, Mikulincer and colleagues' (2006) findings show preliminary evidence that attachment and gratitude are related.

Dwiwardani and colleagues (2014) found further evidence to support the link between attachment and gratitude. The researchers tested the hypothesis that secure attachment facilitates the development of virtues including gratitude, humility, and forgiveness. Using a community sample of 245 participants, they found that attachment significantly accounted for variability in trait gratitude, controlling for religiosity and resilience. Specifically, attachment anxiety was a significant negative predictor of gratitude. They found that attachment avoidance was a weak negative predictor ($\alpha < .10$) of gratitude. The same pattern was found for the relationship between forgiveness and attachment anxiety and avoidance. However, this result pattern is the reverse of that found by Mikulincer and colleagues (2006) who found avoidance to be the stronger predictor of trait gratitude. Nonetheless, studies, together, provide evidence for a link between attachment and gratitude and support for the proposal that attachment theory is useful in providing a framework for the exploration of the development of trait gratitude and gratitude in general.

Aim

The discussion presented in this chapter highlights that there is a need for more research to develop a better understanding of the gratitude construct and the focus of the thesis is to help address this gap in the literature by exploring a theory of gratitude from an attachment account. As such there are two main aims associated with this thesis research program.

Firstly, to assess the viability of the attachment framework as an account of gratitude, and, secondly, to explore whether and how attachment processes are related to gratitude and, if such a relationship exists then to establish if this is causal and to elucidate the role of attachment in gratitude.

Primary Hypotheses

The preceding text provided an analysis of the link between attachment and gratitude and demonstrated that there are theoretical associations between attachment and gratitude and some preliminary empirical support for the relationship between the two constructs. Overall, it is expected that attachment and gratitude are related with attachment security as the strongest predictor of gratitude among attachment variables.

To summarise the reasoning behind the hypothesis, it is proposed that attachment security is facilitative of gratitude arousal and thus may play a role in the development trait gratitude. It is argued that attachment security contains conditions that are analogous to factors found to elicit feelings of gratitude. First, securely attached individuals are a product of having primary caregivers who are reliably responsive and available in times of need and provide responsive care and support (Bowlby 1969). This context has elements that are in line with determinants found to elicit gratitude, in particular, it involves others who provide support which can be interpreted as a benefactor providing a gift of support, time and care. Second, securely attached individuals tend to have positive internal representations of others in the world and have positive views of the self (Bartholomew & Horowitz, 1991). These internal representations of self and others act as a guide in future situations (Bowlby 1969) and because secure individuals have positive internal representations of self and

others, they tend to view others as well-intentioned and trustworthy (Bartholomew & Horowitz, 1991). The perception that a benefactor is well-intentioned is pivotal in the arousal of gratitude (Tesser, Gatewood, & Driver, 1968). It is reasoned that with these conditions, securely attached individuals are more likely to experience gratitude than attachment insecurity and therefore attachment security is facilitative of gratitude arousal and through this influence may play a role in trait gratitude development.

The subtle difference between attachment security at the individual differences level and the normative level should be clarified here. At the individual differences level, an attachment account suggests that a secure attachment style is related to a tendency to experience gratitude. Securely attached individuals as opposed to insecurely attached individuals are more likely to experience gratitude more often because secure individuals will have the cumulative positive experiences that facilitate gratitude arousal which have been internalised into mental representations of the world and which have continuous influences on thoughts, emotions, and behaviours. In contrast, normative processes such as state or momentary feelings of security can be induced experimentally and experienced by anyone and can be used to examine the effect security has on cognition, emotion, and behaviour. Therefore the effect of normative attachment security is short lived and is observed at the state level of experience whereas the effect of secure attachment style is pervasive but cannot be manipulated and reflects individual differences in functioning. Researchers assume that people with secure attachment styles experience the effects observed associated with normative security more permanently than those without a secure attachment style (Baldwin, 2007; Mikulincer & Shaver, 2007b).

Research Design and Scope

The research program contains five studies, one cross-sectional correlational study and four experimental studies. Study 1, the cross-sectional correlational study, was considered important to conduct because it addresses the general hypothesis, the primary hypothesis, and contributes to the aims outlined. This method allows for the exploration of how individual differences in attachment processes and gratitude are related, including assessing whether secure attachment style predicts trait gratitude. Additionally the method can assess whether the findings of Mikulincer and colleagues (2006) could be replicated.

Following from the findings in the cross-sectional study, which demonstrated that attachment individual differences predicted gratitude, experimental studies were designed primarily to address the second aim and assess more directly the primary hypothesis that attachment security is facilitative of gratitude arousal and thus may play a role in the development trait gratitude. Experimental methods were used because they are more able to establish a causal relationship between two constructs and if attachment processes do account for gratitude - it would be directly related rather than just related through correlations.

Due to the lack of research on attachment and gratitude, making the research in this program relatively novel, it was important at the outset to strive when possible to employ methodologies and research designs that have been previously established and demonstrated to be reliable and effective in order to allow confidence that the results observed were experimental effects rather than confounds of the design. This condition limited the scope of the experimental designs to methods used in the attachment literature as attachment processes were the primary independent variables in this research program.

As such, the major experimental technique used in this program was priming methods which is a dominant method used in the attachment literature.

Over the course of the studies, gratitude was examined at the cognitive information processing level, state emotion level, and the trait level, thus providing information in different domains of the gratitude experience. With regard to the attachment processes examined, it is generally accepted that the spectrum of individual differences in attachment functioning is captured in full by two higher order dimensions, typically known as attachment avoidance and anxiety (Brennan et al., 1998; Feeney, 2002; Mikulincer & Shaver, 2007a). Combined, these dimensions and reflect four attachment patterns of behaviour typically known as styles (Brennan et al., 1998) and purportedly capture both attachment security and insecurity with insecurity represented by high scores on avoidance and anxiety, and security represented by absence or low scores on avoidance and anxiety (Bifulco, 2002). Thus, attachment anxiety and avoidance dimensions were used to capture individual differences in attachment functioning due to the empirical support base already established for dimensions and also, these measures were used by Mikulincer and colleagues (2006) when they assessed the relationship between attachment and gratitude. It was thought prudent to use the same measures for comparability in initial studies of the relationships between these constructs for consistency. Developments in the study of positive psychology have highlighted that positive psychology does not necessarily equate to the absence of negative psychology (Joseph & Wood, 2010; Seligman et al., 2005). Inferring the presence of attachment security from the absence of attachment avoidance or anxiety is rather indirect and some researchers have argued that it is an inadequate measure of security (Mikulincer & Shaver, 2007a). As a result, effort was made to also capture

attachment security directly when examining individual differences in attachment functioning. This was achieved using the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). State feelings of attachment security and insecurity were applied in the experimental studies to test the effect of normative processes of attachment.

Methodology and Sample

Data for the studies were obtained from four phases of data collection. Phase 1 contained a sample size of 77 (32 males, 45 females; Age range 17-31). Participants were ANU undergraduate students who were offered course credit or a small remuneration for volunteering. Participants were invited to participate in a social cognition study involving a computer task and survey response which was completed individually. Phase 2 contained a sample size of 148 (50 Males, 98 Females; Age range 17-36). Instructions and recruiting process was the same as Phase 1. Phase 3 contained a sample size of 219 (57 Males, 162 Females; Age range 17-30). Students were invited to participate in an online social cognition study and were offered course credit or a small remuneration for participation. Participants completed self-report measures and a visualisation task. Phase 4 contained a sample size of 393 (Of those who completed the entire study - 112 Males, 268 Females; Age range 17-51). The same recruitment procedure was used in phase 4 as in phase 3.

Structure

The studies are presented in chronological order and each consecutive study is informed by the results of the previous one with the exception of the cross-sectional correlational study which contains data collected from all four phases of data collection.

CHAPTER FOUR

STUDY 1 - EXPLORATION OF THE RELATIONSHIP BETWEEN INDIVIDUAL DIFFERENCES IN ATTACHMENT AND GRATITUDE

This chapter presents Study 1 which explores the relationship between individual differences in attachment and state and trait gratitude. The chapter is formatted in APA manuscript form for submission for publication. The manuscript is written as a standalone document and some repetition of the information presented in the literature review chapters of this thesis is present.

Individual Differences in Attachment Expectancies and the Prediction of State and Trait
Gratitude

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Abstract

There is a lack of research examining how individual differences in trait gratitude develop and the field lacks an adequate theoretical understanding of the gratitude construct. We propose that attachment processes influence gratitude development and explore the relationship between individual differences in attachment functioning and state and trait gratitude. It was expected that both attachment avoidance and anxiety would be negatively related to state and trait gratitude and attachment security would be positively related to gratitude. Undergraduate students ($N = 608$) were recruited over three data collection phases and completed a battery of online questionnaires for course credit. Results supported the main hypothesis although the relationships were small. Attachment security was the strongest predictor of gratitude and uniquely accounted for variability in gratitude after demographic variables, state affect, and attachment avoidance and anxiety were controlled. Attachment avoidance also uniquely predicted gratitude whereas attachment anxiety had a complex relationship with gratitude which is discussed in detail within the paper. The findings demonstrate the value of attachment theory as a framework for exploring in more depth the gratitude construct and is evidence to encourage further research using this framework.

Individual Differences in Attachment Expectancies and the Prediction of State and Trait
Gratitude

There is a burgeoning literature on the benefits of gratitude (see Wood, Froh, & Geraghty, 2010 for a comprehensive review) and its strong relationship with well-being (e.g., Emmons & Crumpler, 2000; McCullough, Emmons, & Tsang, 2002; McCullough, Tsang, & Emmons, 2004). At present, however, there is a lack of knowledge of how the trait form of gratitude is developed due to the absence of systematic studies of its development and the lack of an empirically validated theory of gratitude. This paper argues for the use of attachment theory as a theoretical framework to explore the gratitude construct further and begin the research inquiry into the mechanisms that lead to the development of patterns of individual differences gratitude.

Gratitude Construct Definition

Gratitude is a positive emotion that consists of a mixture of admiration and joy (Ortony et al., 1988), contentment, pleasant surprise (Emmons & McCullough, 2003), and appreciation and thankfulness (Adler & Fagley, 2005; Emmons & Crumpler, 2000; Lazarus & Lazarus, 1994). Research evidence suggests that feelings of gratitude are elicited when an individual attributes a positive outcome to the self originating from a well-intentioned external source. The external source can be a tangible source or an abstract impersonal entity, such as God (Emmons & Paloutzian, 2003; Solomon, 1977), or nonhuman such as animals (Teigen, 1997). The positive outcome, often thought of as a gift or favour, may be either material or nonmaterial (Emmons & McCullough, 2003).

Research suggests that gratitude can be influenced by the value of the gift, cost to the giver, and the intention of the giver (e.g., Emmons & McCullough, 2006; Ferrucci, 2006; Tsang, 2007; Wood, Maltby, Stewart, Linley, & Joseph, 2008). Findings indicate that feelings of gratitude increase as the value of the gift and cost to the benefactor increases. In addition, gratitude decreases as the intentions of the giver became less genuine. Additionally, evidence suggests that individuals still experience grateful emotions towards an external source for the attempt to provide a benefit, even if the attempt is unsuccessful and no benefit is received (Emmons & McCullough, 2006). Overall, research shows that gratitude is context dependent and is usually an interpersonal experience.

Importantly, research has shown that individual attributions are pivotal in determining feelings of gratitude. For example, Tesser and colleagues (1968) found that feelings of gratitude were dependent on an individual's attribution of the intention of the benefactor, the perceived cost to the benefactor, and the perceived benefit to the self. As outlined in the previous paragraph, feelings of gratitude were elicited when individuals perceived the intention of the external source or benefactor to be genuine. Furthermore, the higher the perceived cost of providing the gift/favour, the higher the reported feelings of gratitude. Similarly, the higher the benefit to the self, the higher the level of gratitude experienced. Wood and colleagues (2008) found that personal appraisal of these three contextual factors explained 83% of variability in state gratitude. Thus, regardless of the other determinants, gratitude is dependent on the individual making attributions about others' intentions and is classified as an attribution-dependent emotion (Weiner, 1986).

The finding relating to individual differences in attribution styles suggests possible personality differences and points to the possibility of a trait form of gratitude. Researchers

began to examine this possibility and have found strong evidence for the existence of trait gratitude. Although there is still some debate about the exact definition of trait gratitude and there exists three different measures of trait gratitude, the definition of trait gratitude is markedly similar. McCullough, Emmons, and Tsang (2002) defined trait gratitude as "a generalised tendency to recognise and respond with grateful emotion to the roles of other people's benevolence in the positive experiences and outcomes that one obtains." (p. 112). Adler and Fagley (2005) defined trait appreciation as "acknowledging the value and meaning of something (such as) an event, a person, a behaviour, an object, and feeling a positive emotional connection to it." (p. 81). Watkins, Woodward, Stone, and Kolts (2003) defined trait gratitude as the "predisposition to experience gratitude" where gratitude refers to "a feeling of thankful appreciation for favours received" (p. 432). All three definitions describe a trait tendency to experience grateful emotions which derive from perceiving a positive outcome arising from an external source.

Overall, research has supported the existence of a trait gratitude construct. Trait gratitude is distinct from, though related to, other trait-like measures of emotions such as dispositional happiness, vitality, optimism, hope, depression, anxiety, and envy (Adler & Fagley, 2005; McCullough et al., 2002; Watkins et al., 2003). It is correlated positively with extraversion and agreeableness, and negatively with neuroticism (McCullough et al., 2004). People high on trait gratitude report higher positive affectivity and well-being and differ from the normal population on prosociality and spirituality (McCullough et al., 2002). More importantly, Wood and colleagues (2008) found that trait gratitude significantly influenced individual appraisal of context determinants by increasing the

perception of cost to the benefactor, value of gift, and genuine helpfulness of the benefactor.

Attachment

Since the initial studies that provided confirmatory evidence for trait gratitude, research on gratitude has primarily explored gratitude interventions and its effect on well-being. As a consequence, there has been little research on the origins of gratitude leaving a significant gap in our understanding of the development of trait gratitude. This paper attempts to address this gap by exploring a theory of gratitude using an attachment theory perspective. Attachment theory accounts for social-cognitive and behavioural aspects of interpersonal functioning and has enjoyed strong empirical support (Jude Cassidy & Shaver, 2008). It can provide a useful framework to explore how gratitude can occur and how trait gratitude can develop through the attachment dynamics.

Attachment theory (Bowlby, 1969, 1973, 1980) is a cognitive behavioural theory of interpersonal functioning. It is underpinned by the idea that attachment is an evolved adaptive mechanism, naturally selected for its ability to enhance survival likelihood (Bowlby, 1969). According to Attachment theory (Bowlby, 1969, 1973, 1980) individual interpersonal functioning is influenced by the quality of the attachment bond between an infant and their primary caregiver. The quality of the attachment bond reflects the degree of felt security that is experienced, and varies depending on caregiver responsiveness and availability. The attachment bond is considered secure when the caregiver is responsive and available to the child in times of need (Mikulincer & Shaver, 2007a). A secure attachment bond provides the child with a safe haven to turn to in times of danger and threat, and a

secure base from which to explore the world and broaden-and-build personal resources (Ainsworth, 1989; Bowlby, 1988). An insecure attachment bond exists when caregiver responsiveness and availability in times of need is inconsistent or absent (Mikulincer & Shaver, 2007a). In instances where the caregiver responsiveness and availability are unreliable or absent, infants adjust their attachment bonding strategy to maximise responses from their caregiver. Information related to the interpersonal transactions with caregiver and the success of the adopted attachment bonding strategy are stored and internalised to inform and guide future behaviours. Consequently, patterns of attachment behaviours develop (Ainsworth 1989) and persist through to adulthood (Bowlby 1969; Hazan & Shaver, 1987). As such, the differential strategies adopted by individuals in attachment interactions form the basis of individual differences in attachment patterns of behaviour and interpersonal functioning.

Relationship between Attachment and Gratitude

Although research on the relationship between attachment and gratitude is limited, a small number of studies provide preliminary evidence to suggest that there is a link between these constructs. For example, Lavy and Littman-ovadia (2011) explored whether character strengths such as gratitude and hope, mediated the relationship between attachment and life-satisfaction. They hypothesized that the negative associations between insecure attachment and life satisfaction is mediated by low endorsement of character strengths. They had 394 participants complete measures of attachment (ECR), character strengths (VIA-IS measure) and life satisfaction (SWLS measure). The researchers found love, zest, gratitude and hope to completely mediate the association between avoidance and

lower life satisfaction. Additionally, they found that hope, curiosity, and perspective partially mediated the relationship between attachment anxiety and life satisfaction. Interestingly they did not find a mediating relationship between gratitude, attachment anxiety and life satisfaction. The authors suggested that the mechanisms underlying life satisfaction are different for avoidant and for anxious individuals. Although this study is informative and indicates a relationship between attachment and gratitude, the relationship is in the context of life-satisfaction. The study does not focus directly on the relationship between gratitude and attachment.

More directly, Lystad, Watkins, and Sizemore (2005) examined how attachment related to gratitude and found that people with secure attachment predicted the highest level of trait gratitude and people with avoidant attachment reported the lowest gratitude. Mikulincer and colleagues (2006) conducted two studies that examined how attachment variables predicted trait gratitude direct. In the first study, Mikulincer and colleagues found that attachment avoidance was significantly and uniquely related to trait gratitude ($r = -.38$, $p < .01$) beyond the impact of self-esteem and trust, but that attachment anxiety was not significantly related to trait gratitude ($r = .07$, $p > .05$) when self-esteem and trust were controlled. The researchers reported that these results were replicated in a second sample consisting of married couples. The results show that attachment insecurity is related to trait gratitude levels such that the higher the attachment avoidance levels, the lower the gratitude levels. Attachment anxiety was found to be not directly related to trait gratitude but the authors proposed that attachment anxiety may have an impact on trait gratitude through clouding the emotional experience with negative emotions such as anxiety and affecting the

quality of feelings of gratitude. Thus, Mikulincer and colleagues' (2006) findings show preliminary evidence that attachment and gratitude are related.

Dwiwardani and colleagues (2014) found further evidence to support the link between attachment and gratitude. The researchers tested the hypothesis that secure attachment facilitates the development of virtues including gratitude, humility, and forgiveness. Using a community sample of 245 participants, they found that attachment significantly accounted for variability in trait gratitude, controlling for religiosity and resilience. Specifically, attachment anxiety was a significant negative predictor of gratitude. They found that attachment avoidance was a weak negative predictor ($\alpha < .10$) of gratitude. The same pattern was found for the relationship between forgiveness and attachment anxiety and avoidance. However, this result pattern is the reverse of that found by Mikulincer and colleagues (2006) who found avoidance to be the stronger predictor of trait gratitude. Nonetheless, studies, together, provide evidence for a link between attachment and gratitude and support for the proposal that attachment theory is useful in providing a framework for the exploration of the development of trait gratitude and gratitude in general.

A number of theoretical overlaps between attachment processes and gratitude suggest that they are related. The first involves the contextual determinants of attachment security and the second relates to how working models of attachment can account for individual differences in trait gratitude. With regard to attachment security, the context associated with attachment security is similar if not analogous to a context that would, by definition, lead to feelings of gratitude. Research has shown that gratitude arousal is determined by the perception of a gift received (whether material or intangible) which has been given by an external source that is well intentioned (Tesser et al., 1968; Wood, Maltby, Stewart, Linley,

et al., 2008). The more valuable the gift and the more costly the provision of the gift to the benefactor, the higher the feelings of gratitude (Tesser et al., 1968). In parallel, attachment security is related to one perceiving that one has support and is cared for by significant others who are available to help, care, support, and guide when required and these significant others are reliable in times of need (Bowlby 1969). When the attachment security context is examined, it is clear that the elements of the contextual determinants of gratitude are contained within the attachment security experience. There are elements of the gift, the external source, the intention of the source, the value of the gift to the self, and the cost of the gift to the benefactor. It can be seen that the individual is given the gift of care, attention, support, time, and availability from an external source which is the significant others. The significant others are well-intentioned and are concerned for the welfare of the receiver. The gift has high value to the individual and to some individuals can be deemed invaluable as such a gift cannot be bought. The cost for the benefactor depends on the task but there is a cost to the benefactor at least in terms of time spent and being available and reliable to the receiver. As such, because the contexts of attachment security contain the elements that lead to gratitude arousal, it would be logical to expect that secure individuals would be more likely to experience feelings of gratitude and experience feelings of gratitude more often than those who are not securely attached. Further, for those who are securely attached, this experience of support is repeated over and over throughout childhood and adulthood, leading to more chronic experiences of gratitude. Given that the perception of context is a key determinant of gratitude, individual differences in gratitude in the securely attached population is likely. That is, not all secure people will feel gratitude because some may not perceive the context to contain the factors that lead to gratitude

arousal. Overall, theoretical analysis suggests that attachment security is linked to gratitude arousal where people who are secure are more likely to feel gratitude more often than people who are insecure. Moreover, attachment security appears to contain the determinants that would lead to more gratitude arousal over time which supports the idea that attachment processes may act as a precursor for trait gratitude development.

The second theoretical overlap concerns working models of attachment and the attribution style associated with trait gratitude identified by Wood and colleagues (2008). Wood and colleagues found that the personal appraisal of contextual factors explained 83% of variability in feelings of gratitude. Moreover, they found that people who tended to feel grateful had an attribution style that increased the perceived cost to the benefactor and the value of the gift to the self. Further, participants also perceived the intentions of the benefactor to be more genuine and altruistic. This indicates that feelings of gratitude are primarily dependent on the individual's perception of the context. Working models of attachment provides an arguably valid theoretical account of how the attribution style is developed.

Within attachment theory, working models act to maintain the patterns of behaviour associated with interpersonal functioning. Working models contain information about the interpersonal world and function as a mental representation of the world. Mental representations are adaptive because they model what could be expected given previous experiences and act to facilitate efficient information processing and behavioural responses (e.g., Bowlby, 1969; Mikulincer & Shaver, 2007) Two broad categories of working models exists(Bowlby, 1969); model of self and model of others; and each can be negative or positive (Bartholomew & Horowitz, 1991).

Given that perceptions of the intention of the giver appear to be important in eliciting feelings of gratitude, it is likely that model of others is influential in appraisals in the gratitude context. A positive model of others corresponds to general trust in others' intentions, whereas negative models of others contain the perception that others are untrustworthy, unreliable, or unavailable. The attachment model would suggest then that people with positive models of others are more likely to feel dispositionally grateful and express gratitude than those with a negative model of others. Further, a positive model of self is more predictive of gratitude than a negative model since a negative model of self is associated with low self-esteem and perceptions that one is unlikable which would likely affect the arousal of gratitude. Additionally, a negative model of self is related to self-preoccupation and feelings of gratitude and trait gratitude are oriented outwards in focus. Securely attached individuals have a positive model of others and positive model of self. This means that they have good self-esteem, generally perceive others to be trustworthy and well-intentioned and perceive themselves to be likable.

Finally, the characteristic coping style associated with trait gratitude appears to be consistent with those of securely attached individuals. Trait gratitude has been found to be linked to positive coping strategies such as help seeking behaviour in times of stress, proactive problem solving approaches, and less escapism (Wood, Joseph, & Linley, 2007b). Secure individuals tend to employ support seeking strategies in times of stress (e.g., Mikulincer, Florian, & Weller, 1993), are less likely to avoid problems through escapism such as substance use (Howard & Medway, 2004) and tend to engage in instrumental constructive actions in problem solving (e.g., Bowlby, 1988; Kobak & Sceery, 1988; Ognibene & Collins, 1998; Shaver & Hazan, 1993). As can be seen, the coping strategies

clearly overlap. It is possible that trait gratitude coping style may derive from the same source as the coping style of securely attached individuals through the functions of working models.

In summary, it is proposed that attachment security facilitates the development of trait gratitude because the situation that leads to attachment security contains factors that are similar to factors found to elicit feelings of gratitude. The reasoning follows from the idea that firstly people with secure attachment have had repeated interpersonal experiences that are positive and as a consequence have positive internal mental representations of the self and others and these positive internal representations of self and others influence their expectations of self and intentions of others in situations (Bartholomew & Horowitz, 1991). Secondly, trait gratitude reflects the tendency to feel more gratitude more intensely, more often, across more situations than normal (e.g., McCullough et al., 2002). Therefore it can be expected that the positive mental representations associated with attachment security that leads people to perceive others as well intentioned, coupled with the interpersonal context of attachment security likely facilitates the development of trait gratitude.

The Present Study

The main aim of this study is to explore how individual differences in expectancies about close relationships relate to state and trait forms of gratitude, and, to determine if the attachment perspective is a viable framework from which to investigate the development of gratitude. The main hypothesis is that patterns of attachment expectancies, or working models, are associated with gratitude. Specifically, it is proposed that ‘secure’ patterns have a positive relationship with gratitude and ‘insecure’ patterns have a negative relationship.

Specific Hypotheses

1. Given that trait measures of gratitude have been established (e.g., Adler & Fagley, 2005; McCullough et al., 2002; Watkins et al., 2003) and there is strong evidence for trait gratitude, it is expected that a state measure of gratitude will have a strong, positive relationship with extant measures of trait gratitude.
2. It is expected that secure attachment is uniquely and positively related to trait gratitude even after gender, age, trait positive and negative affect, and attachment anxiety and avoidance are controlled.
3. Attachment avoidance and anxiety are dimensional measures of individual differences in attachment (Brennan et al., 1998) that have been shown to capture variability in attachment functioning (e.g., Mikulincer & Shaver, 2007). Combined, these dimensions reflect four attachment patterns of behaviour typically known as styles (Brennan et al., 1998) and purportedly capture both attachment security and insecurity with insecurity represented by high scores on avoidance and anxiety, and security represented by absence or low scores on avoidance and anxiety (Bifulco, 2002). Since attachment security is represented by low avoidance and low anxiety, it is expected that avoidant attachment would be negatively related to trait gratitude where high levels of attachment avoidance would be associated with lower levels of gratitude.
4. Although theoretically one would expect that insecure attachment is related to lower levels of trait gratitude, the existing evidence regarding the specific relationship between attachment anxiety and gratitude (Mikulincer et al., 2006) is mixed. On balance we expect a weak relationship such that high levels of

anxious attachment are associated with low levels of trait gratitude.

5. It is expected that state gratitude will have the same pattern of association with attachment variables as trait gratitude.

Methodology

Participants

A total of 608 undergraduates recruited from the Australian National University completed a battery of questionnaires in return for course credit. The sample was pooled from four phases of data collection between 2009 and 2013¹. The sample consisted of 195 male and 413 female participants, aged between 17 years and 48years ($M = 19.84$ $SD = 2.45$).

Measures

Attachment Dimensions. Attachment dimensions were measured using the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). This is a 30-item measure scored on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). It contains original items

¹ Participants were pooled from four separate data collection phases. In two of the phases participants ($N = 225$) individually attended the lab and completed a computerised task followed by completion of questionnaires including the measures used for this study. The data for the computerised tasks were used for analysis for two different studies and with different set of hypotheses. An additional 383 participant responses were pooled from the third and fourth phases of data collection. Participants in phases 3 and 4 completed an online visualisation task followed by a battery of questionnaires including the measures used for this study. The data for the visualisation task was used for analysis for a separate study with a different set of hypotheses. Specifically, all participants from phase 3 ($N=219$) and 174 participants from phase 4 ($N=393$) were included in the sample for this study. Phase 4 data collection occurred between 2012 and 2014 and as this study was conducted in 2013, responses from 2014 were not included. Although participants in this study were subject to different experimental settings, the data used in this study involve variables that have been shown to be robust to situational changes and therefore are not susceptible to significant change due to experimental conditions.

from the ECR-R that constitute the Anxiety and Avoidance Scale (Brennan et al., 1998; Fraley et al., 2000). It has demonstrated reliability ($\alpha \geq 0.9$) and validity (Mikulincer & Shaver, 2007a). For the purposes of this study, 10 additional items were included to directly capture attachment security. The security items were derived from other well validated attachment measures including the Adult Attachment Scale (Collins & Read, 1990), the Adult Attachment Questionnaire (Simpson, Rholes, & Phillips, 1996), and the Attachment Style Questionnaire (Feeney, Noller, & Hanrahan, 1994). The language of the items was modified in this study to allow for easy comprehension for young adults. The entire measure has demonstrated reliability ($\alpha \geq 0.8$) and validity (Wilkinson, 2010, 2011). Examples of items include “I prefer not to show others how I feel deep down” (avoidant attachment), “I often worry that other people close to me don’t really love me” (anxious attachment), and “I am comfortable depending on others” (secure attachment). The internal consistency of the modified ECR-GSF in this study was $\alpha = .87$ for Avoidance, $\alpha = .87$ for Anxiety, and $\alpha = .72$ for Security (All reliability estimates reported are Cronbach's alphas).

Trait Gratitude. Trait Gratitude was measured using the Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) which is based on the work of Watkins, Woodward, Stone, and Kolts (2003). The measure captures trait gratitude through three dimensions; appreciation of people, appreciation of life, and absence of feelings of deprivation (also known as sense of abundance or Lack of Sense of Deprivation). Item examples include “I couldn’t have gotten where I am today without the help of many people” (appreciation of other people dimension), “Oftentimes I have been overwhelmed at the beauty of nature” (appreciation of life dimension), and “I really don’t think that I’ve gotten all the good things that I deserve in life” (reversed scored, absence of feelings of

deprivation dimension). The revised form contains 16 items measured on a Likert scale from 1 (Strongly agree) to 7 (Strongly disagree). The GRAT-R has good validity and reliability $\alpha = .92$ (Thomas & Watkins, 2013). The internal consistency of the GRAT-R in this study was $\alpha = .86$.

Trait Appreciation. Appreciation was measured using a modified version of the Appreciation Scale short form. The short form has strong internal consistency ($\alpha = .91$) and is strongly correlated with the long form ($\alpha = .95$) (Adler & Fagley, 2005). Items were rated on either a frequency scale of 1 (more than once a day) to 7 (never), or on an attitude scale of 1 (strongly agree) to 7 (strongly disagree). Twelve items of the short form were used and the language was modified slightly to lower the literacy level required to easily understand the items. For example, items include “I give thanks for something at least once a day” and “I count my blessings for what I have in this world”. The internal consistency of this scale in this study was $\alpha = .93$.

Affect Measure. The Positive and Negative Affect Schedule (PANAS) is a two dimensional 10-item mood scale measuring positive and negative mood (Watson, Clark, & Tellegen, 1988). The schedule can be used to measure state affect or trait affect by changing the instructions to determine the focus on current affective experience or general affective experience. Participants were asked to "indicate to what extent you feel this way right now, that is, at the present moment" (for state affect measure) or "indicate the extent you have felt this way over the past month (for trait measure of affect)". When used to measure state affect, the schedule has been shown to be sensitive to fluctuations in mood. Examples of PANAS items include “Interested”, “Excited”, “Distressed”, and “Upset”. The measure also has good test-retest reliability for trait affect. The scale has high internal

consistency (Moment PA: $\alpha = .89$, NA $\alpha = .85$; Past few weeks PA $\alpha = .87$ NA $\alpha = .87$; Year PA $\alpha = .86$, NA $\alpha = .84$) with excellent convergent and discriminant validity. The internal consistency of the affective scales in this study were: State PA $\alpha = .89$, State NA $\alpha = .89$, Trait PA $\alpha = .90$, Trait NA $\alpha = .89$.

Gratitude Ratings . The gratitude ratings scale was developed to measure participants' state level of gratitude. To measure state gratitude, items were written in present tense and participants were requested to rate their feelings of gratitude in respect to two broad domains – interpersonal and situational - across 12 items. Four items asked participants to rate their agreement to statements relating to gratitude towards significant others such as “I feel very appreciative of my close relationships” on a 7 point Likert scale (1 = strongly disagree to 7 = strongly agree). The remainder items were scenarios constructed using known state gratitude determinants (i.e., gift/benefit, given by external source) such as “a distant relative leaves you \$1000 in her Will” and “a friend buys you a coffee”. Participants were asked to indicate their feelings of gratitude for each item on a 7 point Likert scale from 1 (very ungrateful) to 7 (very grateful). The 12 items were summed to obtain a total state gratitude score. The internal consistency of the scale for this study was $\alpha = .81$.

Results

Prior to the main analysis, correlations between the appreciation and gratitude measures were examined and were found to be lower than expected. A Principal Component Analysis (PCA) with direct oblimin rotation was conducted to assess the factor structure for the combined items. Given the purpose here is to examine the relationship

between attachment processes and trait gratitude, and there is general consensus that there is one latent construct that underlies measures of trait gratitude with supporting evidence of a one factor solution reported by Wood and colleagues (2008), a PCA with one factor was conducted to examine how the items of Appreciation Scale and GRAT loaded on a one factor model. The KMO measure of sampling adequacy ($KMO = .932$) and Bartlett's Test of Sphericity ($\chi^2(45, N = 123) = 9421.58, p < .001$) indicated that PCA was viable. The log-likelihood model fit value $\chi^2(350) = 3798.52, p < .000$ indicate that there was a significant lack of fit of the one factor model to the observed data. The solution produced four eigen values above 1; 9.78, 3.50, 2.00, 1.275, and they respectively accounted for 34.91%, 12.52%, 7.16%, and 4.55% of the variance. The scree plot suggests a better fit with a two factor matrix. The factor matrix for the one factor model showed that loadings were generally moderate to high with the exception of six items (Grat 1, 3, 6, 10, 11, 15) which were poorly loaded and were .35 or below (Tabachnick & Fidell, 2007). All but one of these items (Grat1) belonged to the Lack of a Sense of Deprivation dimension on the GRAT scale and all but Grat1 loaded negatively on the factor. This suggests that the sense of abundance items, which are reverse worded items, do not fit well into the factor model and this is consistent with Wood and colleagues' (2008) findings.

A reliability analysis with all items of the GRAT and Appreciation measures together resulted in a Cronbach's $\alpha = .85$. When the Sense of Abundance items were removed, the reliability statistic increased to $\alpha = .93$. The Grat 1 item was kept because removal only made a .02 difference to the overall Cronbach's alpha. Given this result, the Sense of Abundance items of the GRAT measure were removed (i.e., Grat 3, 6, 10, 11, 15) and the

remainder items from the GRAT and Appreciation scale were collated together to create an aggregate representation of trait gratitude for the following analyses.

Correlations

Prior to the regression analyses, correlations between variables were observed (Table 2). Pearson's correlations yielded results that were generally consistent with expectations. Attachment anxiety and avoidance were moderately correlated (Hemphill, 2003) which is consistent with what has been found in the attachment literature. Secure attachment was strongly correlated to Avoidance and Anxiety. This is also as expected. Note that the correlation is below .7 indicating that although security is strongly related, it is still distinct from the avoidance and anxiety construct. As hypothesised, Trait Gratitude was significantly and negatively related to Anxiety and Avoidance. Trait Gratitude was significantly and positively related to Security. As an effect size, the correlation values indicate a weak relationship between trait gratitude and attachment variables.

State gratitude as represented by Gratitude Ratings was significantly related to Security and Avoidance in the expected direction but the effect size was small. Trait and State Positive Affect were also related to Gratitude Ratings but the effect sizes were also small. Gratitude Ratings were not significantly related to Attachment Anxiety although in the expected direction. The state and trait gratitude measures were strongly and positively correlated. This magnitude is consistent with other state and trait correlations reported in the literature (e.g., the correlation for the state and trait form of the positive affective schedule in this study was .66) (e.g., Cohen et al., 1995; McCullough et al., 2004; Spielberger, 2010).

Predictors of Trait Gratitude

A step-wise hierarchical regression was conducted with five steps to assess the unique variability of trait gratitude accounted for by attachment variables after controlling for demographic variables and trait positive and negative affect. The variables entered in each step are displayed in Table 3. Age and Gender, being covariates, were entered in the first step and accounted for 4.9% of variability ($F_{\text{change}}(3,602) = 11.22, p < .000$) in Trait Gratitude. Only Gender was a significant predictor of Trait Gratitude. Trait negative and positive affect were entered second in step 2 to determine and control for their influence on trait gratitude. Trait Positive and Negative Affect accounted for 10.8% of unique variability in Trait Gratitude ($F_{\text{change}}(2,600) = 38.53, p < .000$). Attachment variables were then entered in steps 3, 4 and 5 to determine their unique contribution to trait gratitude variability. Attachment Anxiety in step 3 was not a significant predictor of Trait Gratitude although it is in the expected negative direction. Avoidance in step 4 accounted for 1% of variability in Trait Gratitude ($F_{\text{change}}(1,598) = 7.13, p < .000$). With the inclusion of Attachment Avoidance, the standardized coefficient for Anxiety changed from negative to positive, although it is not significant. Attachment Security in step 5 accounted for 2.1% of unique variability in Trait Gratitude ($F_{\text{change}}(1,597) = 15.22, p < .000$) after all other variables were controlled. With the inclusion of Security, Attachment Avoidance became non-significant ($\beta = .008, t(597) = .164, p = .87$), and Attachment Anxiety became a significant predictor of Trait Gratitude ($\beta = .107, t(597) = 2.18, p = .03$). The final model with all predictors accounted for a total of 18.1% of variability in Trait Gratitude. Significant predictors were, in order of predictive strength, Trait Positive Affect ($\beta = .269$,

$t(597) = 7.11, p = .000$), Security ($\beta = .233, t(597) = 3.90, p = .00$), Gender ($\beta = .218, t(597) = 5.87, p = .00$), Trait negative affect ($\beta = -.11, t(597) = -2.69, p = .01$), and Anxiety ($\beta = .107, t(597) = 2.18, p = .03$).

Predictors of State Gratitude

Step-wise hierarchical regression modelling was conducted to determine the unique variability of state gratitude as represented by Gratitude Ratings accounted for by attachment variables when demographic variables and state and trait negative and positive affect was controlled. The variables entered in each step are displayed in Table 4. Age and Gender, being covariates, were entered in the first step, in Model 1, and they accounted for 9.1% of variability in State Gratitude Ratings ($F_{\text{change}}(3,526) = 26.27, p < .000$). State and trait negative and positive affect were entered second in steps 2 and 3 to determine and control for their influence on state gratitude. Model 2, with added State Negative and Positive Affect, accounted for 2.4% of unique variability in Gratitude Ratings ($F_{\text{change}}(2,524) = 7.10, p < .00$). The results show that State Negative Affect does not significantly predict Gratitude Ratings. Trait Positive and Negative Affect in Model 3, accounted for 2.4% of unique variability in Gratitude Ratings ($F_{\text{change}}(2,522) = 7.26, p < .001$). The Beta values show that the predictors are in the expected directions with Trait Negative Affect negatively related to Gratitude Ratings and Trait Positive Affect positively related to Gratitude Ratings. With the addition of Trait Negative and Positive Affect, State Positive Affect was no longer a significant predictor of Gratitude Ratings. Attachment variables were then entered in steps 4 and 5 to determine their unique contribution to state gratitude variability. Model 4 revealed that Attachment Anxiety did not significantly

predict Gratitude Ratings although the standardized coefficient is in the expected direction which is negatively related to Gratitude Ratings. Model 5 showed that Attachment Avoidance uniquely accounted for 3.0% of variability in Gratitude Ratings ($F_{\text{change}}(1, 520) = 18.94, p < .000$). The Beta value for Attachment Avoidance is in the expected direction, negatively related to Gratitude Ratings. Interestingly, with the addition of Avoidance, the Beta slope for Anxiety becomes positive, although Anxiety remains an insignificant predictor of Gratitude Ratings. Step 6 showed that Attachment Security uniquely accounted for 1.7% of variability in Gratitude Ratings ($F_{\text{change}}(1,519) = 11.15, p < .001$) in the expected direction. With the inclusion of Attachment Security, Attachment Avoidance became an insignificant predictor of state gratitude ($\beta = -.08, t(519) = -1.40, p = .16$) and the Attachment Anxiety predictor became a significant predictor of state gratitude ($\beta = .137, t(518) = 2.60, p = .01$). Trait gratitude was entered last, after attachment variables, as attachment is developed from infancy and thought to precede the development of trait gratitude. Step 7 showed that Trait Gratitude uniquely accounted for 14.9% of variability in Gratitude Ratings ($F_{\text{change}}(1,518) = 115.94, p < .000$).

The final model with all these predictors accounted for a total of 32.2% of variability in Gratitude Ratings. In the final model, after Trait Gratitude was added, Trait Positive Affect was no longer significant at $\alpha < .05$. Significant predictors were, in order of predictive strength; Trait Gratitude ($\beta = .432, t(518) = 10.77, p = .000$), Gender ($\beta = .155, t(518) = 4.13, p = .00$), Security ($\beta = .135, t(518) = 2.29, p = .02$), Anxiety ($\beta = .114, t(518) = 2.40, p = .02$), and Trait Negative Affect ($\beta = -.10, t(518) = -2.13, p = .03$).

Discussion

This study examined the relationship between individual differences in attachment and state and trait forms of gratitude. The results were generally consistent with hypotheses and provided evidence to show that attachment processes are related to gratitude both at the trait and the state level. In general, the pattern of results for state and trait gratitude was similar; Gender and Attachment Security were the strongest predictors of gratitude over that of Age, Affect, and Attachment Anxiety and Avoidance. Trait gratitude, Gender, and Attachment Security were the strongest predictors of State Gratitude respectively over Attachment Anxiety, Age, and Avoidance. Overall the pattern of relationship between attachment variables and state and trait gratitude were similar. The findings provide evidence for the expected relationship between attachment processes and gratitude and reveal novel information regarding how attachment processes relate to gratitude.

Trait Gratitude Construct

Analysis showed that the two measures of trait gratitude, GRAT and the Appreciation Scale, were not correlated to the extent expected of measures that capture the same underlying construct. Factor analysis did not show a clear one factor model, and revealed that items from the GRAT Lack of a Sense of Deprivation (LOSD) domain were poorly loaded on the one factor model. Reliability analysis indicated that these items detracted from the overall internal consistency of the scale. These results are similar to those reported by Wood and colleagues (2008). Overall, the negatively worded items, although appearing valid, are inconsistent with the latent trait gratitude construct. Given that these results were found across two independent studies, this suggests that, in the interest of measuring the

latent trait gratitude construct, researchers may want to consider removal of these items from the GRAT if they plan on using it in future.

Relationship between State and Trait Gratitude

As expected, the results showed that there was a significant and substantial association between state gratitude and trait gratitude. Due to the temporal relationship of the state and trait construct, this can be interpreted as, people who were higher on trait gratitude tended to have higher scores on the state gratitude rating. This relationship is in the expected direction and is comparable to other effect sizes found for other state and trait relationships. The findings are also consistent with those found by Wood and colleagues (2008).

Predictors of State and Trait Gratitude

The findings for state and trait gratitude were generally consistent with expectation and both state and trait gratitude had similar patterns of predictor relationships. Significant predictors of trait gratitude were, in order of predictive strength, Trait Positive Affect, Attachment Security, Gender, Trait Negative Affect, and Attachment Anxiety. Significant predictors of state gratitude were, in order of strength, Trait Gratitude, Gender, Attachment Security, Attachment Anxiety, and Trait Negative Affect. The findings are generally consistent with expectation and with results reported in the field. Gratitude researchers have observed moderate to large correlations between trait gratitude and positive affect and small to moderate negative correlation between trait gratitude and negative affect (Adler & Fagley, 2005; McCullough et al., 2002; Watkins et al., 2003). Watkins et al. (2003) found

that gratitude can enhance positive affect and speculated that it is likely that a “upward spiral” relationship is involved where positive affect and gratitude have a bidirectional impact on each other. Although the findings of previous research concerns trait gratitude, the results presented here for state gratitude demonstrates that similar mechanisms are at work for state gratitude as for trait gratitude. Gender was found to predict trait gratitude where females scored higher on trait gratitude than males. This is consistent with findings reported by Kashdan and colleagues (2009) who found gender differences in trait gratitude levels. Specifically, they found that men were less likely to feel gratitude, made more critical evaluations of gratitude and benefited less from gratitude. They found that women evaluated perceiving a receipt of a gift as less obligatory or burdensome than men and experienced greater gratitude. In another study they found that women perceived the expression of gratitude to be less complex than men. These gender differences were partially mediated by willingness to express emotions.

Individual Differences in Attachment Functioning and Gratitude

In this study, Attachment Avoidance uniquely predicted State and Trait Gratitude but Attachment Anxiety did not, after Age, Gender, and Trait Positive And Negative Affect were controlled. This result is consistent with those found by Mikulincer and colleagues (2006) and supports their interpretation that attachment avoidance, which reflects negative working models of others, inhibits the experience of gratitude. Mikulincer and colleagues (2006) argued that attachment anxiety was not related to gratitude because attachment anxiety contained an ambivalent model of others where people high on anxiety are able to hold positive views of others in the world but had negative views of other people’s

reliability and availability towards them. Hierarchical regression analysis in this study revealed an interesting and complex pattern associated with attachment anxiety and gratitude which appears contrary to expectation. Specifically, when attachment avoidance was included in the model, the relationship slope between attachment anxiety and gratitude, although not significant, changed from negative to positive. Further, when attachment security was accounted for in the model, attachment anxiety became a significant predictor of gratitude such that high attachment anxiety predicted higher state and trait gratitude. These results cannot be explained clearly by Mikulincer and colleagues' (2006) interpretation of the working models of others and anxiety. It is better explained by the working model conceptualization of Bartholomew and Horowitz (1991) where the two higher order dimensions of attachment functioning is represented by working models of self and others. Taken from Bartholomew and Horowitz's (1991) perspective, the attachment anxiety dimension represents the working model of the self and the attachment avoidance dimension represents working model of others. Therefore, the finding related to attachment avoidance is as expected, that positive models of others is related to higher ratings on state and trait gratitude. The attachment anxiety finding indicates that working models of the self dimension does not predict variation in state or trait gratitude.

However, in a model containing Attachment Security, Avoidance, and Anxiety, Attachment Avoidance became a non-significant predictor of Trait Gratitude, and Attachment Anxiety became a significant positive predictor. That is, high attachment anxiety predicted higher trait gratitude scores after secure attachment was included as a predictor. The results indicate a suppression effect (MacKinnon, Krull, & Lockwood, 2000) of attachment security on attachment anxiety. A suppression effect is evident when

“variables suppress irrelevant variance in the other predictor variable(s), thus indirectly allowing for a more concise estimate of the predictor-criterion relationship” (p. 5) (Lancaster, 1999). It appears that the inclusion of attachment security subsumed the variability in gratitude accounted for by attachment avoidance, making attachment avoidance nonsignificant and suppressed irrelevant variance associated with attachment anxiety. One possible interpretation of this suppression effect is inclusion of attachment security subsumed the variability in gratitude that relates to positive model of others and self, leaving attachment avoidance to account for variability predicted by negative model of others and attachment anxiety to account for variability predicted by negative model of self. Consequently, the results show that attachment avoidance no longer predicts gratitude, indicating that negative model of others does not impact on gratitude; and attachment anxiety significantly predicts gratitude, suggesting that negative model of self is associated with higher state and trait gratitude levels.

It suggests that people who have a negative model of the self, which reflects low self-esteem (M. Rosenberg, 1965) and self-acceptance (Fey, 1955) and relates to feelings of self-adequacy and self-efficacy, tend to feel more grateful towards others. It is known that people with high attachment anxiety have a tendency to make biased appraisals of contexts, particularly negative appraisals of themselves and ambivalent appraisals of others (Mikulincer et al., 2003, 2006). It is possible that people with a negative model of self tend to feel more grateful because they are more likely to attribute higher value to other people’s actions or gifts and higher cost related to other people for the giving of the gift.

Although this is contrary to expectation, this result brings attention to the possible impact of attachment functioning beyond the appraisal of other people’s intentions via the

model of others and towards the other determinants of gratitude, namely, value of gift and cost of provision of gift to the giver. In other words, we have so far only considered the link between attachment functioning and gratitude through the impact of the working model of others which we argue is due to its theoretical impact on a person's appraisal of other people's intention which is one of three determinants of gratitude. However, the results related to attachment anxiety and model of self, suggests that attachment functioning through the impact of the model of self could influence feelings of gratitude through the appraisal and interpretation of the remaining two determinants of gratitude - the value of the gift to the self and the cost to the benefactor for providing the gift. People with a negative model of self have low self-esteem and have feelings of inadequacy and low self-efficacy. The receipt of a gift within this context of negative perception might result in the appraisal of the gift as more valuable to self and the provision of the gift to cost more.

Although significant, the effect size for attachment anxiety and gratitude is small particularly in relation to that found for attachment security and gratitude. It is important to note that attachment security uniquely predicted gratitude when all other predictors were accounted for and among the attachment variables, had the largest effect size. This is evidence to support the argument that within attachment functioning, attachment security is a particularly important factor of consideration in relation to gratitude. We argue that attachment security plays a facilitative role in the development of trait gratitude because situations that lead to attachment security contain factors that are analogous to factors found to elicit feelings of gratitude. Attachment security is associated with perceiving that one has support and is cared for by significant others who are available and responsive to one's needs (Ainsworth, 1973; Bowlby, 1969; Mikulincer & Shaver, 2007a). Feelings of

gratitude are determined by the perception of receipt of a gift, the value of the gift to the self, the perceived intention of the benefactor, and the cost to the benefactor for providing the gift (Tesser et al., 1968; Wood, Maltby, Stewart, Linley, et al., 2008). Although the individual will likely not consciously frame their experience in these terms, situations associated with attachment security can be observed as being given the gift of care, attention, support, time, and availability from an external source which is the significant others. The significant others are well-intentioned and are concerned for the welfare of the receiver. The aid has high value to the individual and may be deemed invaluable as such gifts cannot be bought. The cost for the benefactor depends on the task but there is a cost to the benefactor at least in terms of time spent and being available and reliable to the receiver. For those who are securely attached, this experience of support is repeated over and over throughout childhood and adulthood. Therefore, people who are secure would likely experience more gratitude than those who are not secure over time. Moreover, people with secure attachment have positive internal mental representations of the self and others (Bartholomew & Horowitz, 1991) and positive internal representations of self and others influence their expectations of self and intentions of others in situations. It is argued that positive mental representations associated with attachment security leads people to perceive others as well intentioned (a necessary condition for gratitude arousal) and when coupled with the interpersonal context of attachment security (where significant others are available and responsive in times of stress and need, which can be interpreted as a valuable gift of support and care) is facilitative of gratitude arousal and thus may act as a precursor of the development of trait gratitude.

Overall, the results from this study validate previous research findings on gratitude and demonstrate the viability of attachment theory as a useful framework to investigate the development of trait gratitude. Although the findings are informative, the investigation of a theory of gratitude is still in the formative stages; there are some limitations associated with this design and more research is required to further our understanding of how attachment relates to gratitude and to better articulate the mechanisms involved.

Limitation and Future Research directions

There are a number of limitations associated with this study. First, it is of a correlational design and results cannot be interpreted as direct or causal, limiting the inferences that can be made relating to attachment variables and gratitude. That being said, the findings in this study provide important information about how attachment variables and other variables relate to gratitude which form an important foundation to direct future research questions and explorations. Correlational information is a necessary complement to direct, causational information in constructing an in depth, comprehensive understanding of phenomena (Kenny, 1979; Stanovich, 2007). Second, the attachment processes examined in this study were limited to those measured by the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). Although these are the most commonly used, and arguably among the most studied attachment individual difference dimensions, there are other facets of attachment functioning and other measures of attachment processes that were not directly captured in this study. For example, individual differences in attachment functioning can be observed at the cognitive level where differences in working models of self and others have

been shown to influence people's perception of situations (e.g., Bartholomew & Horowitz, 1991; Scharfe & Bartholomew, 1994). A key premise that attachment security and gratitude are linked is based on the functions of working models of attachment. Future research could directly assess how working models of self and others relate to gratitude using the Relationship Questionnaire (Bartholomew & Horowitz, 1991) which operationalises attachment individual differences on working models of self and others. Further, four attachment prototypes can be discerned from the RQ which can be used to explore how different attachment styles relate to gratitude and can be used to test how different combinations of working models of self and others impact on the arousal of gratitude and the development of gratitude.

Finally, the participant sample was recruited from undergraduate university students who are not necessarily representative of the general population. The age of the sample was relatively young, and the results seem to indicate that there is a weak relationship between age and state gratitude although this relationship is subsumed when trait gratitude was included in the model. In any case, even though the particulars of the sample used in this study did not appear to affect the integrity of this study in carrying out the aim and testing the hypotheses relating to attachment and gratitude, it is worthwhile to attempt to gain a sample that is representative of the normal population to allow high confidence in generalising results to the general population. It would be desirable to see future research studies collect data from samples that differ from this one, perhaps with a wider age range or recruited from the community to complement the findings from this sample. Even considering those limitations, this study provided valuable and novel information about the

relationship between attachment processes and trait and state gratitude. This study is among very few that has attempted to address the gap in our understanding of the development of trait gratitude and in doing so it has provided a solid foundation of supporting evidence for future research endeavours exploring attachment functioning and trait gratitude development.

Conclusion

In summary, the findings from this study demonstrated the value of attachment theory as a framework for exploring in more depth the gratitude construct and to examine ideas on how gratitude and trait gratitude develops. Evidence from this study demonstrates that attachment security uniquely predicts state and trait gratitude even after controlling for demographic variables, affect, and attachment avoidance and anxiety. These results highlight the possible contribution of attachment processes in accounting for gratitude, and encourage further research in this area

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Table 1

Factor loadings from principal components analysis with oblimin rotation for 28 items from the short version of the Gratitude, Resentment, and Appreciation Test (GRAT) and the Appreciation Scale (AS) (N=608)

Items	Factor
Grat1	.242
Grat2	.380
Grat3	-.200
Grat4	.472
Grat5	.382
Grat6	-.258
Grat7	.385
Grat8	.486
Grat9	.475
Grat10	-.189
Grat11	-.213
Grat12	.593
Grat13	.494
Grat14	.520
Grat15	-.253
Grat16	.609
App1	.687
App2	.659
App3	.662
App4	.596
App5	.760
App6	.741
App7	.809
App8	.773
App9	.778
App10	.786
App11	.795
App12	.656

Table 2

Pearson's Correlations

	Gratitude Ratings	Stateneg	Statepos	Traitneg	Traitpos	Anxiety	Avoidance	Secure	Trait Gratitude
Stateneg	-.068								
Statepos	.125**	.161**							
Traitneg	-.149**	.618**	.021						
Traitpos	.159**	-.020	.661**	.045					
Anxiety	-.050	.294**	.006	.357**	-.092*				
Avoidance	-.251**	.134**	-.118**	.252**	-.128**	.299**			
Secure	.247**	-.179**	.161**	-.302**	.184**	-.608**	-.647**		
Trait	.519**	-.076	.284**	-.137**	.291**	-.100*	-.195**	.254**	
Gratitude									
Mean	5.96	13.82	24.71	14.75	25.92	2.73	2.87	2.89	130.06
Stdev	.55	5.50	7.54	5.87	8.30	.75	.69	.53	20.16

Note. Stateneg = State negative affect; Statepos = State positive affect; Traitpos = Trait positive affect; Traitneg = Trait negative affect. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 3
Step-wise Hierarchical Regression of Attachment Variables on Trait Gratitude controlling for the effects of Gender, Age, and Trait Positive and Negative Affect.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R ² Change	F _{change}	df1	df2	Sig. F _{change}
1	.228a	.052	.049	19.68791	.052	16.550	2	603	.000
2	.400b	.160	.155	18.56206	.108	38.683	2	601	.000
3	.401c	.161	.154	18.57250	.000	.324	1	600	.569
4	.413d	.171	.162	18.47487	.010	7.358	1	599	.007
5	.438e	.192	.182	18.25702	.021	15.381	1	598	.000

Note. Traitpos = Trait positive affect; Traitneg = Trait negative affect

- a. Predictors: (Constant), Gender, Age
- b. Predictors: (Constant), Gender, Age, Traitpos, Traitneg
- c. Predictors: (Constant), Gender, Age, Traitpos, Traitneg, Anxiety
- d. Predictors: (Constant), Gender, Age, Traitpos, Traitneg, Anxiety, Avoidance
- e. Predictors: (Constant), Gender, Age, Traitpos, Traitneg, Anxiety, Avoidance, Secure

Table 4
Step-wise Hierarchical Regression of Attachment Variables on State Gratitude controlling for the effects of Gender, Age, and State and Trait Positive and Negative Affect.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R ² Change	F _{change}	df1	df2	Sig. F _{change}
1	.301a	.091	.087	.52358	.091	26.267	2	526	.000
2	.339b	.115	.108	.51761	.024	7.100	2	524	.001
3	.372c	.139	.129	.51154	.024	7.258	2	522	.001
4	.372d	.139	.127	.51203	.000	.002	1	521	.964
5	.411e	.169	.156	.50343	.030	18.940	1	520	.000
6	.432f	.186	.172	.49859	.017	11.151	1	519	.001
7	.579g	.335	.322	.45113	.149	115.942	1	518	.000

Note. Stateneg = State negative affect; Statepos = State positive affect; Traitpos = Trait positive affect; Traitneg = Trait negative affect. a. Predictors: (Constant), Gender, Age. b. Predictors: (Constant), Gender, Age, Statepos, Stateneg. c. Predictors: (Constant), Gender, Age, Statepos, Stateneg, Traitneg, Traitpos. d. Predictors: (Constant), Gender, Age, Statepos, Stateneg, Traitneg, Traitpos, Anxiety. e. Predictors: (Constant), Gender, Age, Statepos, Stateneg, Traitneg, Traitpos, Anxiety, Avoidance. f. Predictors: (Constant), Gender, Age, Statepos, Stateneg, Traitneg, Traitpos, Anxiety, Avoidance, Secure. g. Predictors: (Constant), Gender, Age, Statepos, Stateneg, Traitneg, Traitpos, Anxiety, Avoidance, Secure, Trait Gratitude

CHAPTER FIVE

STUDY 2 - INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY ON GRATITUDE USING THE LEXICAL DECISION TASK

The previous chapter presented research that explored the relationship between individual differences in attachment processes and gratitude. The results provided evidence that attachment processes are associated with gratitude, with attachment security as the strongest predictor of gratitude among attachment variables. These findings provided support for an attachment perspective of gratitude and encourage further exploration of the relationship between these two constructs. Accordingly, this study builds on the findings of the previous chapter by exploring whether there is a causal relationship between attachment and gratitude. In particular, this study assesses the causal link between attachment security and gratitude at the cognitive level of processing.

As reviewed in Chapters 1 to 3, there is a significant lack of research examining the relationship between attachment and gratitude. In fact there are no known studies that directly investigate the causal relationship between these two constructs (Watkins, 2014). As such there are no particular research methods that have previously been used and tested for the study of these two variables together that can be employed here. Thus, the method used in this study to test the causal link between these two constructs is novel with regard to the study of these two variables together. The following section details methodologies that have been used to study causality in the attachment literature and provides a rationale for the methodology employed in this study. Previous experimental methodologies within

the gratitude literature predominantly involve gratitude interventions, are not relevant to this study, and as a result, is not reviewed here.

Recent advances in experimental priming techniques have allowed researchers to directly explore the cognitive processes involved in attachment functioning and allowed them to design studies to test the premises of attachment theory at the cognitive level. Research stemming from these techniques have provided important causal evidence demonstrating the validity of the attachment theory of interpersonal functioning (e.g., Baldwin, Fehr, Keedian, Seidel, & Thomson, 1993; Banse, 1999; Mikulincer, Gillath, Sapir-lavid, & Yaakobi, 2010). Consistent with the premises of attachment theory, researchers have shown that when a threat is encountered, attachment related schemas are activated (e.g., Mikulincer et al., 2002), the accessibility of mental representations of attachment figures is increased (e.g., Ein-Dor, Mikulincer, & Shaver, 2011; Gillath et al., 2006; Mikulincer et al., 2000, 2002; Pierce & Lydon, 1998), and attachment related goals become salient (e.g., Gillath et al., 2006). Additionally, it has been demonstrated that a sense of security can be induced using priming techniques and this sense of security induces effects that are consistent with the broaden-and-build model of functioning (e.g., Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Mikulincer & Shaver, 2001). Indeed, induction of security is related to increased positive affect, positive expectations of relationships (Rowe & Carnelley, 2003), increased self-esteem, a reduction in anxiety (Carnelley & Rowe, 2007), promotion of empathic responses (Mikulincer, Hirschberger, et al., 2001), and promotion of endorsement of self-transcendent values (Mikulincer et al., 2010).

These advances in our understanding of the cognitive processes and influences of attachment were not possible without developments in cognitive experimental priming techniques. Priming is a broad term that refers the presentation of stimuli prior to an event (e.g., Balota & Lorch, 1986). The stimuli 'prime' the participants, that is, activate related schemas in the participants' mind and influences their responses. Cognitive priming techniques are based on the idea of interconnecting neuronal network activation, where presented stimuli creates an activation cascade for networks that are associated with the stimuli (Collins & Loftus, 1975). Activation heightens the network's readiness to act and influences mental processes which in turn influence behaviour.

Experimental designs using priming techniques have been shown to be effective for testing causal relationships and this methodology has been preferred by many researchers studying causal relationships in the attachment literature (e.g., Baldwin, Carrell, & Lopez, 1990; Mikulincer et al., 2002). Broadly, two types of priming techniques exists; supraliminal and subliminal priming; which differ in whether the prime is consciously perceived by the participant or not. Supraliminal priming studies are often used when socially desirable responding is not a factor in the experiment because the participant is able to consciously perceive the prime. This method works best when participants are unable to ascertain the purpose of the prime in the experiment. However, in social psychology, socially desirable responding is often a problem for experimenters who want to observe the true relationship between two variables. The subliminal priming technique, where primes are presented in a way that participants are unable to consciously perceive the prime, provides a solution for this problem. This method also helps researchers explore unconscious mental processes at work. Accordingly, attachment researchers tend to prefer

the subliminal priming designs (e.g., Mikulincer, Gillath, & Shaver, 2002) and consequently the majority of priming studies in the field are subliminal in design.

A subliminal priming technique was used in this study to explore attachment and gratitude because attachment priming effects are better established for this technique than others (Baldwin, 2007; Carnelley & Rowe, 2010; Gillath, Selcuk, & Shaver, 2008; Mikulincer et al., 2002). Moreover, a computerized lexical decision task (Meyer & Schvaneveldt, 1971) was employed with an affective priming technique based on Mikulincer, Gillath, and Shaver (2002: Study 1 and 2) to examine how attachment relates to gratitude. The lexical computer task requires that participants assess a letter string to determine whether the letter string is a word or a non-word. The participants' reaction times (RTs) represent the relationship between prime and the target; the faster the reaction time, the stronger the connection between the two variables. The study is a 3x4 within subject factorial design with prime word conditions (Secure, Neutral, Positive) and type of target stimuli (Gratitude Words, Neutral Words, Secure Words and Non-Words). The dependent variable is the reaction time to each target stimulus. It is hypothesised that positive mental representations of self and others, associated with attachment security, is necessary for the formation of gratitude. The main prediction is that induced attachment security leads to faster reaction times to gratitude words than neutral words.

It is expected that positive mental representations of self and others, associated with secure attachment style, is necessary for the formation of gratitude. Therefore it is expected that when attachment security is primed, response rates to gratitude words will be faster than compared to a neutral condition or when attachment insecurity is primed.

Hypotheses:

1. In the Secure Prime condition, the response time for Gratitude words will be faster than Neutral words.
2. Response time for Gratitude words would be faster in the Secure Prime condition than the Neutral Prime condition.
3. Response time for Gratitude words will be faster in the Secure Prime condition than the Positive Prime condition.
4. In the Secure Prime condition, response time for Secure words will be faster than Neutral words.

Methodology

Participants

Undergraduate students from the Australian National University participated in the study for course credit. 32 were male (42%) and 45 were female (58%). The average age of the sample was 21 years with a range of 17 to 31 years. 45 (58%) participants had English as their first language and 32 (42%) had English as their second language.

Procedure

Notices and flyers about the study were posted online and on billboards at the Australian National University. Interested parties contacted the researcher via email and arranged for a time to attend. On arrival, participants were told that as part of the study they would perform a lexical decision task followed by an online survey.

The computer task was programmed based on procedure used by Baldwin et al. (1993) and Mikulincer et al. (2000). The task was run on a Dell PC with a colour monitor. Brightness and contrasts were set low and the primes and target letter strings were displayed in white lettering on a black background in the middle of the monitor. Participants worked at their own pace but were instructed to complete the task as fast as they could. They were given 30 practice trials followed by 360 experimental trials. The words and non-words in the practice trials were different from those given in the experimental trials.

The three prime categories each contained three prime words which were randomly presented. For the Secure Prime Condition, three prime words (Love, Secure, and Safe) were selected based on their association with attachment security. The Positive Prime Condition contained prime words (Luck, Happy, and Success) that are associated with positive emotions. The Neutral Prime Condition contained neutral prime words (Box, Desk, and Paper), selected for their neutrality of emotional valence. The target letter strings consisted of words randomly presented from four word categories: Gratitude Words, Secure Words, Neutral Words, and Pseudo Words. There are five unique words each in the Gratitude and Secure Word categories, 10 words in the Neural Words Category, and 20 in the Pseudo Category. Examples of targets include computer (Neutral Words Category), supported (Secure Words category), grateful (Gratitude Words Category), and formcot (Pseudo Words Category). Again words were selected for each category based on their relevance to the category. That is, words associated with feelings of gratitude (according to the gratitude literature) were selected for the Gratitude Words Category, words associated with attachment security were selected for the Secure Words Category, and words with

neutral emotional valence were selected for the Neutral Words Category. The Pseudo Words Category was composed of scrambled words from the other three categories.

Each trial consisted of rapid subliminal presentation of a prime word followed by the presentation of one target letter string. Participants judged as quickly as possible whether the letter strings were words or not by pressing assigned keys on the keyboard. On each trial, the prime was presented for 33ms (which is not long enough for participants to consciously see it), followed by a backward mask for 33ms, followed by a letter string (target). Participants were told that each trial would begin with a + in the middle of the screen and that they should fix their eyes on it. They were told that the + would then be followed by a light flash, which should be ignored, and then a target letter string will appear. The + was present for 835ms followed by the presentation of a forward mask (XXXXXXXXXX) for duration of 167ms. One of three primes (neutral word, secure word, or positive word) followed after, presented subliminally for 33ms followed by a backward mask (XXXXXXXXXX) for 33ms duration. Because the prime may produce an afterimage that is temporarily active in the peripheral parts of the visual system, a backward mask of XXXX was presented immediately after the prime presentation. Forward and backward masks are visual patterns added before and after a stimulus to mask the conscious perception of the stimulus. The backward mask is followed by presentation of a target from one of four categories: Neutral words, Secure words, Gratitude words or Pseudo words/Non-words. Participants judged as quickly as possible whether the target was a word or not. Participants pressed the "L" key on the keyboard if they thought the target was a valid word and pressed the "A" if they thought the target word was not a valid word. After the participant responds, the stimulus item disappears from the screen which is followed by

600ms pause before the next trial begins. As a manipulation check, participants were asked at the end of the experiment to indicate whether they had seen a word within the “flash of letter strings” (i.e., the prime) that appeared before the target presentation. If the participants indicated that they had, they were asked to report the word that they had seen. Data from participants who had perceived the prime were removed from analysis. Secure targets and gratitude targets are matched for word length.

Materials

Attachment Dimensions. Attachment dimensions were measured using the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). This is a 30-item measure scored on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). It contains original items from the ECR-R that constitute the Anxiety and Avoidance Scale (Brennan et al., 1998; Fraley et al., 2000). It has demonstrated reliability ($\alpha \geq 0.9$) and validity (Mikulincer & Shaver, 2007a). For the purposes of this study, 10 additional items were included to directly capture attachment security. The security items were derived from other well validated attachment measures including the Adult Attachment Scale (Collins & Read, 1990), the Adult Attachment Questionnaire (Simpson et al., 1996), and the Attachment Style Questionnaire (Feeney et al., 1994). The language of the items was modified in this study to allow for easy comprehension for young adults. The entire measure has demonstrated reliability ($\alpha \geq 0.8$) and validity (Wilkinson, 2010, 2011). Examples of items include “I prefer not to show others how I feel deep down” (avoidant attachment), “I often worry that other people close to me don’t really love me” (anxious attachment), and “I am comfortable

depending on others” (secure attachment). The internal consistency of the modified ECR-GSF in this study was $\alpha = .86$ for the avoidance dimension, $\alpha = .90$ for the anxiety dimension, and $\alpha = .67$ for attachment security (all reliability estimates reported are Cronbach's alpha).

Trait Gratitude. Trait Gratitude was measured using the Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) which is based on the work of Watkins, Woodward, Stone, and Kolts (2003). The measure captures trait gratitude through three dimensions; appreciation of people, appreciation of life, and absence of feelings of deprivation (also known as sense of abundance). Item examples include “I couldn’t have gotten where I am today without the help of many people” (appreciation of other people dimension), “Oftentimes I have been overwhelmed at the beauty of nature” (appreciation of life dimension), and “I really don’t think that I’ve gotten all the good things that I deserve in life” (reversed scored, absence of feelings of deprivation dimension). The revised form contains 16 items measured on a Likert scale from 1 (Strongly agree) to 7 (Strongly disagree). The GRAT-R has good validity and reliability $\alpha = .92$ (Thomas & Watkins, 2013). The internal consistency of the GRAT-R in this study was $\alpha = .87$.

Trait Appreciation. Appreciation was measured using a modified version of the Appreciation Scale short form. The short form has strong internal consistency ($\alpha = .91$) and is strongly correlated with the long form ($\alpha = .95$) (Adler & Fagley, 2005). Items were rated on either a frequency scale of 1 (more than once a day) to 7 (never), or on an attitude scale of 1 (strongly agree) to 7 (strongly disagree). Twelve items of the short form were used and the language was modified slightly to lower the literacy level required to easily understand the items. For example, items include “I give thanks for something at least once a day” and

“I count my blessings for what I have in this world”. The internal consistency of this scale in this study was $\alpha = .93$.

Results

Cleaning and Screening

Prior to analysis, the reaction times (RT) for correct responses were averaged for each target stimuli category and prime condition for each individual. 9% of participants had more than 5% of reaction times over 1200ms and no reaction times were over 2000ms. RTs for individual trials that were higher than 1500ms were considered to be incorrect. 3% of the trials had reaction times were above 1500ms with 10% of participants having more than 5% of reaction times over 1500ms. Participants with an accuracy rate below 90% were excluded from subsequent analysis. Of the 77 participants, 14 participants (18%) had below 90% accuracy and were subsequently removed from analysis, leaving 63 participants. No participants had more than 5% of trials that were outliers (cut off criteria $z > 3.29$).

The survey data set was screened for out-of-range values, and implausible means and standard deviations. No evidence was found for the presence of multicollinearity or singularity. Assumptions of normality, homoscedasticity, and linearity were assessed and found to be plausible for the majority of variables in the data set.

Affective Priming and Reaction Time to Gratitude Words

***A priori* Analysis**

Paired sample t-tests were conducted to assess the four specific hypotheses. Consistent with expectations, in the secure condition, participants responded significantly

faster to Secure words ($M = 555.48\text{ms}$) than to Neutral words ($M = 570.68\text{ms}$) ($t(62) = -3.19, p = .002$). However, contrary to expectations, participants were significantly slower to respond to Gratitude words ($M = 581.87\text{ms}$) than Neutral words ($M = 570.68\text{ms}$) in the Secure condition ($t(62) = 2.08, p = .04$); there were no significant differences in response time between gratitude words in the secure condition ($M = 582.87\text{ms}$) and Gratitude words in the Neutral condition ($M = 573.59\text{ms}$); and no differences were found in response time between Gratitude words in the Secure condition ($M = 581.87\text{ms}$) and Gratitude words in the Positive condition ($M = 573.59\text{ms}$).

Post Hoc Analysis

Follow up post hoc analysis was conducted to understand the results further. A 3×3 repeated measures analysis of variance was conducted for prime condition (Secure, Positive, Neutral) and target stimuli (Gratitude words, Secure words, and Neutral Words). The results revealed a significant main effect for target type, $F(2, 124) = 17.934, p = .000, \eta_p^2 = .224$, indicating that participants responded differently to different categories of words. The main effect for prime and the prime and target interaction were not significant ($F(2, 124) = 2.49, ns, \eta_p^2 = .04$; $F(4, 248) = .49, ns, \eta_p^2 = .01$).

The estimated marginal means statistic for each target category reveal that Secure targets had the fastest RTs ($M = 553.15\text{ms}$), followed by Neutral targets ($M = 569.32\text{ms}$), followed by Gratitude targets ($M = 576.22\text{ms}$). Non-orthogonal comparisons showed that RTs for Gratitude words were significantly slower than Secure words ($t(62) = 5.28, p = .00$); RTs for Gratitude words were not different from Neutral words ($t(62) = 1.575, ns$) and RTs for Secure words were significantly faster than the Neutral words ($t(62) = -5.51, p =$

.00). The results indicate that participants responded faster to Secure words than to other words. Consequently, the analyses indicate that the main target effect resulted from participants responding faster to Secure target words than other types of target words regardless of prime conditions.

Overall, the estimated marginal means plot (Figure 3) showed a trend in the data that was in the opposite direction to what was hypothesised, although analysis showed that the differences were not statistically significant ($t(62) = 1.38$ ns). RTs for Gratitude words were slower in the Secure condition ($M = 581.87$ ms, $SD = 80.41$) compared to the Neutral ($M = 573.19$ ms, $SD = 84.61$) and Positive condition ($M = 573.59$ ms, $SD = 67.40$).

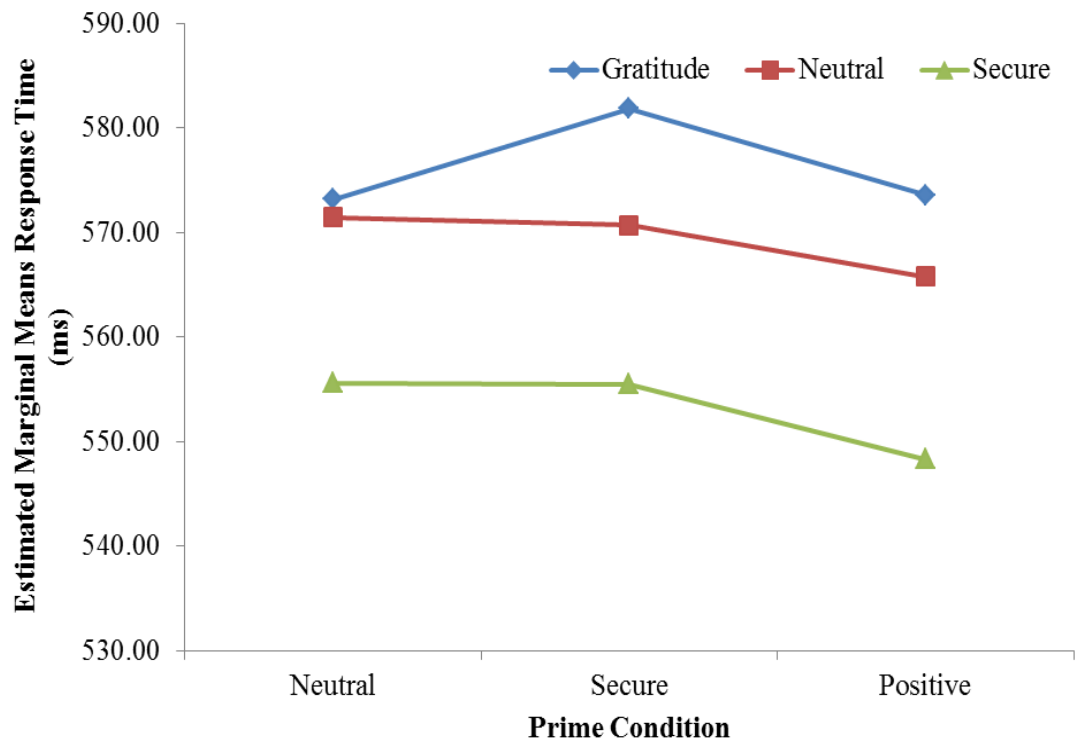


Figure 3. Estimated marginal means of reaction time by Prime and Target.

The Contribution of Attachment Style, Trait Gratitude and English as a Second Language (ESL)

Both attachment processes and gratitude have state and trait levels of experience. Because traits can influence behaviour and state level performance it is also important to consider whether attachment styles and trait gratitude influenced variations in RTs. Further, English as a second language (ESL) may affect participants' responses to computerised word tasks that are in English. To assess for the possible interaction between these variables and performance on the Lexical Decision task, and control for it, a 3 x 2 repeated measures ANCOVA was conducted with prime (Secure, Neutral, Positive) by target type (Gratitude and Neutral) with Attachment Avoidance, Attachment Anxiety, ESL, and Trait Gratitude as covariates.

The model revealed one significant main effect for ESL ($F(1, 58) = 8.4, p < .01, \eta_p^2 = .13$). People with ESL had generally longer RTs. No interaction effect was found between ESL and prime and target. This suggests that people with ESL generally responded slower to the target words but that the proficiency did not interact with other variables. Main effects for Avoidance, Anxiety, and Trait Gratitude were not statistically significant. The prime and target interaction effect was not significant. However simple effects test showed that RTs for Gratitude targets were significantly slower than RTs for Neutral words in the Secure condition ($t(57) = 2.02, p < 0.05$). No simple effects were found in the Neutral or Positive condition.

With the individual differences variables included in the analysis as covariates and accounted for, two significant interaction effects were revealed; The interaction between Prime, Target, and Avoidance ($F(2,116) = 2.961$ $p = .056$ $\eta_p^2 = .049$, power = .566) and the interaction between Target and Avoidance ($F(1,58) = 4.07$ $p < .05$ $\eta_p^2 = .066$, power = .509). The specifics of these interaction effects are illustrated in Figures 4 to 7. In particular, in the Neutral condition (Figure 4), high avoidance levels were associated with longer RTs on Gratitude words and shorter RTs on Neutral words. Under positive affective priming (Figure 5), avoidance levels did not affect RTs on Neutral words but was still associated with slower RTs for Gratitude words compared to Neutral words. Under Secure priming (Figure 6), Avoidance had no influence on RTs for either target type. Figure 7 displays the beta estimate of Avoidance by Prime and Target on RTs. The figure shows the relative magnitude of influence of Avoidance across Prime and Target. The influence is largest in the Neutral condition where affective priming was not applied. When positive affect was primed, in the Positive condition; the effect of Avoidance on response to Neutral target seen in the Neutral condition disappeared. In fact, the Avoidance beta estimate changed from negatively valence to positively valence. The interaction between Avoidance and Gratitude target appear similar to the Neutral condition and unchanged. In the Secure condition, where security was primed, the effect of Avoidance on response to both target types seen in the Neutral condition no longer existed. Overall, the figure series show that Avoidance moderated the effect of target type on response time in the Neutral condition and the Positive condition but this effect was neutralised in the Secure condition.

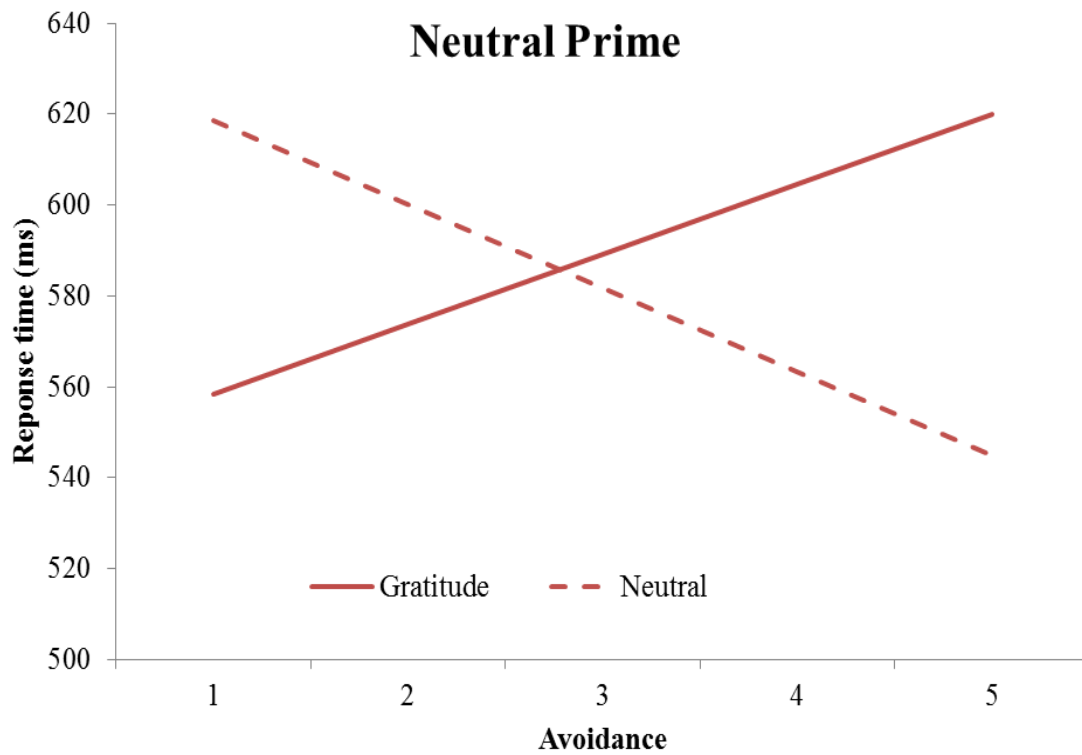


Figure 4. Interaction between avoidance and target in the neutral condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait Gratitude = 4, ESL= 1.

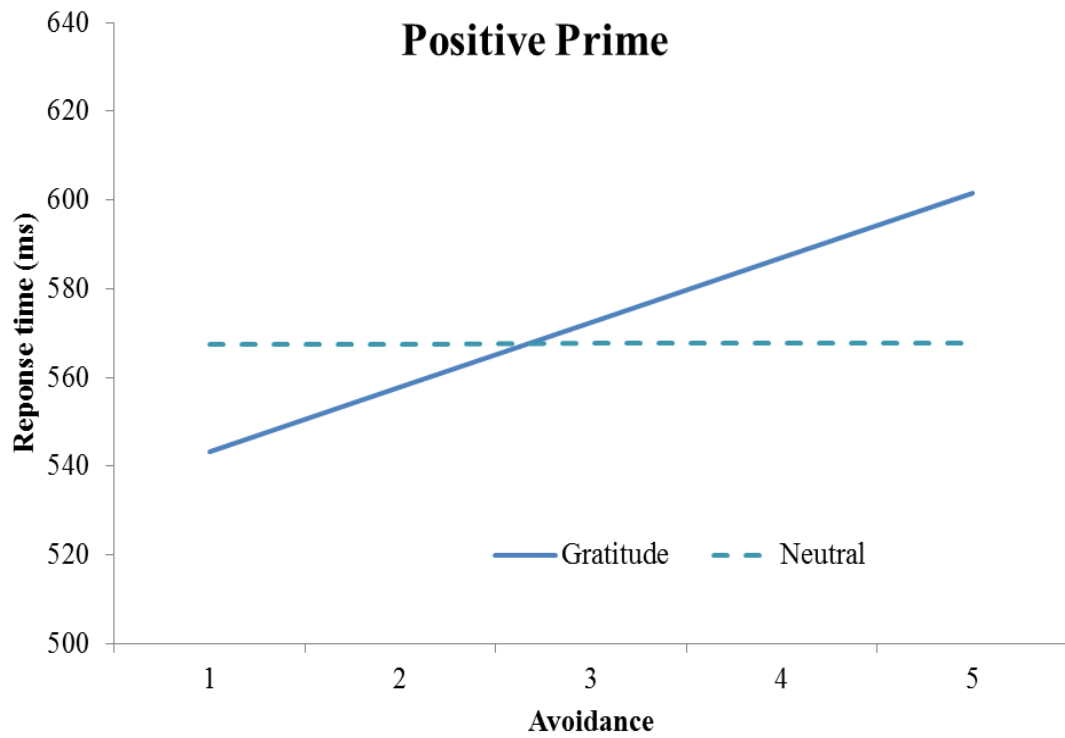


Figure 5. Interaction between avoidance and target in the positive condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait gratitude = 4, ESL= 1.

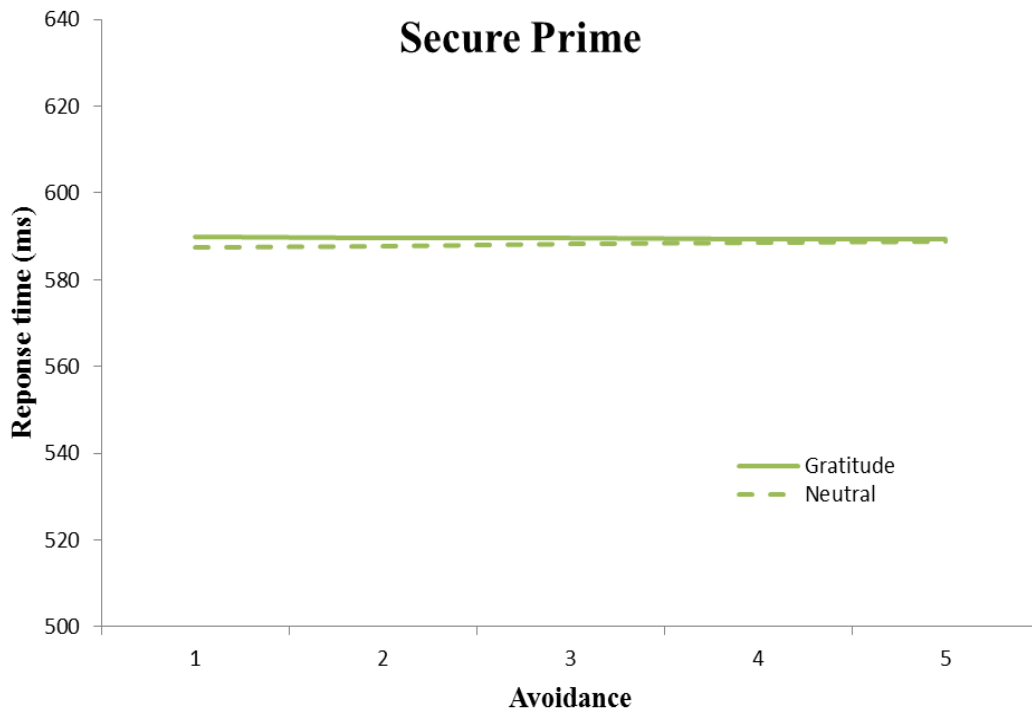


Figure 6. Interaction between avoidance and target in the secure condition on mean response time. Other covariates in the model were held constant: Anxiety = 3, Trait gratitude = 4, ESL= 1.

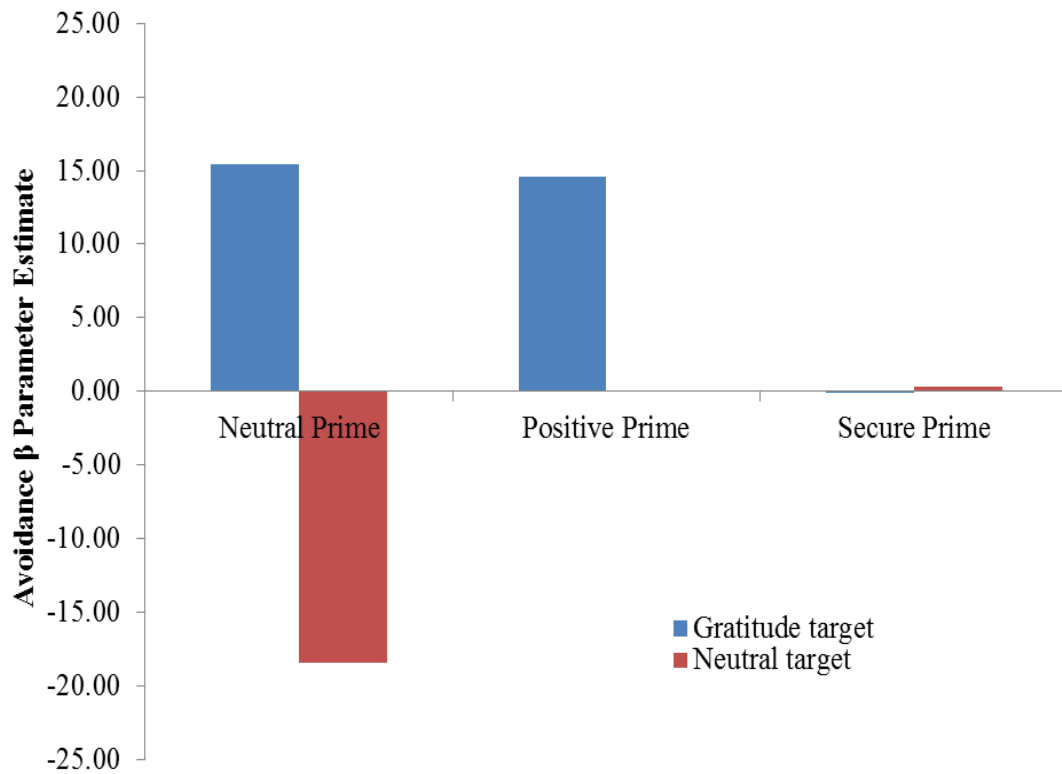


Figure 7. Avoidance Beta parameter estimate by target and condition

Discussion

The results from this study were somewhat unexpected and impeded the direct testing of the hypotheses set out earlier. First, in accordance with expectations, in the Secure condition, the RTs for Secure words were found to be significantly faster than the Neutral words. This suggested that the secure priming was effective. However, contrary to expectations, within the Secure condition, participants' reaction times to Gratitude words were significantly slower than Neutral words. Moreover, there were no significant differences found between Gratitude words in the Secure condition and Gratitude words in the other conditions. Further analyses were conducted to explore the mixed results and the analyses revealed a direct relationship between individual differences in attachment

avoidance and responses to the Gratitude target which was moderated by prime condition. This finding provides tentative support for the general hypothesis that attachment processes are related to gratitude and is detailed below.

Post hoc analyses revealed a significant main effect for Target which helped clarify some of the mixed results found in the *a priori* analysis. The target effect showed that participants responded faster to attachment security words than Gratitude or Neutral word categories. This suggests that there is a general preference for attachment related words leading participants to respond faster to Secure words regardless of priming condition. Moreover, it indicates that the statistical difference between Secure words and Neutral words in the Secure condition may be an artefact of the main target effect rather than due to the effect of Secure priming.

Further analyses were conducted to better understand the results by controlling for the effects of covariates thought to have an influence on participants' response time including Attachment Avoidance, Anxiety, Trait Gratitude, and ESL. When these were accounted for, the main target effect became insignificant, a main effect for ESL was found and two interaction effects were revealed; a partially significant two-way interaction between Attachment Avoidance and Target, and a three-way interaction effect between Attachment Avoidance, Target, and Prime condition. The target effect changed to insignificance after the covariates were controlled suggesting that the target main effect observed in the previous analysis was a manifest of trait variables, likely the avoidance and anxiety variables. The results of this analysis indicated that ESL influenced participants' reactions times in general where participants with English as a second language were

generally slower in the Lexical Decision task than participants who had English as a first language.

More importantly, the interaction effects finding showed that individual differences in attachment avoidance levels affected participants' response time to information depending on the prime condition. In the Neutral condition those with higher attachment avoidance were slower to respond to gratitude information and responded faster to neutral information compared to other conditions. In the Positive affect condition, where positive affect was primed, high attachment avoidance was similarly associated with slower response time to gratitude information, however individual differences on attachment avoidance no longer impacted on participants' responses to neutral information. In the Secure condition, where attachment security was primed, individual differences on attachment avoidance did not impact on participants' responses to gratitude or neutral information.

The results suggest that, in general, attachment avoidance is likely associated with suppression or blocking of information processing of gratitude information compared to neutral information. Research has shown that attachment avoidance is related to suppression of emotion, particularly those specific to attachment (Edelstein & Gillath, 2008). Only attachment security priming negated the influence of attachment avoidance on response times to gratitude information, positive affective priming did not have this effect. It appears that under the Neutral and Positive affect priming condition, individual differences on avoidance influenced participants' cognitive processing of conscious information so that, gratitude information which may be perceived to be related to attachment is suppressed and therefore reaction times to gratitude information is slowed.

However under unconscious secure priming, individual differences in avoidance is neutralised by feelings of security which acts to remove the suppression or block placed by active attachment avoidance cognitive processes. This finding indicates that there is a relationship between attachment avoidance and gratitude information and supports the position that attachment processes are related to gratitude.

Overall, with the covariates in the model, the main target effect observed earlier was no longer present and attachment avoidance was found to influence participants' responses to targets depending on prime conditions. The experimental effects found revealed the influence of attachment avoidance on participants' responses to gratitude information. It seems that secure priming did have a small effect, but this effect, evident when observing the pattern across the priming conditions, appears to interact with attachment avoidance rather than participants' response to targets directly. This result was not hypothesised but shows that attachment avoidance is related to gratitude where attachment avoidance appears to block or suppress the processing of gratitude information leading participants with higher attachment avoidance to respond slower to gratitude words than neutral words. This is in line with the general hypothesised direction of the relationship between attachment processes and gratitude which is that secure attachment would be positively related to gratitude and insecure attachment such as attachment avoidance and anxiety would be negatively related to gratitude. Additionally, the observed relationship is consistent with findings of Mikulincer and colleagues (2006) and Dinh and Wilkinson (2008) where attachment avoidance was negatively related to trait gratitude.

This finding has implications for our understanding of how attachment functioning could impact on the development of trait gratitude. The result suggests that attachment

avoidance could act to inhibit the development of trait gratitude through suppression of gratitude related information, leading to a decrease in likelihood of arousal of feelings of gratitude. People higher on attachment avoidance are likely slower to observe information in the situational context that relates to feelings of gratitude. Therefore information related to the arousal of gratitude such as positive intentions of others, value of gift to self, and possibly cost of providing the gift to the benefactor may also be suppressed in individuals with high avoidance. As a result, attachment avoidance would relate to less likelihood of trait gratitude development.

Limitations

It is unclear why the subliminal priming did not have significant direct effects on participants' responses to targets. It is possible that the lack of direct effects on targets may be due to the particular way in which the experiment was designed. This was a within subjects design based on Mikulincer, Gillath, and Shaver (2002), where participants were exposed to all three primes and the primes appeared in random order rather than in blocks. Even though, Mikulincer and colleagues (2002) reported effective subliminal priming effects for secure primes and threat targets under within subject designs, as have a number of others (Baldwin et al., 1990, 1993; Mikulincer, Hirschberger, et al., 2001), it is possible that close temporal proximity in the presentation of the different primes contributed to "noise" or overlaps in effects of prime on target responses, creating a weak, unclear pattern on results for variables in this study. It is perhaps more likely that the inclusion of a Secure Target category may have introduced more "noise" to the data set as the secure targets are in the same information network as the secure primes and may have acted as a supraliminal prime, possibly overshadowing the effects of the other prime words. It is also possible that

there was a word length effect, which could partially explain why participants' response time for gratitude words were slower than other words. Gratitude words tended to be longer in length than Secure and Neutral words. Longer words take longer time to process therefore possibly increasing the reaction time for those words. However, the differences between response time for Gratitude words and Neutral words were not statistically different so this effect is not likely.

The *post hoc* analyses produced some weak findings that may be better detected if there was more power in the study. The study was designed with more than enough power to assess the *priori* hypotheses since these involved within subject measures and a sample size of 77 is among the largest of study samples found in the literature that employ repeated measures. In fact most repeated measures studies within the attachment security literature have sample sizes within the range 20 to 60 participants (e.g., Baldwin et al., 1990; Maier, Bernier, Pekrun, Grossmann, & Zimmermann, 2004; Mikulincer et al., 2002; Mikulincer, Hirschberger, et al., 2001; Mikulincer & Horesh, 1999) The low power associated with the *post hoc* analyses were associated with tests of between subject factors. The sample size was large enough to conduct the analyses and in fact larger than those reported by Mikulincer, Gillath, and Shaver (2002) for their Study 1 (n = 42) and 2 (n = 48) which conducted the same series of analyses. It is possible that a larger sample size may have produced more power to detect the weaker effect sizes with more confidence.

Further research is required to continue to explore the relationship between attachment and gratitude and studies of an experimental nature are recommended. The hypotheses outlined earlier, relating to the relationship between attachment security and gratitude remains to be examined. Future studies could use a different cognitive paradigm

to explore the causal relationship between attachment and gratitude. An example of one such design is a computerised Stroop colour naming task (Mikulincer et al., 2002; Stroop, 1938), a cognitive task that has been successfully adapted to use to test causal relationships in the attachment literature related to security priming.

Conclusion

In summary, the findings presented in this chapter provide important information on the nature of the relationship between attachment and gratitude. The results suggest that at the cognitive level, high attachment avoidance acts to inhibit processing of gratitude information but that this relationship can be moderated by induced ‘state’ feelings of attachment security. Overall, this points to the likelihood of possible biases in information processing of gratitude information depending on individuals’ attachment functioning style and suggests that attachment avoidance is negatively related to gratitude. Although the findings improved our knowledge and understanding of the relationship between attachment and gratitude, it is unclear why there were no direct priming effects, suggesting possibly that the experimental manipulation was not very effective. The following chapter presents a study designed to test the same hypotheses but uses a different experimental paradigm in order to avoid the limitations noted for this study.

CHAPTER SIX

STUDY 3 - INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY AND GRATITUDE USING THE STROOP COLOUR NAMING TASK

In the previous chapter, the Lexical Decision study found a moderation effect where reaction times to gratitude information were influenced by a combination of both prime condition and trait attachment avoidance. However, no direct priming effect including attachment priming was found. Due to the nature of the design, it was unclear whether the null priming effects were due to the experimental design or reflected the nature of the relationship between attachment and gratitude. It is possible that a number of factors specific to the design may have acted to weaken the priming effect rendering it ineffective. For example, it is possible that the *within-subjects* design weakened the priming effect through the close presentation of different prime categories. Further the inclusion of a Secure word target category may have confounded the priming effect by acting as a supraliminal prime. The current study sets out to examine the same questions as the Lexical Decision study but using a different cognitive priming design that is free of the limitations of the previous study.

This study, like the Lexical Decision study in the previous chapter, extends the exploration of gratitude into the cognitive realm and assesses whether gratitude is linked to attachment security by determining whether information pertaining to gratitude is contained within the secure schemata. This study employs an affective priming technique using the

computerised Stroop colour naming task (Stroop 1938) adapted by Mikulincer, Gillath, and Shaver (2002: Study 3) to test the link between attachment security and gratitude.

The Stroop task methodology is well established and is widely used in the cognitive psychology field to study information processing (Atkinson et al., 2009; Frings, Englert, Wentura, & Bermeitinger, 2010; MacLeod, 1991). The computerised Stroop colour naming task requires that participants identify and indicate by compressing designated keys, the colour of a word target that appears on the screen. Typically participants are subject to a subliminal presentation of an affective prime prior to the presentation of a target word (see Methods for more details).

The Stroop methodology has been increasingly employed by attachment researchers in recent years who were looking for an empirically validated method to examine causal relationships as well as a way to explore cognitive attachment processes and attachment activation strategies (e.g., Atkinson et al., 2009; Edelstein & Gillath, 2008; Haydon, Roisman, Marks, & Fraley, 2011; Mikulincer et al., 2002; Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, & Brosschot, 2003). For example, Atkinson and colleagues (2009) used the Stroop task to examine the selective attention of organized and disorganised attached mothers. They found that disorganised attached mothers responded slower to negative emotional stimuli compared to neutral stimuli whereas organised attached mothers had no difference. This provided evidence to support the working models conceptualisation of attachment individual differences. Similarly, using the Stroop task, Haydon and colleagues (2011) found significant differences in performance on the Stroop task between different attachment states of mind particularly the dismissing types compared to the preoccupied types. Edelstein and Gillath (2008) investigated attachment-related differences

in emotional processing biases and found that avoidant individuals had reductions in emotional Stroop interference for attachment related words. The results showed that avoidant individuals tend to inhibit attention to potentially threatening information. Mikulincer, Gillath, and Shaver (2002) explored the concept of attachment system activation by assessing the accessibility of attachment information when a threat stimulus is presented. Using both the Lexical Decisions task (Study 1 and 2) and the Stroop task (Study 3) they found that threat primes led to increased accessibility of representations of attachment figures. Moreover, attachment anxiety heightened attachment activation and attachment avoidance inhibited the activation of the attachment system. Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, and Brosschot (2003) investigated the effect of mental representations of attachment on information processing in a clinical population and with a nonclinical comparison group. They employed the Stroop task and had both supraliminal and subliminal exposure conditions. They found a priming effect for threatening words only in the supraliminal condition. Additionally, the results revealed that in the nonclinical group, people with insecure attachment were associated with a global response inhibition to the Stroop task and attachment security in the clinical population showed the largest Stroop interference effect of threatening words compared to other groups. Their results provided evidence that attachment security is characterised by open information processing of stimuli of all types and is less likely to involve defensive exclusion of negative information. Overall, the research reviewed provides evidence that the Stroop task is a method that can be used to study causal relationships in attachment processes, particularly in the cognitive domain.

In the Stroop task, interference with colour naming, evidenced by slower response times, indicates that the word is accessible within the schema network. Therefore, it is reasoned that if gratitude is part of the attachment security schema then one should expect slower colour naming in the Stroop task for gratitude words following priming of secure attachment words compared to priming of neutral words. The current study is a 3 x 2 *between* subjects subliminal priming design with primes words Secure (Attachment condition), Success (Positive condition), and Shelves (Neutral condition) and two types of target stimuli; Gratitude words and Neutral words. Unlike in the Lexical Decision study in the previous chapter, the Secure words target category was not included in this study to prevent the possibility that the Secure target words might interfere with the priming effect. Participants were randomly assigned to one of three experimental conditions and within those conditions were presented with one prime word for all trials of the Stroop task.

As with the previous chapter, it is argued that positive mental representations of self and others, associated with secure attachment, is facilitative of gratitude arousal and cognition. Therefore if this is correct, when attachment security is primed, there is an automatic spread of activation for positive mental representations of self and others and information within including gratitude information. It is expected that when attachment security is primed, information processing for gratitude is activated, leaving participants to perform slower on Stroop task when they perceive gratitude words.

Specific Hypotheses:

1. In the Secure Prime Condition, the response time for Gratitude words will be slower than Neutral words.
2. Response time for Gratitude words would be slower in the Secure Prime Condition

than the Neutral Prime Condition.

3. Response time for Gratitude words will be slower in the Secure Prime Condition than the Positive Prime Condition.

A second dependent variable was included in this study to assess the relationship between attachment processes and feelings of gratitude (see *Measures* section for more details). This measure was designed to assess whether affective priming has an effect on participants' state feelings of gratitude and provide additional information beyond that of the response data which reflects only information processing rather than emotional states.

Specific Hypotheses:

4. Participants in the Secure Prime Condition would have higher scores on the Gratitude Ratings Scale than compared to participants in the Neutral Prime Condition.
5. Participants in the Secure Prime Condition would have higher scores on the Gratitude Ratings Scale than compared to participants in the Positive Prime Condition.
6. Participants in the Positive Prime Condition would have higher scores on the Gratitude Ratings Scale than compared to participants in the Neutral Prime Condition.

Both attachment processes and gratitude have state and trait levels of experience. Because traits can influence behaviour and state level performance it is also important to consider whether attachment styles and trait gratitude influenced participants' performance. Further, given that trait variables, particularly attachment avoidance and anxiety were found to account for variability in participants' performance in the Lexical Decision study,

it is thought that these variables will likely influence participants' responses in the Stroop task as well. Based on the findings from the Lexical Decision study, it is expected that trait attachment variables, specifically avoidance, may have an inhibitory effect on processing of gratitude information and thus slow down participants' responses to gratitude words.

Specific Hypotheses:

7. Trait gratitude does not influence participants' reaction times.
8. Attachment avoidance has an inhibitory effect on gratitude information processing and is associated with slower response time to gratitude words than neutral words which is moderated by attachment security
9. Attachment anxiety does not influence participants' performance on the Stroop task

Methodology

Participants

A sample of 148 psychology students (98 women and 50 men, ranging in age from 17 to 36 years, median 19) from the Australian National University participated in the study as part the requirements for their undergraduate degree. 92 participants had English as their first language and 56 had English as a second language. Participants were randomly assigned into one of three prime conditions (49 Secure, 49 Positive, 50 Neutral).

Materials and Procedure

Participants were instructed that participating involved completing a computer task followed by an online survey. Instructions for the computer task appear on the computer screen once participants are ready to begin. In the computer task, participants were asked

to name the colour of the words that appear on the screen as fast and as accurately as possible. Participants were screened for vision impairments. Prior to participation, participants were asked if they had normal vision to rule out those with colour blindness. Those with normal vision and corrected vision for short-sightedness and long-sightedness were permitted to participate.

The task was presented on Dell colour monitor. Word primes were displayed in black lettering and the target stimuli were displayed in one of four colours (blue, red, green, and pink) on a white background at the centre of the monitor. Pilot testing of text colours showed that some colours did not appear as strong in intensity as others when displayed on screen. It was considered important that the different colours were matched to prevent colour intensity affecting reaction time to words. The colours selected were adequately contrasting and matched for intensity in tone when they appeared on screen. Participants worked at their own pace, beginning with 32 practice trials (16 colour blocks stimuli and 16 word colour stimuli) followed by 120 experimental trials. The 120 trials were divided into three blocks of 40 trials. Between each block, participants were given a general reminder of the colour of the keys and how to complete the computer task. They were told to begin the next set of trials when they were ready. The target stimuli in the practice trials were different from those in the experimental trials.

This study is a 3x2 between subject subliminal priming design with three experimental prime conditions and two target categories. In the Secure condition, participants were exposed to the word *secure*. In the Neutral condition, participants were exposed to the prime word *shears*. In the Positive condition, participants were exposed to the prime word *success*. The prime words appeared in all of the 120 trials. The *secure* word

was selected as prime for the Secure condition because this semantically best represented attachment security. The word *shears* was selected for the Neutral condition because it is not an emotion word in semantic terms and for the majority of people it would be neutral in meaning due to assumed rarity of use of this term in an emotional context. The word *success* was selected for the Positive condition because it has positive connotation. The word success often implies a positive situation and outcome and has been linked with positive emotions and positive psychology (J. E. Bono & Ilies, 2006; Fredrickson, 2000, 2001). Note the prime words were matched for length (as best as possible) and all started with S.

There are two target categories (Gratitude words and Neutral words) each containing five unique words and which are matched for length between the categories. The Gratitude target category contain a list of five words that are used in the literature to mean gratitude such as appreciate, value, and thankful. The Neutral target category contain a list of five words that have no emotional meaning for the majority of people including words like clock, bookcase, and calculator. Each word is presented in four colours which makes (5x2x4) 40 unique target stimuli and across three prime conditions (Secure, Neutral, Positive) making a total of 120 unique trials. The trials were randomly presented.

At the beginning of a trial, participants focus on a (+) in the middle of the screen. Next a prime word is presented subliminally for 33ms and is then masked by a backward mask (XXXXXXXX) displayed for 500ms. This is followed by the presentation of 1 of 40 target words. Participants were instructed to name the colour of the stimuli as quickly as possible by pressing an appropriately labelled key on the keyboard (D for red words, F for

green words, J for blue words, and K for pink words). Once a key has been pressed, the trial ends and after a 500ms pause, the next trial begins.

Once the computer task was completed, participants were directed to the online survey which immediately presented a Gratitude Ratings Scale developed to measure their state gratitude level followed by a measure of state affect. After these, a distractor task was presented followed by measures attachment orientation and trait gratitude. The order of the attachment and gratitude measures were randomised.

Measures

Attachment dimensions. Attachment dimensions were assessed using the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) as described in the previous chapter. The internal consistency of the modified ECR-GSF in this study was $\alpha = .87$ for the avoidance dimension, $\alpha = .87$ for the anxiety dimension, and $\alpha = .74$ for attachment security (All reliability estimates reported are Cronbach's alpha).

Attachment working models and prototypes. Attachment working models and prototypes were measured using the Relationship Questionnaire (Bartholomew & Horowitz, 1991) which contains four descriptions, each corresponding to a specific attachment style: Secure, Preoccupied, Dismissing, and Fearful. Participants were required to indicate the extent that each description was like them on a 7 point Likert scale from 1 (not at all like me) to 7 (very much like me). The two dimensions Model of Self and Model of Others were obtained from participant's Likert scale responses (D. W. Griffin & Bartholomew, 1994). Participants were also asked to select one of four options that best

represented their attachment behaviour. Scharfe and Bartholomew (1994) reported a reliability estimate of Kappa's = .35 and ratings (test-retest r 's around .5) comparable to the Hazan and Shaver's (1987) three-category classification.

Trait Gratitude. Trait Gratitude was measured using the Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) which is based on the work of Watkins, Woodward, Stone, and Kolts (2003). The measure captures trait gratitude through three dimensions; appreciation of people, appreciation of life, and absence of feelings of deprivation (also known as sense of abundance). Item examples include "I couldn't have gotten where I am today without the help of many people" (appreciation of other people dimension), "Oftentimes I have been overwhelmed at the beauty of nature" (appreciation of life dimension), and "I really don't think that I've gotten all the good things that I deserve in life" (reversed scored, absence of feelings of deprivation dimension). The revised form contains 16 items measured on a Likert scale from 1 (Strongly agree) to 7 (Strongly disagree). The GRAT-R has good validity and reliability $\alpha = .92$ (Thomas & Watkins, 2013). The internal consistency of the GRAT-R in this study was $\alpha = .86$.

Gratitude Ratings . The gratitude ratings scale was developed to measure the state level of gratitude. It has 12 items measured on a 7 point Likert scale. Four of the items asked participants to rate how strongly they agreed with statements such as "I feel grateful for the love that I received" on a 7 Likert scale of 1 (strongly disagree) to 7 (strongly agree). Eight items required participants to rate how grateful they feel from 1 (very ungrateful) to 7 (very grateful). Example of items include "I am grateful for the help I get from my friends" and rating "how grateful you would feel if - a friend buys you a coffee". The internal consistency of the scale for this study was $\alpha = .78$.

Results

Cleaning and Screening of Survey Data

The survey data was screened for out-of-range values, and implausible means and standard deviations. Bivariate correlations and regressions were used to assess multicollinearity and singularity and no evidence was found for their presence. Histograms, stem-and-leaf graphs, box plots, and normal probability plots were used to identify univariate normality and univariate outliers. Scatterplots of residuals were used to assess multivariate linearity. Mahalanobis Distances and Cook's D were used to screen for possible multivariate outliers. Assumptions of normality, homoscedasticity, and linearity were assessed using residuals analysis and found to be plausible for the majority of variables in the data set.

Attachment Security and Response to Gratitude Words

Correct RTs were averaged for each person for each target stimuli category. A 3 x 2 ANOVA for prime word (Secure, Positive, and Neutral) and target stimuli (Gratitude, Neutral) was conducted on RTs with the last factor as a within subjects factor. The ANOVA yielded a significant between groups factor ($F(2, 145) = 3.84 p < .05$), indicating that the group RTs were statistically different. The estimated marginal means plot (Figure 8) show that the mean for Gratitude targets in the Positive condition was faster than the mean for Neutral targets. The same pattern is observed in the Secure condition. The pattern of results appears contrary to expectation and is confirmed by Tukey HSD tests which revealed that RTs for targets ($M = 616\text{ms}$, $SD = 184$) were significantly faster than Neutral

targets ($M = 630\text{ms}$, $SD = 205$) in the Secure condition ($t(2798) = 7.84$, $p < .01$). Further, RTs for Gratitude targets were significantly faster in the Secure condition compared to RTs for Gratitude targets in the Neutral condition ($t(145) = 2.42$, $p < .05$) and the Positive condition ($t(145) = 2.38$, $p < .05$). The RTs for Gratitude targets in the Positive condition were not statistically different from the Gratitude targets in the Neutral condition. RTs for Gratitude targets were not significantly different from RTs for Neutral targets in the Positive condition.

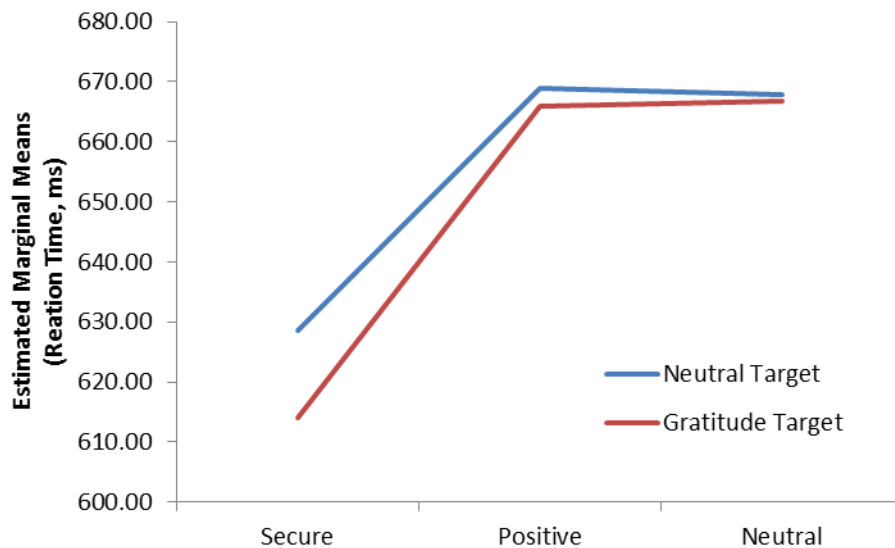


Figure 8. Estimated marginal means plot of target and prime on RTs.

Post hoc analysis was conducted in light of the unexpected findings. A two-way 3x2 ANOVA for prime word (Secure, Positive, and Neutral) and target stimuli (Gratitude, Neutral) was conducted on RTs with the last factor as a within subjects factor. A significant main effect for target was found ($F(1,145) = 4.31$, $p < .05$, $\eta_p^2 = .029$). Pairwise comparisons revealed that RTs for Gratitude words ($M = 648.96\text{ms}$) were, significantly faster than Neutral words ($M = 655.06\text{ms}$), $t(145) = 2.08$, $p < .05$. A test of Between-

Subjects effects showed a significant main effect for Prime word ($F(2, 145) = 3.10, p < .05, \eta_p^2 = .04$). Marginal means estimates indicated that RTs for targets in general, were faster in the Secure Prime Condition ($M = 621.30\text{ms}$) followed by the Neutral Prime Condition ($M = 667.29\text{ms}$) and the Positive Prime Condition ($M = 667.43\text{ms}$). *Post hoc* pairwise comparisons revealed that RTs between the Neutral and Positive condition were not significantly different. This indicates that RTs for the Secure condition was significantly faster than RTs for the Neutral and Positive condition combined ($t(145) = 2.16, p < .05$). The RTs for the Positive and Neutral condition were not significantly different ($t(145) = .07, p > .05$) from each other. The interaction effect between prime and target was not significant ($F(1,145) = 2.02, ns, \eta_p^2 = .027$). No other effects were found.

Controlling for Individual Differences effects

It is possible that the effect of prime condition on target response is a small effect size and may not be observed due to the influence of individual differences on response time. Individual differences such as attachment orientation and trait gratitude levels may influence participant response time to targets. An ANCOVA was conducted to control for variability explained by these variables to improve the ability to detect possible small effect sizes between prime condition and target response times.

A 3x2 ANCOVA was conducted for Prime and Target with Anxiety, Avoidance, and trait Gratitude as covariates. The resulting estimated marginal means plot suggest a possible main effect for prime condition with possible differences in reaction time between Neutral and Gratitude words in the Secure condition. Gratitude words and Neutral words did not appear different in the Neutral or Positive condition. The analysis revealed one significant

main effect and two significant interaction effects. First, the findings show that when individual differences variables were accounted for, a marginally significant interaction effect for Target X Prime was found at $\alpha < 0.1$, ($F(2,142) = 2.419$, $p = .093$, $\eta_p^2 = .033$ power = .48). Pairwise comparisons showed that the prime and target interaction was significant under the Secure Prime Condition where response times to Neutral targets ($M = 627.08\text{ms}$) were significantly slower than response times to Gratitude targets ($M = 612.07\text{ms}$), $t(48) = 2.99$, $p < .01$. Second, a significant interaction effect between Target X Anxiety ($F(1,142) = 6.296$, $p = .013$, $\eta_p^2 = .042$) was found. Parameter estimate tests showed that Attachment Anxiety was not a significant predictor of response time for Neutral targets ($\beta = 11.70$, $t(142) = .892$, $p = ns$, $\eta_p^2 = .006$) but was as a marginally significant predictor, at $\alpha = 0.10$, of response time for Gratitude targets ($\beta = 22.42$, $t(142) = 1.71$, $p = < .10$, $\eta_p^2 = .02$). The beta slope valence indicates that higher scores on Anxiety was related to slower response times to Gratitude targets. Third, a significant between subject effect was found for Prime ($F(2,142) = 3.382$, $p = .037$, $\eta_p^2 = .045$). Pairwise comparisons between the groups show that RTs within the Secure Prime Condition was significantly faster than RTs within the other conditions (Neutral $t(142) = 2.24$, $p < .05$: Positive $t(142) = 2.26$, $p < .05$). No other effects were significant.

The effect of Affective Priming on Participants' Gratitude Ratings Scores

To examine the effect of affective priming on participants' Gratitude Ratings Scores (GR), controlling for the effects of working models of self and others, Trait Gratitude and ESL, a univariate ANCOVA was conducted for Prime condition on Gratitude Ratings Scale with Model of Self, Model of Others, Trait Gratitude and ESL as covariates. Results

showed no significant relationship between the prime condition and GR. However Trait Gratitude and Model of Others significantly predicted participants' scores on the gratitude measure ($F(1,141) = 26.35, p = .00, \eta_p^2 = .16$ and $F(1,141) = 5.99, p = .016, \eta_p^2 = .041$ respectively). Model of self was partially significant, at $\alpha = .10$, ($F(1,141) = 2.29, p = .09, \eta_p^2 = .02$) but Prime condition ($F(2,141) = .17, p = .84, \eta_p^2 = .00$) and ESL were not significant predictors ($F(1,141) = 1.16, p = .28, \eta_p^2 = .00$). The corrected model accounted for 24.5% of variability in GR. Parameter estimates for the significant predictors were in order of effect size: Trait Gratitude $B = 2.65, STD = .52$; Model of Others $B = 2.90, STD = .118$; and Model of Self $B = -1.9, STD = .109$.

To examine the effect of affective priming on participants' gratitude ratings, controlling for the effects of covariates Attachment Anxiety, Avoidance, and Trait Gratitude, a univariate ANCOVA was conducted with Gratitude Ratings Scale as a dependent variable, Prime condition as an independent variable, and Trait Gratitude, Avoidance, and Anxiety as covariates to determine whether these traits influenced the state levels of gratitude. The analysis revealed a significant main effect for Trait Gratitude ($F(1,142) = 33.99, p < .01, \eta_p^2 = .19$) and Anxiety ($F(1,142) = 8.06, p < .01, \eta_p^2 = .05, \text{power} = .805$). Avoidance was partially significant at $\alpha = 0.1$ ($F(1,142) = 3.05, p = .08, \eta_p^2 = .02, \text{power} = .411$) but Prime condition was not ($F(2,142) = .49, p = .62, \eta_p^2 = .01$). The corrected model accounted for 24% of variability in GR. Parameter estimates for the significant predictors were in order of effect size: Trait Gratitude $B = 3.08, STD = .53$; Attachment Anxiety $B = 1.90, STD = .67$; and Attachment Avoidance $B = -1.20, STD = .69$.

Discussion

This study examined how attachment processes relate to gratitude using a subliminal emotional Stroop priming design. The findings were contrary to expectations but provided important information regarding the interaction between attachment processes and gratitude within the cognitive information processing domain. As with results from the Lexical Decision study in the previous chapter, reaction times for Gratitude words in the Secure Prime Condition were the reverse of expectation. Instead of being significantly slower than Neutral words, reaction times to Gratitude words were found to be significantly faster than Neutral words in the Secure Prime Condition. Further, reaction times for Gratitude words were faster in the Secure condition than reaction times for Gratitude words in the Neutral condition and in the Positive condition. *Post hoc* analysis revealed significant main effects for target words and for prime condition. However, the target main effect disappeared when the effects of attachment and trait gratitude were controlled. The main effect for prime revealed that participants in the Secure condition generally responded faster to target words than participants in the other conditions. When the influences of individual differences variables were controlled for, a weak interaction effect between target and prime was found. The results showed that secure priming influenced participants' responses to gratitude information but positive affect priming did not. However these effects were in the reverse direction expected for response times in the Stroop task. It is possible that the effect observed reflects what is commonly termed a *reversed priming effect* (Banse, 2001; Glaser & Banaji, 1999; Glaser, 2008) which represents a significant experimentally observed

priming effect that is in the opposite direction to the typical effect expected of a particular paradigm test.

With affective priming, Banse (2001) has found that a *reverse priming effect* can occur when the priming is presented subliminally. The findings from this study and the Lexical Decision study in the previous chapter are consistent with such an interpretation. Moreover, it has been found that under supraliminal priming, for the Stroop task for example, an interference effect (slower RTs compared to control) is observed with congruent prime and target pairs but this pattern is reversed when the prime is subliminally presented so that faster response times are found for congruent prime and target pairs (Frings et al., 2010; Hermans, De Houwer, & Eelen, 1994; McKenna & Sharma, 2004; Wyble, Sharma, & Bowman, 2005). Researchers investigating the *reverse priming effect* argue that this effect reflects the affective prime's ability to reduce the Stroop interference effect for congruent information under unconscious information processing (e.g., Banse; 2001, Hermans, 1996; Wentura, 1999). In other words the effect found for this study suggests that the attachment security was schematically related to the gratitude information (congruent) and as such the security prime acted to reduce the Stroop interference effect for gratitude words, facilitating faster processing of gratitude information than neutral information, leading to faster response times for Gratitude words than Neutral words.

Importantly, the response time data from this study is convergent with those of the Lexical Decision study which also revealed a pattern of results reversed from expectation. Taken together, it can be interpreted that the findings show evidence for a priming effect for attachment security and gratitude and that this effect manifests as a *reverse priming effect* under subliminal priming conditions. From this position, it can be interpreted that

secure priming acted to reduce the Stroop Interference Effect for gratitude information which makes gratitude information more accessible than neutral information. Further, it would also suggest that gratitude is more closely related to attachment security than positive affect and that attachment security and gratitude are located within the same information network.

Even though the pattern of results can be interpreted in the direction outlined above, it is noted that because the findings were not hypothesised, conclusions based on this interpretation of the results are considered to be tentative. Further research evidence is required to support this particular interpretation of the findings and this is discussed in more detail in the *limitations and future research directions* section of this chapter.

The weak significant interaction effect for target and attachment anxiety suggests that attachment processes have an effect on people's processing of gratitude information. The results show that attachment anxiety is associated with slower processing of gratitude related information than neutral information. It is possible that individuals with high attachment anxiety find it difficult to process emotional information such as gratitude that is not congruent with their general emotional default of anxiety. They may find that processing of incongruent information harder than processing neutral information, hence the differences in response time between Gratitude words and Neutral words. Unlike attachment anxiety, individual differences in trait gratitude did not predict participants' responses to gratitude information. Overall, the findings from this study show that both individual differences in attachment anxiety and experimentally induced feelings of security influenced participants' responses to gratitude information.

It is not clear why no effects were found for attachment avoidance on participants' response times to targets within the Stroop task when this relationship was found in the Lexical Decision study in the previous chapter. Attachment anxiety and avoidance are associated with different cognitive profiles (Gillath, Bunge, Shaver, Wendelken, & Mikulincer, 2005; Mikulincer et al., 2003) and it is possible that the contrast between the results may be a manifest of the different experimental designs interacting differently with the two attachment strategies. For example, it may not have been possible to detect differences in response time between people high or low in avoidance because all participants were required to employ avoidant, inhibition behaviours/strategies to complete the Stroop task leading to no measurable attachment avoidance effect.

This study mainly explored the normative influences of attachment security and provided evidence that attachment security impacts on people's response to gratitude information compared to neutral information. A sense of security was associated with generally faster processing of information but was significantly so for gratitude information. Further, in line with findings from the Lexical Decision study in the previous chapter, the positive affect prime did not have an impact on participants' response times relating to gratitude information, suggesting that attachment security has a stronger association and is more relevant to gratitude than just positive affect. Overall, the results suggest that at the cognitive level, high anxiety act to inhibit processing of gratitude information, whereas attachment security enhances the processing of gratitude information above that of neutral information. Taken together with the finding regarding the inhibitory relationship between attachment avoidance and gratitude information processing from the Lexical Decision study, these relationships point to the likelihood of possible biases in

information processing of gratitude information depending on individual's attachment functioning style. Consistent with general expectations, results suggest that individuals with secure attachment will more likely process gratitude related information than insecure individuals and this indicates that attachment security may be a necessary condition for trait gratitude development.

Affective Priming and Participants' Gratitude Ratings

The hypotheses relating to gratitude ratings were not supported. The findings showed that subliminal cognitive affective priming in general did not have an impact on participants' gratitude ratings. This absence of influence may be due to the nature of the priming task. First, because the task was related to cognitive information processing and network activation, the influence of the priming only related to participants' processing of information and was limited to influencing only participants' reaction times (processing time) to target stimuli. Similarly, the size of the priming effect was small and may not be powerful enough to extend influence towards participants' emotional states. The analysis revealed that trait gratitude predicted participants' gratitude ratings; people high on trait gratitude reported stronger feelings of gratitude across more scenarios than those who were low on trait gratitude. This finding indicates that people with a high score on the trait gratitude measure tended to feel more grateful across more situations than those who scored low, supporting the concept of trait gratitude.

Interestingly, individual differences in attachment had variable associations with gratitude ratings depending on how the attachment construct was measured. Measures of working models showed that working models of others predicted participants' gratitude

ratings where positive model of others related to higher gratitude ratings and negative model of others predicted lower gratitude ratings. Model of self weakly predict participants' gratitude ratings and the relationship was reversed from what is expected where a positive model of self was associated with lower scores on the gratitude ratings scale. The finding relating to model of others is in line with the research on determinants of gratitude where the main determinant was a person's appraisal of other's intentions (e.g., Tesser & Gatewood, 1968). However the finding relating to model of self is contradictory to expectation. As is the finding for attachment anxiety which was found to predict participants' gratitude ratings score but in the reverse direction where higher anxiety was related to higher gratitude ratings. The results seem to suggest that people higher on attachment anxiety, who had a more negative model of self rated being more grateful across more scenarios than those low on anxiety with more positive model of self. Attachment avoidance was found to weakly predict participants' gratitude ratings where people higher on avoidance had lower gratitude ratings. The results for attachment avoidance may not have been as strong due to the lower power to detect small effects. The power for attachment anxiety was significantly higher. These findings suggest a complex interaction between attachment trait variables and feelings of gratitude depending on the attachment orientation. However, given the weak partially significant results relating to model of self and attachment avoidance the interpretations associated with these variables can only be considered as suggestive. The results suggest that it is possible, in terms of attachment styles, that a person with positive model of others and a negative model of self may also be able to develop a tendency to feel grateful. Further research is required to determine if this relationship is robust and can be replicated. Overall, the analysis relating to gratitude

ratings suggest that affective priming at the subliminal cognitive level does not generalise to the emotional level and that trait gratitude, and individual differences in attachment, particularly, model of others and attachment anxiety predict participants' feelings of gratitude.

Limitations and Future Research Directions

There are a number of limitations to consider. First, the results were contrary to expectations and after review of the pattern of results from this study and the Lexical Decision study in the previous chapter, the author interpreted the evidence to suggest that a priming effect between attachment security and gratitude was evident and this effect manifested as a *reverse priming effect* under subliminal priming conditions. When considered as a *reverse priming effect*, the pattern of results provided support for the hypotheses relating to attachment processes and gratitude. However, there may be other explanations or interpretations of the results. Because this experimental study is novel there are no other research findings to compare and contrast with apart from the Lexical Decision study within this thesis. It is possible that the results may not reflect a *reverse priming effect* and that attachment security and positive affect have a stronger relationship with neutral information than gratitude information. However, this interpretation does not make theoretical sense and does not match with the correlational data amassed showing the positive relationship between gratitude and positive affect and well-being variables (see Wood, Froh, & Geraghty, 2010 for a review). Overall, there is an argument and evidence to support the interpretation of the *reverse priming effect* for the pattern of results found for this study. However, because this result was unexpected, conclusions based on this

interpretation cannot be made with strong confidence. Further research is required to determine whether there is a direct positive relationship between attachment security and gratitude and negative relationship between attachment avoidance and anxiety and gratitude. A supraliminal priming design may in theory reveal the nature of these relationships.

Second, the findings associated the cognitive priming tasks were weak effects which limits the level of confidence associated with the interpretation of the findings. However, the overall same pattern of results was observed across this study and the Lexical Decision study which are from different independent samples, using different samples, and different experimental paradigms. This provides convergent evidence and supports the interpretations taken from the results. The small effect sizes might be related to the slight mismatch between experimental paradigm and the variables of interest. Indeed mixed findings in relation to apriori hypotheses in this and the Lexical Decisions study suggests the possibility that the subliminal priming method for Lexical Decisions Task and Stroop task may not be the best paradigm to use to study attachment and gratitude. Ultimately this research is interested in the analysis of emotion and traits and stronger effects might be better observed at the state and trait level of analysis rather than at the subliminal information processing level. That being said the findings from this level of analysis has revealed an important link in understanding the development of trait gratitude - that is, the influence of information processing biases, linked to attachment, in the uptake of gratitude information.

Nonetheless, a future research idea is to design supraliminal priming experiments to examine whether attachment security would predict more experiences of gratitude

emotion than insecure, positive affect or control. This would test the replicability of the results in this study and assess these constructs at the emotional level of analysis. This is the aim of the studies presented in the next chapter.

Conclusion

The findings presented in this chapter provide important information on the nature of the relationship between attachment and gratitude. Evidence was found that supports the hypothesis that attachment processes are linked to gratitude both at the normative and individual differences level of attachment functioning. At the normative level, through the presence of a *reverse priming effect*, evidence suggests attachment functioning directly influences the processing of gratitude information where attachment anxiety inhibited the processing of gratitude information and attachment security enhances it. This indicates that attachment functioning may impact on gratitude arousal through biases in information processing. Further evidence at the individual differences level of attachment functioning shows that attachment processes predicts feelings of gratitude across a number of scenarios. Although the results are interpreted to be generally consistent with expectations, it is a *post hoc* account and is taken as a tentative conclusion. Further, the two experimental subliminal cognitive designs, presented in this chapter and Chapter 5, have produced weak effect sizes which is possibly due to a mismatch between the methodology and the construct studied – information processing method with emotional and trait constructs. The next chapter presents two experimental studies that examine whether the link between attachment security and gratitude can be observed at the supraliminal level in the expected direction (rather than reversed as in the subliminal priming studies). The chapter is presented in

manuscript format in preparation for submission and is written with enough detail that it can be a stand-alone document. Thus it will contain some literature review which has also been covered in Chapters 1 to 3.

CHAPTER SEVEN

STUDIES 4 AND 5 - INVESTIGATING THE INFLUENCE OF ATTACHMENT SECURITY AND GRATITUDE AT THE AFFECTIVE LEVEL

This chapter presents Study 4 and 5 which explores the influences of attachment security on gratitude arousal. The chapter is formatted in APA manuscript form for submission for publication. The manuscript is written as a standalone document and there is some repetition of the information presented in the literature review chapters of this thesis. Also, because it is a standalone document, the studies will be renumbered to be Study 1 (Study 4 of the research program) and Study 2 (Study 5 of the research program).

Attachment as a Framework for Exploring the Development of Gratitude: Evidence that
Attachment Security is related to higher likelihood of Gratitude Arousal

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Abstract

Two studies test the premise that attachment security facilitates gratitude arousal. Both studies, with a total sample size of 612, demonstrated that the conditions specific to attachment security leads to more report of gratitude emotions than positive affect, attachment insecurity, or control conditions. In Study 1, 219 undergraduate students were randomly assigned to one of four experimental conditions (Secure, Insecure, Positive, Neutral) in an online study. Participants were primed according to condition using visualisation methods and then were asked to detail their thoughts and feeling followed by completing measures of trait attachment and gratitude. One in five (20%) participants primed to feel secure attachment reported feelings of gratitude compared to 2-6% of participants in the other conditions. Study 2 (N = 393) replicated the results from Study 1 in an independent sample. Additionally, Study 2 showed that normative attachment processes predicted state gratitude arousal whereas individual differences in attachment processes did not. The findings provide evidence that secure attachment is linked to gratitude and demonstrate the utility of an attachment perspective in the study of gratitude.

Attachment as a Framework for Exploring the Development of Gratitude: Evidence that Attachment Security is related to higher likelihood of Gratitude Arousal

Gratitude is a positive higher order emotion that has three levels of experience: state, mood, and trait (McCullough et al., 2002, 2004; E. L. Rosenberg, 1998). The emotion is defined as "a feeling of thankful appreciation for favours received" (Watkins, Woodward, Stone, & Kolts, 2003; p.432) and has been shown to be elicited by one's perception of three factors (Tesser et al., 1968): the value of the gift/favour, the intention of the benefactor, and the cost to the benefactor for providing the gift. The higher the score on these factors, the more grateful one feels. Research has shown that gratitude is strongly linked to well-being and life-satisfaction. For example, completing gratitude lists daily for two weeks led to higher feelings of life-satisfaction, well-being, and physical vitality (McCullough et al., 2004) compared to controls. Additionally, trait gratitude, "a predisposition to experience gratitude" (Watkins et al., 2003, p. 432), is positively related to general life-satisfaction and subjective well-being (e.g., Joseph & Wood, 2010), prosociality and positive social relationships (e.g., Algoe, Haidt, & Gable, 2008; Emmons & McCullough, 2003), negatively related to psychopathy (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003; Wood, Maltby, Gillett, Linley, & Joseph, 2008), and negatively related to stress (Deutsch, 1984; Wood, Maltby, Gillett, et al., 2008). Overall, being associated with the 'good life' has made the gratitude construct highly interesting to psychology and worthy of further exploration (Watkins, 2014).

The literature on gratitude can be broadly divided into two areas of focus. In one, researchers are studying how gratitude emotion arises and how feelings of gratitude can

influence well-being (e.g., Froh, Sefick, & Emmons, 2008) while in the other researchers study trait gratitude and how it is related to other psychological constructs (e.g., Adler & Fagley, 2005). Currently these two areas are not well integrated. We do not know if the mechanisms at work that link the effects of gratitude related tasks to well-being are the same as those that are found for trait gratitude and well-being. More importantly we lack an empirically validated theoretical understanding of the gratitude construct, particularly an understanding of how trait gratitude develops and how it relates to well-being. It is important to focus our attention in this direction because having a theoretical framework for gratitude would not only improve our understanding but would help direct research more effectively and efficiently and may enhance our ability to cultivate gratitude. This paper attempts to bridge this divide by exploring the development of gratitude from an attachment perspective and testing the validity of this theory. There are both theoretical reasons and preliminary evidence to suggest that attachment theory may provide a useful framework to explore the development of gratitude.

Attachment theory (Bowlby, 1969, 1973, 1980) is a social cognitive theory of interpersonal functioning underpinned by the idea that attachment is an evolved adaptive mechanism, naturally selected for its ability to enhance survival likelihood (Bowlby, 1969). According to attachment theory, infants instinctively develop an attachment to their primary caregiver, which is aimed at achieving a sense of security. Individual interpersonal functioning is influenced by the quality of the attachment bond between an infant and their primary caregiver, which is determined by caregiver responsiveness and availability.

The attachment bond is considered *secure* when the caregiver is responsive and available to the child in times of need (Mikulincer & Shaver, 2007a). A secure attachment

bond provides the child with a safe haven to turn to in times of danger and threat, and a secure base from which to explore the world and broaden-and-build personal resources (Ainsworth, 1989; Bowlby, 1988). An *insecure* attachment bond exists when caregiver responsiveness and availability in times of need is inconsistent or absent (Mikulincer & Shaver, 2007a). In instances where the caregiver responsiveness and availability are unreliable or absent, infants adjust their attachment bonding strategy to maximise responses from their caregiver. The differential strategies adopted by individuals in attachment interactions in early life are argued to form the basis of individual differences in attachment patterns of behaviour in adulthood (Mikulincer & Shaver, 2007a) and hence interpersonal functioning (W. A. Collins & Madsen, 2006; Main, Hesse, & Hesse, 2011; Main et al., 1990; Main, 1996)

There are a number of overlaps between attachment processes and gratitude that suggest that they are related and support the position that attachment processes and individual differences in attachment related expectancies may play a role in trait gratitude development. The first involves the contextual determinants of attachment security and the second relates to how working models of attachment can account for individual differences in trait gratitude. With regard to attachment security, the context associated with attachment security is similar if not analogous to a context that would, by definition, lead to feelings of gratitude.

Studies demonstrate that gratitude arises when people receive aid that is perceived as costly, valuable, and well intentioned (e.g., Tesser et al., 1968; Wood, Maltby, Stewart, Linley, & Joseph, 2008). This suggests that gratitude is in part an emotion that is directed towards appreciating the helpful actions of others (McCullough et al., 2001; Wood et al.,

2010). In parallel, feelings of attachment security are associated with perceiving that one has support and is cared for by significant others who are available and responsive to one's needs. When the attachment security context is examined, it is clear that the elements of the contextual determinants of gratitude as outlined by Tesser and colleagues (1968) are contained within the attachment security experience. Tesser and colleagues found that feelings of gratitude were determined by the perception of receipt of a gift, the value of the gift to the self, the perceived intention of the benefactor, and the cost to the benefactor for providing the gift. Although there is agreement regarding the formulation of the determinants of gratitude identified by Tesser and colleagues, the term 'gifts' and 'benefactor' are seen as somewhat concrete and a little limiting. Researchers have since adopted a more inclusive definition of the two determinants, gifts and benefactor, due to findings that feelings of gratitude can be equally aroused by abstract, immaterial gifts from non-interpersonal sources such as *mother nature* or from events like "waking up in the morning" (Emmons & McCullough, 2003). With this in mind, the attachment security context contains elements of the gift, the external source, the intention of the source, and the value of the gift to the self, and the cost of the gift to the benefactor. Although the individual will likely not consciously frame their experience in these terms, it can be seen that the individual is given the gift of care, attention, support, time, and availability from an external source which is the significant other. The significant others are well-intentioned and are concerned for the welfare of the receiver. The aid has high value to the individual and may be deemed invaluable as such gifts cannot be bought. The cost for the benefactor depends on the task but there is a cost to the benefactor at least in terms of time spent and being available and reliable to the receiver. As such, because the contexts of secure

attachment contain the elements that lead to gratitude arousal, it would be logical to expect that secure individuals would be more likely to experience feelings of gratitude more often and more strongly than those who are not feeling secure. Further, for those who are securely attached, this experience of support is repeated over and over throughout childhood and adulthood, leading to more chronic experiences of gratitude. Given that the perception of context is a key determinant of gratitude, individual differences in gratitude in the securely attached population is likely. That is, not all secure people will feel gratitude because some may not perceive the context to contain the factors that lead to gratitude arousal. Overall, theoretical analysis suggests that attachment security is linked to gratitude arousal where people who are secure are more likely to feel gratitude more often than people who are insecure. Moreover, attachment security appears to contain the determinants that would lead to more gratitude arousal over time which supports the idea that attachment processes may act as a precursor for trait gratitude development.

The second theoretical overlap concerns working models of attachment and the attribution style associated with trait gratitude identified by Wood and colleagues (2008). Wood and colleagues found that personal appraisal of contextual factors explained 83% of variability in feelings of gratitude. Moreover, they found that people who tended to feel grateful had an attribution style that increased the perceived cost to the benefactor and the value of the gift to the self. Further, participants also perceived the intentions of the benefactor to be more genuine and altruistic. This indicates that feelings of gratitude are primarily dependent on the individual's perception of the context. Within attachment theory, working models reflect the history of attachment related interactions with the

primary caregiver and act to maintain the patterns of behaviour associated with interpersonal functioning (Bowlby, 1969/1982). Working models contain information about the interpersonal world and functions as a mental representation of the world. Mental representations are adaptive because they model what could be expected given previous experiences and act to facilitate efficient information processing and behavioural responses (Bowlby, 1969/1982, 1973, 1980). There are two broad categories of working models (Bowlby, 1969), Model of Self and Model of Others, and each can be negative or positive (Bartholomew & Horowitz, 1991). These categories are argued to reflect the underlying dimensions of attachment anxiety and attachment avoidance respectively (Brennan et al., 1998).

There is increasing evidence to suggest that there is a link between individual differences in attachment expectancies and gratitude, although the literature is limited. Lavy and Littman-ovadia (2011) found trait gratitude to mediate the relationship between attachment and life-satisfaction. More directly, Lystad, Watkins, and Sizemore (2005) examined how attachment related to gratitude and found that people with secure attachment predicted the highest level of trait gratitude and people with avoidant attachment reported the lowest gratitude. In the same vein, Mikulincer, Shaver, and Slav (2006) found attachment avoidance to be negatively related to participant self-report of gratitude towards their partner. Dinh and Wilkinson (2008) found both attachment avoidance and attachment anxiety to be negatively related to trait gratitude and secure attachment positively related to gratitude. Finally, Dwiwardani and colleagues (2014) found that attachment significantly accounted for variability in trait gratitude, with attachment anxiety significantly negatively related to trait gratitude and attachment avoidance weakly negatively related to trait

gratitude ($\alpha < .10$). These results point to the possible utility of attachment theory as a framework for exploring the development of gratitude and suggest the importance of attachment security in gratitude arousal.

Given that attachment processes have been shown to affect one's perception of external factors and bias one's processing of interpersonal information (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Dykas & Cassidy, 2011; Edelstein & Gillath, 2008), leading to specific patterns of behaviour and personality tendencies (e.g., Mikulincer, 1998), it is thought that attachment processes may affect gratitude arousal and may influence the development of trait gratitude. More specifically, it is argued that attachment security may facilitate the development of trait gratitude. The aim of the studies presented here is to assess whether attachment security influences gratitude arousal, using experimental priming techniques previously developed by Mikulincer and Arab (1999) and Mikulincer and Shaver (2001).

Attachment Security and Priming

Feelings of attachment security have been successfully induced in experimental conditions using various priming techniques (e.g., Cassidy, Shaver, Mikulincer, & Lavy, 2009; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). These techniques involve researchers contextually activating the 'secure base schema' by presenting participants with related, congruent information (e.g., Mikulincer et al., 2001). The priming effect is thought to function by a process of spreading activation (Collins & Loftus, 1975; Klauer & Musch, 2003). Supraliminal priming techniques are applied with participants' conscious knowledge and usually involve asking participants to visualize or recall memories to make salient the

schema (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Carnelley & Rowe, 2007). To activate feelings of security, researchers often ask participants to recall memories of feeling supported by an attachment figure (e.g., Carnelley & Rowe, 2010). Subliminal priming techniques expose participants to information at the unconscious level (for a review see, Mikulincer & Shaver, 2007b).

Researchers have shown that secure priming techniques lead people to respond in ways similar to those who generally feel secure with respect to attachment. These responses include increased positive self-evaluation (Baldwin, 1994), increased support seeking (Pierce & Lyddon, 1998), and increased positive perception of others' supportiveness (L. H. Cohen, Towbes, & Flocco, 1988). Additionally, there is a growing literature that shows security priming produces positive psychological effects (Baldwin et al., 1996; Mikulincer & Shaver, 2001; Rowe & Carnelley, 2003). Importantly, studies have shown that attachment security primes produce distinctly different effects to general positive primes. Security primes have been shown to lead to thoughts related to felt security, positive care, a sense of merging with another, positive emotion, and communion (Rowe & Carnelley, 2003) and are distinct from the effects of positive primes and other relationship themed primes (e.g., Ein-Dor, Mikulincer, & Shaver, 2011; Mikulincer et al., 2001).

The Present Studies

Given the preliminary results linking attachment security and gratitude (Dinh & Wilkinson, 2008; Mikulincer et al., 2006), the main aim of the two studies presented here is to test whether attachment security acts to generate gratitude arousal. The main hypothesis is that feelings of attachment security will increase the likelihood of gratitude arousal.

Study 1 examines the proportion of people who report feeling grateful in four different affect priming conditions: Secure, Insecure, Positive, and Neutral, using a supraliminal priming method. Study 2 replicates Study 1 with in an independent sample.

Study 1

The main aim of this study is to determine if attachment security influences the likelihood of gratitude arousal. The following hypotheses are proposed:

- The proportion of people who report feeling grateful will be significantly higher in a Secure Prime condition compared to all other conditions because a Secure Prime condition contains more determinants that lead to gratitude arousal.
- Due to the positive association between gratitude and positive affect (for a review see Wood et al., 2010), it is expected that the proportion of people who report feeling grateful in the Positive Prime condition would be higher than a Neutral Prime and an Insecure Prime condition. Further, the Positive Prime condition involves participants visualizing receiving a large sum of money which is one of the determinants of gratitude arousal and therefore will be more likely to elicit feelings of gratitude than the Insecure or Neutral condition. It is thought that the positive condition would not elicit as high a proportion of people reporting feelings of gratitude than the Secure Prime condition because the Secure Prime condition contains within it more determinants of gratitude, specifically positive perception of intentions of others and the provision of support and attention from others.
- It is expected that the Insecure and Neutral Prime conditions would not differ significantly in the proportion of people who report feeling grateful. Neither

condition contain factors that would elicit feelings of gratitude.

- The same pattern of relationship is expected between experimental conditions and participants' Gratitude Ratings (representing participants' strength of feelings of gratitude) as specified above for gratitude arousal.

Design

This is an online study using a supraliminal visualisation priming technique based on Mikulincer and Arab (1999, Study 3) and Mikulincer and Shaver (2001, Study 3).

Participants were randomly assigned to one of four conditions: Secure, Neutral, Positive, and Insecure priming and were affectively primed through the use of vignettes. Participants entered the study online, completed some demographic details, followed by the prime visualisation exercise. After being primed, they were asked to describe their current emotional state by free text.

Methodology

Participants

The sample consisted of 219 undergraduates who participated to obtain course credits. Of those who completed, 57 were male and 162 were female (35% Male, 65% female). Age ranged from 17 years to 30 years ($M = 19.56$). 144 (66%) had English as a first language. Participants were randomly assigned to one of four prime conditions (71 Secure, 48 Positive, 48 Neutral and 52 Insecure).

Materials and Procedure

Undergraduate university students were invited to participate in an online study about social cognition. After completing basic demographic information, participants were randomly assigned to one of four priming conditions: Secure, Insecure, Positive, and Neutral/Control. Participants were told that they would perform a visualisation exercise and specific instructions for the task would follow. During the visualisations, participants were asked to describe the content of their visualisations such as the people and events that they visualised. This acted as a check that the participant engaged with the visualisation exercise. After the task, participants were asked to describe the feelings arising from the visualisation. Following this, participants completed the Gratitude Ratings Scale.

Gratitude Ratings Scale. The Gratitude Ratings Scale was developed to measure participants' degree of experienced gratitude. It has 12 items each rated on a 7 point Likert scale. Items 1 to 4 required that participants respond by indicating the extent to which they agree or disagree with the items. An example is "I feel grateful for the love I receive". Items 5 to 12 required participants to indicate the degree of gratitude they feel from 1 (very ungrateful) to 7 (very grateful) in response to situations illustrated by items such as "your partner looks after you when you are sick". The internal consistency of the scale for this study was $\alpha = .75$.

Visualisation instructions

In the Secure condition participants are asked to visualise an interpersonal episode that contains a prototypical if-then sequence of secure-base schema (Mikulincer & Arad, 1999; Mikulincer & Shaver, 2001). In the first part they are asked to visualise a situation.

The script is as follows: "take a moment to imagine a situation in which you deal with a life problem that is difficult to solve on your own. It can be a problem that you have experienced or can see yourself experiencing. Take a moment and consider the details of the problem...Take a moment to visualise the consequences of the problem for you...How is the problem impacting on you...What are the thoughts that come up for you...Take a moment and consider the emotions that arise for you...In 5 to 10 lines, please describe in the space below the details of your visualisation".

In the second part they were asked to visualise the people within the situation and the reactions and interactions that occur. The script is as follows: "Building on the situation you visualised earlier, imagine that there are other persons in your surroundings who are sensitive and responsive to your distress...They want to help you only because they love you...They leave other activities to assist and support you...".

Following the visualisations, as in all other conditions, participants were asked to visualise the people in the context. The script is as follows: "Picture the faces of these people and imagine what it is like being with them in that difficult situation you imagined earlier...In the space below, briefly describe: The people in your visualisation, who are they; Their relationship with you; What they are doing and not doing; and How they interact with you".

In all conditions, after the visualisation, participants were asked to report the feelings and thoughts that arose from the visualisation, "Keeping in mind the problem situation and the persons in your surroundings, in the space below, briefly describe: Your feelings in the visualisation; The thoughts going through your mind in the visualisation".

Within the Insecure condition participants are asked to visualise a prototypical insecure episode: The first part of the visualisation is the same as the secure condition. The second part script is as follows: "Building on the situation you visualised earlier, imagine that there are other persons in your surroundings who are being insensitive and unresponsive to your distress...They are not helping...They seemed preoccupied and engaged in other things...". Participants are then asked to visualise the people in the context, exactly as instructed in the secure condition.

In the Positive prime condition participants received the following instructions for visualisation in the first part: "Now, take a moment to visualise yourself being notified that you have won a large amount of money in a lottery prize. What are the thoughts that come up for you...Take a moment and consider the emotions that arise for you...In 5 to 10 lines, please describe in the space below the details of your visualisation". In the second part, they were instructed the following: "Building on the situation you visualised earlier, imagine other students in your class hearing about this notice...They are approaching you...They are congratulating you....They are telling others about your good fortune...".

In the Neutral priming condition, for the first part, participants received the following instructions: "Now, imagine yourself going to a grocery store and buying products you need for your house." In the second part, participants are instructed the following: "Building on the situation you visualised earlier, imagine other persons who are also buying products...They are talking among themselves about daily issues...They are examining new brands and comparing different products...".

Results

Spontaneous Feelings of Gratitude by Prime Condition

Based on participants' text responses, an excel macro was used to parse responses to identify participants who reported feelings of gratitude with this defined as the use of any of the following words: grateful, gratitude, appreciate, appreciation, glad, appreciative, indebted, and thankful. A literature search was conducted to identify words that connote gratitude and used in that manner by the population. The frequency of use of each word is presented in Table 5 according to prime condition. Table 6 displays the number of people who reported feelings of gratitude according to prime condition.

A chi-square test of independence with Yate's correction for continuity (Preacher & Briggs, 2001) was used to determine whether the observed differences were statistically significant and revealed that the proportion of participants who used gratefulness related words in their text responses in the Secure condition was significantly different from the Neutral condition, $\chi^2(1, 119) = 8.09, p < .001$, the Positive condition, $\chi^2(1, 119) = 5.95, p < .05$, and the Insecure condition, $\chi^2(1, 123) = 8.89, p < .001$. Consistent with expectations, the proportion of people in the secure condition reporting gratitude was significantly higher than the proportion in the other conditions. The other conditions were not different from each other in the proportion of people reporting gratitude.

Effects of Affective Priming on Participants' Gratitude Ratings**Evaluation of the Gratitude Ratings scale**

Prior to assessing the relationship between affective priming and participants' gratitude ratings, it was necessary to determine that the Gratitude Ratings scale was a viable measure of state gratitude. A Principal Component Analysis (PCA) with direct oblimin rotation was conducted to explore the factor structure for the items because the Gratitude Ratings scale is a novel measure. A PCA with one factor was conducted to assess how the items load on a one factor model. The KMO measure of sampling adequacy (KMO = .776) and Bartlett's Test of Sphericity ($\chi^2(66, N = 219) = 754.137, p < .001$) indicated that PCA was viable. The solution produced three eigen values above 1: 3.885, 1.507, 1.236 and they respectively accounted for 32.38%, 12.56%, and 10.30% of the variance. The component matrix showed that loadings were generally moderate to high with the exception of 3 items which were .35 or below (Items 8, 9, and 11). These items loaded better on factor 2 but not factor 3. The scree plot suggests a one factor model with the elbow point beginning from the second component number. The component plot in rotated space shows no particularly clear clustering of items, although items 8, 9, and 11 were slightly away from the main cluster. Reliability analysis was conducted to further assess the one factor model. The analysis showed a Cronbach's alpha of .75. Removal of items 3, 11, and 8 further improved the internal consistency to .82. Subsequent analyses employed the 9 item Gratitude Ratings scale.

Effects of Affective Priming on Participants' Gratitude Ratings score

A one way ANOVA was conducted to determine if the prime conditions influenced participants' Gratitude Ratings scale score. The omnibus F-test was insignificant ($F(3, 215) = 1.682, p = .172$) indicating that there were no differences between the conditions in gratitude ratings.

Discussion

The visualisation study was developed as a supraliminal priming study to extend and further test the relationship between attachment processes and gratitude. Overall, the findings were consistent with expectation and support a causal relationship between primed attachment security and the arousal of gratitude feelings. Specifically, the generation of text responses with gratitude related words under an attachment security condition is higher than the other conditions, even the Positive prime condition. The results reveal that almost 1 in 5 (20%) people in the Secure condition reported feelings of gratitude as opposed to 1 in 50 (2%) in the neutral and insecure (2%) condition and 1 in 20 in the positive condition (4%). This suggests that the conditions specific to attachment security led to more frequent feelings of gratitude.

Within the design of this study, the attachment security condition is experimentally different from the others on one key factor, that is, people in the secure condition were primed to feel secure by visualising that significant others aided them and were responsive and available to them in times of need. Because the proportion of people who reported feeling grateful was significantly higher in the secure condition than any of the others, this suggests that normative feelings of security leads to a higher likelihood of feeling gratitude

than feeling positive, insecure, or neutral. People who reported feeling grateful within the secure condition felt grateful for the help and support they received from significant others. Also of note is the pattern of proportion of people who reported feeling grateful across the various conditions. Specifically, the lowest proportion appears in the Insecure condition followed by the Neutral and the Positive condition. This pattern is consistent with what would be expected given the particulars of these conditions. The Insecure condition is associated with feelings of insecurity, stress, and anxiety and the presence of these emotions is likely to impede the arousal of a positive and security related emotion such as gratitude. On the other hand, the Positive condition is associated with positive affect and in a situation where one receives a material gift of money, feelings of gratitude are more likely to be aroused. Consequently, the positive condition contains a proportion of people reporting feelings of gratitude higher than the insecure and the neutral condition.

The findings related to Gratitude Ratings (GR) were contrary to expectations. Participants' GR scores did not differ between the experimental conditions. This indicates that the priming did not influence participants' feelings of gratitude for other situations. There are a number of possible reasons for these results. It is possible that the effect size associated with the affective priming manipulation for this study was not large enough to influence participants' feelings of gratitude to other contexts. The GR measures participants' feelings of gratitude beyond the visualisation situation. For example, participants are asked to rate their degree of gratitude if "a friend buys coffee" for them or rate their agreement to statements like "I feel very appreciative of my close relationships". Because the security priming was shown to be effective and elicited free text reports of gratitude from participants, the lack of relationship between the security priming and the

GR can be interpreted as suggesting that feelings of security predicts feelings of gratitude specific to the situations involved in the visualisation but did not generalise to feelings of gratitude towards other situations. Additionally, it is possible that the findings here suggest a complex relationship between attachment processes and gratitude where normative attachment relates to state feelings of gratitude and individual differences in attachment relate more to trait gratitude responses. Further research is required to assess this relationship possibility.

As such, the findings from this study relate to the normative aspect of attachment functioning and state feelings of gratitude and show that normative attachment security increases the likelihood of state gratitude arousal. It is noted that even though the proportion of people reporting feelings of gratitude was significantly higher than all other conditions, this proportion is a minority rather than a majority which leads to speculation concerning the possible underlying effects at work that account for this result. One possibility is that the results reflect an interaction between individual differences and secure priming on participants' feelings of gratitude. For example, trait differences in attachment or gratitude could have accounted for the results in that it may have been only individuals who also had trait gratitude and or had, a secure attachment style who reported feeling grateful under security priming. A limitation of this study is that attachment individual differences were not measured and these relationships cannot be tested.

Study 2 attempts to replicate the novel results found relating to affective priming and gratitude and addresses the limitations identified by including measures of attachment individual differences.

Study 2

The experimental design of Study 2 is identical to Study 1. Where Study 2 differs is at the end of the experimental manipulation, measurement of the free text report of gratitude and completion of the Gratitude Ratings, participants are asked to complete a number of self-report measures which capture individual differences in attachment styles and trait gratitude. Study 2 has two aims, first to replicate the experimental results of Study 1 relating to attachment security and report of gratitude and secondly, to explore the relationship between normative and individual differences of attachment on gratitude.

Methodology

Participants

A total of 393 undergraduates participated in the online study to obtain course credits. 28 participants (7.1%) did not complete the entire study. 112 indicated that they were Male and 268 indicated they were female (28.5% Male, 68.2% female). Age ranged from 17 years to 51 years ($M = 19.49$). The majority (76%) had English as a first language. Participants were randomly assigned to one of four prime conditions and 365 participants (93%) completed this part in full (82 Secure, 100 Positive, 95 Neutral and 88 Insecure).

Materials and Procedure

Identical to Study 1, after completing basic demographic information, participants were randomly assigned to one of four priming conditions: Secure, Insecure, Positive, and Neutral/Control. Participants were told that they would perform a visualisation exercise and specific instructions for the task would follow. During the visualisations, participants were

asked to describe the content of their visualisations such as the people and events that they visualised. This acted as a record to check that the participant did engage with the visualisation exercise. After the task, participants were asked to describe the feelings they felt arising from the visualisation. Following this, participants completed the Gratitude Ratings scale and other measures of individual differences. The order of these measures was randomised and the descriptions of the measures are below.

Measures

Attachment dimensions. Attachment dimensions were measured using the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). This is a 30-item measure scored on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). It contains original items from the ECR-R that constitute the Anxiety and Avoidance Scale (Brennan et al., 1998; Fraley et al., 2000). It has demonstrated reliability ($\alpha \geq 0.9$) and validity (Mikulincer & Shaver, 2007a). For the purposes of this study, 10 additional items were included to directly capture attachment security. The security items were derived from other well validated attachment measures including the Adult Attachment Scale (Collins & Read, 1990), the Adult Attachment Questionnaire (Simpson et al., 1996), and the Attachment Style Questionnaire (Feeney et al., 1994). The language of the items was modified in this study to allow for easy comprehension for young adults. The entire measure has demonstrated reliability ($\alpha \geq 0.8$) and validity (Wilkinson, 2010, 2011). Examples of items include “I prefer not to show others how I feel deep down” (avoidant attachment), “I often worry that other people close to me don’t really love me” (anxious attachment), and “I am comfortable

depending on others” (secure attachment). The internal consistency of the modified ECR-GSF in this study was $\alpha = .82$ for the avoidance dimension, $\alpha = .87$ for the anxiety dimension, and $\alpha = .72^2$ for attachment security. All reliability estimates reported are Cronbach’s alpha.

Trait Gratitude. Trait Gratitude was measured using the Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) which is based on the work of Watkins, Woodward, Stone, and Kolts (2003). The measure captures trait gratitude through three dimensions; appreciation of people, appreciation of life, and absence of feelings of deprivation (also known as sense of abundance). Item examples include “I couldn’t have gotten where I am today without the help of many people” (appreciation of other people dimension), “Oftentimes I have been overwhelmed at the beauty of nature” (appreciation of life dimension), and “I really don’t think that I’ve gotten all the good things that I deserve in life” (reversed scored, absence of feelings of deprivation dimension). The revised form contains 16 items measured on a Likert scale from 1 (Strongly agree) to 7 (Strongly disagree). The GRAT-R has good validity and reliability $\alpha = .92$ (Thomas & Watkins, 2013). The internal consistency of the GRAT-R in this study was $\alpha = .84$.

Trait Appreciation. Appreciation was measured using a modified version of the Appreciation Scale short form. The short form has strong internal consistency ($\alpha = .91$) and is strongly correlated with the long form ($\alpha = .95$) (Adler & Fagley, 2005). Items were rated on either a frequency scale of 1 (more than once a day) to 7 (never), or on an attitude scale of 1 (strongly agree) to 7 (strongly disagree). Twelve items of the short form were used and

² Item 18 of the measure was removed as it significantly decreased the internal consistency of the scale indicating that it was not compatible with the other items and was not measuring the same construct.

the language was modified slightly to lower the literacy level required to easily understand the items. For example, items include “I give thanks for something at least once a day” and “I count my blessings for what I have in this world”. The internal consistency of this scale in this study was $\alpha = .93$.

Gratitude Ratings. The gratitude ratings scale was developed to measure participants’ state level of gratitude. The 9 items used from study 1 was again used for this study for consistency. The internal consistency of the scale for this study was $\alpha = .84$.

Results

Spontaneous Feelings of Gratitude

A macro was run in excel to identify participants who reported feelings of gratitude. Participants who expressed feeling grateful using the following terms were identified as expressing feelings of gratitude: Grateful, Gratitude, Appreciate, Appreciation, Glad, Appreciative, Indebted, and Thankful. The frequency of use of each word is presented in the Table 7 according to prime condition. Table 8 displays the number of people who reported feelings of gratitude according to prime condition.

Table 8 displays results showing that 19.51% of people in the Secure condition spontaneously described feeling grateful compared to 4.55% in the Insecure condition, 6% in the Positive condition and 5.26% in the Neutral condition. A chi-square test of independence showed that the proportion of participants who felt grateful in the Secure condition was significantly different from the Neutral condition, $\chi^2(1, 176) = 8.55, p < .001$, the Positive condition, $\chi^2(1, 181) = 7.74, p < .001$, and the Insecure condition, $\chi^2(1, 169) = 9.16, p < .001$. Consistent with expectations, the proportion of people in the Secure

condition reporting gratitude was significantly higher than the proportion in the other conditions. The other conditions were not different from each other in the proportion of people reporting gratitude.

Effects of Affective Priming on Participants' Gratitude Ratings score

A one way ANOVA was conducted to determine if the prime conditions influenced participants' Gratitude Ratings. The omnibus F-test was not significant ($F(3, 347) = 1.19, p = .31$) indicating that there were no differences between the conditions in Gratitude Ratings.

Effect of Individual Differences on report of Gratitude Related Words.

To assess whether individual differences in attachment and trait gratitude influenced participants' report of gratitude (GRW) within the conditions, a multinomial logistic regression was conducted with prime condition on GRW with attachment anxiety, attachment avoidance and trait gratitude and appreciation as covariates. The model fitting information Chi-Square $\chi^2(7, 341) = 19.8, p < .001$ is significant indicating that there is a significant relationship between the independent variables and the dependent variable. The Pseudo R^2 values indicate that the model accounted for between 5.5% to 11.9% of variability in GRW. The likelihood ratios tests (for complete tests see Table 10) show that there is a significant relationship between prime and GRW ($\chi^2(3, 345) = 15.85, p < .00$). This indicates that there is a difference between the prime conditions on reporting of feelings of gratitude. This reflects the results reported earlier regarding the significant difference between the Security condition on gratitude emotion compared to the other three

condition. Attachment Avoidance, Attachment Anxiety, and Appreciation were not significantly related to GRW. Trait Gratitude was only partially predictive of GRW ($\chi^2(1, 347) = 3.44, p = .09$).

Effect of Affective Priming on Gratitude Ratings with Trait variables controlled

It is possible that trait variables such as attachment styles and trait gratitude as well as age, gender, and English as a second language (ESL) may influence the impact of priming on participants' gratitude ratings. To control for these effects, an ANCOVA was conducted with Prime on Gratitude Ratings and Age, Gender, ESL, Anxiety, Avoidance, Trait Gratitude and Appreciation as covariates. Table 9 displays the means and standard deviations for the variables within the analysis by prime condition. Three significant main effects were found for Gender ($F(1, 337) = 12.77, p < .00$), Trait Gratitude ($F(1, 337) = 10.84, p < .00$) and Appreciation ($F(1, 337) = 38.32, p < .00$). No other significant relationships were found.

Discussion

The findings relating to the affective priming from Study 2 replicate those of Study 1, showing a relationship between Attachment Security Priming and participants' report of gratitude. As with Study 1, 20% of people in the Secure condition reported feelings of gratitude compared to only 4 to 6% of participants in the other conditions. Unlike the proportion of people in the Secure condition reporting gratitude, the proportion of people in the Positive and Insecure condition reporting gratitude was not statistically different from that of chance, which is represented by the proportion of people who reported feeling

grateful in the Neutral condition. Importantly, the results show that Attachment Security is distinct and a stronger predictor of gratitude than Positive Affect and positive outcome as represented by winning a large sum of money in the Positive condition. Although the proportions are a little different, the pattern is the same as with Study 1, where the proportion of people who reported feeling grateful was smallest in the Insecure condition, followed by the Neutral condition, followed by the Positive condition. This pattern is as expected theoretically, with the Insecure condition being associated with negative affect, the Neutral with none, and the Positive with positive affect. The findings are consistent with the hypothesis that attachment security is causally related to gratitude arousal, that attachment security activation leads to more occurrences of gratitude.

The findings related to the Gratitude Ratings were also consistent with those of Study 1, namely participants' GR score did not differ between the experimental conditions. This study also assessed the influence of trait variables on participants' gratitude responses within the experimental conditions. The findings showed that individual differences in attachment processes did not influence participants' reporting of gratitude words or participants' Gratitude Ratings Score, which are both state measures of gratitude. In fact, covariates such as Age, Gender, ESL and individual differences in Attachment Anxiety and Avoidance were not related to participants' responses relating to state measures of gratitude. As expected, Trait Gratitude and Trait Appreciation predicted participants' Gratitude Ratings. However, these trait variables did not predict participants' reporting of gratitude words immediately after affective priming.

General Discussion

The findings presented demonstrate the value of attachment theory in providing a theoretical framework for understanding gratitude and the role of attachment security in gratitude arousal. Two independent studies showed that activating attachment security is associated with a higher likelihood of gratitude arousal in a specific context. Both studies found approximately 20% (1 in 5) of participants in the attachment security group reported feeling grateful which was significantly higher than the baseline rate represented by the control condition which was between 2 to 6%. Further, the evidence indicates that gratitude arousal occurs more frequently when security of attachment was made salient rather than simple positive affect, with the rate of gratitude arousal in the positive condition not statistically different from the neutral control condition. Additionally, the proportion of people who reported feeling grateful in the insecure condition was consistently lower than the control condition although not statistically different. This result is convergent with previous research (e.g., Dinh & Wilkinson, 2008; Dwiwardani et al., 2014; Lystad et al., 2005) where attachment security was found to be positively correlated with trait gratitude.

Analysis of the influence of individual differences in attachment and trait gratitude showed that these variables did not predict participants' reporting of gratitude under affective priming and did not interact with how affective priming influenced participants' reporting of gratitude. Trait Gratitude did not significantly predict participants' reporting of gratitude under affective priming which indicates that participants' feelings of gratitude were specific to the Attachment Security condition and was not influenced by trait variables. Attachment Avoidance and Anxiety did not have an effect on the relationship

between affective priming and participants' Gratitude Ratings (Participants' endorsement of whether and how grateful they felt). The finding that trait attachment variables do not interact with security priming is in line with other research findings (Carnelley & Rowe, 2007; Mikulincer & Shaver, 2007b). Only Trait Gratitude and Appreciation significantly predicted participants' Gratitude Rating score which is consistent with expectations that the tendency to feel gratitude predicts higher endorsement of feelings of gratitude in different contexts (Adler & Fagley, 2005; McCullough et al., 2002; Watkins et al., 2003; Wood, Maltby, Stewart, & Joseph, 2008). Overall, individual differences in attachment functioning as represented by attachment avoidance and anxiety dimensions was unrelated to participants' state gratitude levels in these studies.

No priming effects were found in relation to participants' Gratitude Ratings.

Moreover, state feelings of security did not have a strong residual effect on participants' feelings of gratitude in other contexts. The findings have implications for our understanding of how attachment processes differentially interact with state and trait forms of gratitude at both the normative and individual differences level of functioning. The finding that induced attachment security is associated with higher likelihood of gratitude arousal but does not predict participants' feelings of gratitude in other scenarios is theoretically understandable. The result indicates that feelings of attachment security and the conditions specific to attachment security (having significant others who are available and responsive when in need) facilitates the arousal of gratitude but as a temporary state does not influence participants' feelings of gratitude towards other contexts and scenarios.

Context/environment and repeated experiences are important factors in the development of personality (Mischel & Yuichi Shoda, 1995; E. Waters et al., 2002). According to

attachment theory, context and our experiences in it are processed, internalised and organised so that we have a representative model of the world to help us formulate expectations and action repertoires to respond effectively to current and future situations (Bowlby, 1969). Repeated experiences of attachment security leads to a person with a secure attachment style (e.g., Ainsworth, 1985a; Main et al., 1990) who tends to experience feelings of security the majority of time and who has a view that others in the world are generally trustworthy and well-intention (Bartholomew & Horowitz, 1991). As such, an attachment account suggests that individuals with a secure attachment style are more likely to develop trait gratitude than individuals with insecure attachment and this relationship is facilitated by internal working models.

Further research is required to determine if repeated experiences of felt security would result in the development of the tendency to feel gratitude. There is a body of research that demonstrates that repeated priming of attachment security has a pervasive positive effect on functioning. Research has shown that repeated priming of attachment security produces positive effects on the parent–child relationship (Sohlberg & Birgegard, 2003), stress (Dandeneau, Baldwin, Baccus, Sakellaropoulo, & Pruessner, 2007), self-esteem, expectations towards relationship partners (Carnelley & Rowe, 2007), mood, and compassion towards others (Gillath & Shaver, 2007). The effects of the priming has been shown to last beyond the priming session with effects being present as long as a week after the priming was administered (Gillath & Shaver, 2007). The next step in testing the hypothesis that attachment security facilitates trait gratitude development is to determine if repeated security inductions leads to the generalisation of feelings gratitude to other scenarios or contexts. One method of attachment security induction was used in the studies

in this paper, it would be useful to establish the effects of other types of security induction on gratitude arousal. Numerous methods have been developed to induce attachment security including subliminal or supraliminal exposure to names of attachment figures (Mikulincer, Shaver, Gillath, & Nitzberg, 2005), pictorial representations of security (Bowles & Meyer, 2008; Mikulincer, Gillath, et al., 2001), visualisations of security related information (e.g., Baldwin et al., 1996; Bartz & Lydon, 2004), and memory recall of secure experiences (Rowe & Carnelley, 2003). For a review of attachment security inductions see Gillath, Selcuk and Shaver (2008) and Mikulincer and Shaver (2007b).

Limitations and Future Directions

There are a number of limitations associated with these studies. First, the samples for the two studies are limited to undergraduate university students who are not necessarily representative of the general population and it is possible that the sample may differ from the general population in their gratitude profile. Future research using different populations would address this issue. Second, with the exception of the priming manipulation, the constructs and variables examined were based on self-report measures. For example, the measure of state feelings of gratitude relied on participants' awareness of their state feelings and accurate reporting of those feelings. Of course, self-report measures are a useful method to gather information of people's internal states and in the case of gratitude, there is not yet a method of directly measuring or capturing a person's feelings of gratitude objectively. Therefore this limitation is present for the field until a method of objectively observing gratitude is possible.

The studies here have mainly focused on the state level of gratitude experience which is a necessary component of developing an understanding of the gratitude construct. Much more research is required to continue to further our understanding of the development of this construct. For example, the findings here show that attachment processes, particularly attachment security, are linked to gratitude. However the mechanisms that link the two are unclear and require further examination and testing. Attachment theory offers a framework in which to examine and explore this unknown. First, it is likely that feelings of gratitude occur naturally when the external determinants (receipt of gift and value of gift to self, benefactor intentions, cost to benefactor for providing the gift) are clearly and unambiguously present. Second, trait gratitude is likely to be formed through repeated interpersonal experiences that lead one to form an attribution bias regarding one's perception of the external determinants that lead to feelings of gratitude (Wood et al., 2008). Under the attachment perspective, differences in working models of others and self would lead to individual differences in attribution biases (Mikulincer et al., 2006; Mikulincer & Shaver, 2007a). To test the link between attachment security and gratitude, further research is required to examine the influences of working models on individual attributions in relation to gratitude arousal.

The studies presented here are among the few focused on addressing the lack of empirically validated theoretical understanding of the gratitude construct, particularly the development of trait gratitude. The findings provide evidence for a causal relationship between attachment security and the arousal of feelings of gratitude which was replicated in two independent samples. Further research is required to determine the mechanisms involved that lead to gratitude arousal under attachment security induction and to

investigate factors involved in the development of trait gratitude. Finally, the results indicate that there is utility in using an attachment framework to continue the exploration of the development of gratitude.

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Table 5

Study One, Frequencies of Gratitude Related Words by Condition

Condition	Gratitude Related Words								Total	Sample Size
	Grateful	Gratitude	Appreciate	Appreciation	Glad	Appreciative	Indebted	Thankful		
Positive	2	0	0	0	0	0	0	0	2	48
Neutral	0	0	0	0	1	0	0	0	1	48
Secure	5	1	2	0	4	1	0	3	16	71
Insecure	0	0	0	0	1	0	0	0	3	52
<i>Total</i>	<i>7</i>	<i>1</i>	<i>2</i>	<i>0</i>	<i>6</i>	<i>1</i>	<i>0</i>	<i>3</i>	<i>20</i>	<i>219</i>

Table 6

Study One, Frequencies and Percentages of Participants Employing Gratitude Related Words by Condition

Condition	People listing gratitude emotion	Sample size	%
Positive	2	48	4.17%
Neutral	1	48	2.08%
Secure	14	71	19.72%
Insecure	1	52	1.92%
<i>Total</i>	<i>18</i>	<i>219</i>	<i>8.21%</i>

Table 7

Study Two, Frequencies of Gratitude Related Words by Condition

Condition	Gratitude Related Words								Total words	Sample Size
	Grateful	Gratitude	Appreciate	Appreciation	Glad	Appreciative	Indebted	Thankful		
Positive	0	0	1	0	4	1	0	1	6	100
Neutral	1	0	0	0	3	0	0	1	5	95
Secure	6	2	5	0	3	2	0	2	16	82
Insecure	2	0	4	0	0	0	0	1	7	88
<i>Total</i>	<i>9</i>	<i>2</i>	<i>10</i>	<i>0</i>	<i>10</i>	<i>3</i>	<i>0</i>	<i>5</i>	<i>34</i>	<i>365</i>

Table 8

Study Two, Frequencies and Percentages of Participants Reporting Gratitude Related Words by Condition

Condition	People listing gratitude emotion	Sample Size	%
Positive	6	100	6.00%
Neutral	5	95	5.26%
Secure	16	82	19.51%
Insecure	4	88	4.55%
<i>Total</i>	<i>31</i>	<i>365</i>	<i>7.88%</i>

Table 9
Study Two, A Descriptive table of Means, Standard Deviations, and Sample Size for Gratitude Ratings (Dependent Variable) and Covariates by Prime condition.

Condition		Avoidance	Anxiety	Trait Gratitude	Trait Appreciation	Gratitude Ratings
Insecure	Mean	2.80	2.66	6.89	58.72	54.85
	Std. Deviation	0.70	1.33	1.02	13.24	6.10
	N	86.00	87.00	87.00	87.00	87.00
Neutral	Mean	2.66	2.75	6.68	56.48	54.29
	Std. Deviation	2.20	1.31	0.99	11.04	5.18
	N	95.00	95.00	95.00	95.00	95.00
Positive	Mean	2.83	2.85	6.89	60.28	55.70
	Std. Deviation	0.73	0.72	0.94	12.27	5.05
	N	97.00	99.00	99.00	99.00	99.00
Secure	Mean	2.82	2.67	6.82	57.89	55.43
	Std. Deviation	0.65	0.71	0.95	11.22	5.84
	N	70.00	70.00	70.00	70.00	70.00
Total	Mean	2.77	2.74	6.82	58.39	55.05
	Std. Deviation	1.29	1.07	0.98	12.04	5.53
	N	348	351	351	351	351

Note. The count of participants in the prime conditions is less when used to examine the variables within this table because these measures appeared in the latter half of the study where a small percentage of participants had dropped out.

Table 10

Study Two, Effect of Individual Differences on report of Gratitude Related Words – Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	201.359 ^a	.000	0	.
Anxiety	202.008	.649	1	.421
Avoidance	202.222	.863	1	.353
App	201.908	.549	1	.459
Prime	217.313	15.954	3	.001

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

CHAPTER EIGHT

GENERAL DISCUSSION

Review of Thesis Aims and Objectives

This thesis set out to examine the nature of the relationship between attachment and gratitude and to assess the viability of an attachment account of gratitude. Gratitude is a positive higher order affect with strong links to multiple indicators of well-being, evidenced by both correlational associations and direct causal relationships established through intervention studies, making it a construct worth studying due to the potential benefits of gratitude for clinical and well-being psychology. The literature on gratitude is broadly divided into two general domains: one examines the relationship between trait gratitude and well-being (e.g., Adler & Fagley, 2005; Wood, Joseph, & Linley, 2007; Wood, Maltby, Stewart, & Joseph, 2008), and the other explores the effect of short gratitude-based interventions on well-being (e.g., Browning, 2012; Froh, Sefick, & Emmons, 2008; Lambert, Green, Fincham, & Stillman, 2009; Otsuka, 2012). Little is currently known about how trait gratitude develops, or the mechanisms linking trait gratitude or gratitude interventions to well-being. The field lacks an empirically validated theory of gratitude and thus is unable to account for the “how” of the gratitude phenomenon (Emmons & Mishra, 2011; Wood et al., 2010). A few theories have been proposed but they are lacking in empirical support and tend to only account for limited aspects of the gratitude construct (Wood et al., 2010). This thesis argued that attachment theory (Bowlby, 1969, 1973, 1980), a social cognitive theory of interpersonal functioning which provides an extensive account of personality that encompasses affective, behavioural, social, and cognitive processes, can contribute by providing an

account of individual differences in the propensity to feel gratitude and how this may develop. Due to the lack of research on attachment and gratitude, the main aim of the research program was to explore whether and how attachment processes related to gratitude and assess whether there is a potential causal relationship between attachment security and gratitude as a way to test the viability of the attachment model of gratitude.

The primary hypothesis was that attachment security facilitates gratitude arousal and is linked to the tendency to experience gratitude. It was argued that attachment security contains conditions that are analogous to factors found to elicit feelings of gratitude. First, securely attached individuals are a product of having primary caregivers who are reliably responsive and available in times of need and provide responsive care and support (Bowlby 1969). This context has elements that are in line with determinants found to elicit gratitude. In particular, it involves others who provide support which can be interpreted as a benefactor providing a gift of support, time and care. Second, securely attached individuals tend to have positive internal representations of others in the world and have positive views of the self (Bartholomew & Horowitz, 1991). These internal representations of self and others act as a guide in future situations (Bowlby 1969) and because secure individuals have positive internal representations of self and others, they tend to view others as well-intentioned and trustworthy (Bartholomew & Horowitz, 1991). The perception that a benefactor is well-intentioned is pivotal in the arousal of gratitude (Tesser, Gatewood, & Driver, 1968). It is reasoned that with these conditions, securely attached individuals are more likely to experience gratitude than insecurely attached individuals and therefore attachment security is facilitative of gratitude arousal and through this influence may play a role in trait gratitude development.

The research program set out to systematically test first the correlational relationship between attachment and gratitude to determine whether an attachment model of gratitude is viable. Study 1 (Chapter 4) explored the relationship between attachment processes at the individual differences level and state and trait gratitude. Study 2 to 5 focused on testing the hypothesis that attachment security is causally linked to gratitude at cognitive and affective levels of experience. In particular, Study 2 and 3 (Chapter 5 and 6) assessed whether cognitive activations of attachment security influenced participants' reactions to gratitude information differently to neutral information. Study 4 and 5 (Chapter 7) examined whether induced feelings of security resulted in increased likelihood of gratitude arousal compared to induced insecurity, induced positive affect, or control.

Summary of Empirical findings

To assess the viability of an attachment model of gratitude it was important to explore the relationship between attachment processes and gratitude. A cross-sectional study (Chapter 4) of individual differences in attachment and state and trait gratitude was designed for this purpose. Analysis of survey responses from 608 participants revealed that attachment processes are significantly linked to state and trait gratitude. The results were generally consistent with expectations demonstrating that attachment security was the strongest predictor of state and trait gratitude among attachment variables and uniquely predicted gratitude even after age, gender, trait positive and negative affect, and attachment avoidance and anxiety were accounted for. Attachment avoidance was also found to uniquely predict state and trait gratitude after age, gender, trait affect, and attachment anxiety were accounted for. Unexpectedly attachment anxiety did not uniquely predict gratitude and when attachment security was included in

the model it became a significant predictor of gratitude but in the opposite direction than that hypothesised. Overall, the findings provided evidence to demonstrate that attachment processes predict gratitude and revealed new information regarding how attachment processes are related to gratitude. The study showed that attachment security is an important variable among attachment variables in relation to gratitude and provided evidence that the attachment framework is a possibly useful approach to study gratitude further.

Following from the findings of the cross-sectional, survey study demonstrating that attachment processes have a significant predictive relationship with gratitude, four experimental studies were designed to examine whether attachment security had a direct influence on gratitude. Two studies (Chapter 5 and 6) examined attachment and gratitude at the cognitive information processing level and two studies (Chapter 7) tested the relationship between these variables at the affective level. The first experimental study employed a subliminal affective priming technique using a computerised Lexical Decision Task (Chapter 5) to test whether attachment security and gratitude are found within the same semantic cognitive network. Previous research has shown that priming effects are present for prime and target pairs that are congruent (belong to the same schema or category) (e.g., Baldwin, 2007; Carnelley & Rowe, 2010; Spruyt, Hermans, De Houwer, & Eelen, 2004; Spruyt, Hermans, De Houwer, Vandromme, & Eelen, 2007; Van den Bussche, Van den Noortgate, & Reynvoet, 2009). Unexpectedly, a clear priming effect was not found and the pattern of results indicated a trend in the response time data that was in the opposite direction to that expected for the Lexical Decision paradigm. Moreover, a priori analysis showed that instead of participants in the secure prime condition responding faster to gratitude information

than neutral information as hypothesised, the estimated marginal means and paired sample t-tests showed that people were responding significantly slower to gratitude information than neutral information. Additionally, a weak three-way interaction effect with prime, target, and avoidance was found. This indicated that attachment avoidance inhibits information processing of gratitude information but the effect was negated under the secure priming condition, which although was not hypothesised, supports the general expectation that attachment processes have an association with gratitude.

The next study tested the same hypotheses using a different subliminal affective priming task (Chapter 6), a computerised Stroop colour naming task. Analysis revealed a marginally significant priming affect ($\alpha = .10$) that was again in the opposite direction to that expected for the paradigm but is consistent with those found for the Lexical Decision Task. Additionally, attachment anxiety was found to have a weak ($\alpha = .10$) inhibitory effect on gratitude information compared to neutral information. In the context of a growing body of research reporting observations of *reversed priming effects* (e.g., Banse, 2001; Glaser & Banaji, 1999; Glaser, 2008; Musch & Klauer, 2003) particularly under subliminal priming as opposed to supraliminal priming (e.g., Banse, 1999, 2001; Hermans, Spruyt, De Houwer, & Eelen, 2003), and considering the convergent evidence between the two affective subliminal priming studies presented, it was interpreted that a priming effect was present and the effect reflected the presence of cognitive activation for gratitude information when attachment security was primed. In the case of the Stroop experiment, this cognitive activation effect between attachment security and gratitude acted to reduce the typical Stroop interference effect (Banse, 2001; Hermans, 1996; Wentura, 1999), leading to faster response time to gratitude information compared to neutral information. The findings relating to the *reverse*

priming effect and the inhibitory effect of attachment avoidance and anxiety provided evidence that attachment processes directly influenced gratitude within the cognitive domain. It was noted that although the author interpreted the results to show a *reversed priming effect*, because it was a *post hoc* account and the effects found were weak, further research evidence was required to allow for confidence in the particular interpretation taken. This was addressed in the studies presented in Chapter 7.

The next two experimental studies (Chapter 7) examined whether feelings of attachment security facilitated gratitude arousal using a supraliminal priming method. Participants were asked to participate in a visualisation task which acted to prime them to experience feelings of either security, insecurity, positivity, or neutral depending on their random assignment into one of these conditions. As expected, attachment security was associated with more reports of feelings of gratitude than all other experimental conditions. Another study was run using an independent sample to determine if the results could be replicated. The same pattern of results was found. The findings from both studies provided evidence that inducing attachment security is related to a higher likelihood of gratitude arousal. The finding that at the supraliminal level, affective priming was in the expected direction, supports the interpretation that the *reversed priming effect* found in the two previous subliminal priming designs were evidence of a legitimate priming effect between attachment security and gratitude and reflected a direct influence of attachment processes on gratitude.

Implications

Theoretical Contribution of Thesis

Overall, the thesis findings provided preliminary empirical support for the viability of the attachment account of gratitude and validates the speculation of researchers such as Mikulincer, Shaver, and Slav (2006), Buck (2004), and Watkins (2014) that attachment and gratitude are causally linked. The following section explores in detail how the findings have contributed to advancing knowledge of attachment and gratitude.

The viability of the attachment account of gratitude

A significant contribution of this thesis is that it has provided a systematic empirical investigation of the causal link between attachment and gratitude which was previously non-existent in the literature. More importantly, the findings provided evidence to support the viability of the attachment model of gratitude which has been previously speculated by numerous researchers (Buck, 2004; Mikulincer et al., 2006; Watkins, 2014). This means that attachment is relevant to gratitude. The findings pave the way for more in-depth exploration of the particulars of how attachment is involved in gratitude. For example, it is possible that these two variables relate in a developmental-interactionist manner as suggested by Buck (2004) where positive attachment containing trust, mutual respect, reciprocity, and fairness are required for genuine gratitude to arise. Alternatively, but similarly, the attachment and gratitude relationship may exist according to Watkins' (2014) proposal where secure attachment is necessary to elicit gratitude due to the secure individuals good will of others and trust that others can meet their needs. Neither of these proposals have been empirically tested

to date and the findings from this thesis provides an affirmative for an attachment perspective and thus encourages further exploration of these proposals.

An attachment account of trait gratitude

Given the evidence supporting the viability of an attachment framework of gratitude, it is pertinent to consider what attachment theory can contribute in relation to a theory of gratitude. The following section articulates the theoretical account of gratitude from an attachment perspective and discusses the implication of the empirical findings in relation to the attachment theory of gratitude.

Attachment theory enjoys extensive empirical support as a theory of personality particularly in regards to interpersonal functioning (Mikulincer & Shaver, 2007a). Its account of personality development relates to attachment processes which intersect social, cognitive, emotional, and behavioural domains of experience (Bowlby, 1969, 1973, 1980). Attachment theory and the evidence base for it, is detailed in Chapter 2. In brief the general process of personality development according to attachment theory begins with the context/environment and the interpersonal transactions between the individual and significant others. The interpersonal experience is processed and information is stored cognitively to create internal representations of the world which are used to anticipate future experiences so individuals can respond effectively and efficiently (Bartholomew & Horowitz, 1991). The information within the internal working models shape the individual's emotional and behavioural responses and these models are the underlying mechanisms of individual differences in behaviour and functioning.

An attachment theory of trait gratitude proposes that attachment security is a necessary condition for the development of trait gratitude. People who are securely

attached have significant others who are responsive and available to them in times of distress. These significant others provide them with help, care, and support when they are in need and act as a safe-haven and a secure-base from which they can explore the world, broaden-and-build resources when not under duress, and go to for support when they feel unsafe (Bowlby, 1969; E. Waters et al., 2002). This condition is analogous to the conditions identified in the gratitude literature as important in eliciting feelings of gratitude (Tesser et al., 1968). Over time, these interpersonal experiences are internalised into working models of the world. Research has shown that securely attached individuals have positive working models, that is positive expectancies of others and positive evaluations of self (e.g., Bartholomew & Horowitz, 1991; Mikulincer et al., 2003, 2006). Positive models of others relates to the perception that other people in the world are trustworthy and well-intentioned (Bartholomew & Horowitz, 1991; Mikulincer et al., 2003, 2006). Positive models of self relates to having positive self-esteem, self-liking, and feelings of self-efficacy. Since the appraisal of the external source's intentions have been shown to be pivotal in the arousal of gratitude (e.g., Emmons & Mishra, 2011; Tesser et al., 1968; Wood, Maltby, Stewart, Linley, & Joseph, 2008), a person would need to have a positive model of others as opposed to having a negative model of other for trait gratitude to be developed. It is argued that attachment security, containing the positive model of others and self, provides the best conditions required for both gratitude arousal to occur and for the tendency to experience gratitude because secure individual will tend to interpret other people's actions as well-intentioned and trustworthy and the self as worthy of such positive intentions and actions. Further, because they have significant others who are available and willing to provide aid to them when they feel stressed or threatened, they are more

often exposed to gratitude eliciting situations than insecure individuals. Therefore they will experience more gratitude than insecure individuals and will tend to perceive situations as having more gratitude determinants than insecure individuals.

With regard to empirical evidence supporting the attachment account, the research from this thesis revealed that there is a small to medium relationship between attachment processes and gratitude. All the studies presented showed that attachment security predicted gratitude, encompassing cognitive, affective, and trait levels of the gratitude experience. Attachment security was the strongest predictor of gratitude among attachment variables, and, depending on the method of measurement, attachment security accounted for small to medium variance in gratitude. The evidence presented in Chapter 5 and 6 suggests that attachment security and gratitude are connected and attachment security is implicated in the processing of gratitude related information. Further evidence, in Chapter 7, demonstrated that state feelings of attachment security was linked to a higher likelihood of gratitude arousal, supporting the premise that situations arousing attachment security will contain more frequent gratitude arousal than those inducing attachment insecurity. Chapter 4 demonstrated that people with a secure attachment style are more likely than insecure attachment styles to report feelings of gratitude and to have higher scores of trait gratitude.

The findings from this thesis also revealed a complex interplay between attachment processes and gratitude when it relates to individual differences in the insecure attachment anxiety dimension. Consistent with Mikulincer and colleagues' (2006) findings, attachment anxiety did not uniquely predict gratitude. Mikulincer and colleagues (2006) proposed that this was due to people with high attachment anxiety having ambivalent working models of others containing a mix of positive perceptions of

others where others are seen as skilful and likable but are at times unreliable and unavailable. Their argument suggests that this ambivalence results in an unclear relationship between attachment anxiety and gratitude under statistical analysis. Interestingly, in this thesis, when attachment avoidance and security were included in the predictive model, attachment anxiety became a significant predictor of gratitude in the positive direction, indicating that people with higher attachment anxiety had a propensity to feel more gratitude and score higher on trait gratitude than less anxiously attached people. This unexpected result suggests the possibility that when attachment avoidance and security are controlled for, they act to reduce irrelevant variance in the attachment anxiety variable³ thus revealing a clear but small relationship between attachment anxiety and gratitude. This positive relationship, which is significant but smaller than the relationship between attachment security and gratitude (which was small to medium in magnitude), suggests the possibility that people high on attachment anxiety associated with negative model of self (Bartholomew & Horowitz, 1991) make certain attributions regarding the determinants of gratitude (gift, cost, and benefactor intentions) which leads them to feel more grateful. It is possible that the negative feelings of self-efficacy, low self-esteem, low self-adequacy (Mikulincer et al., 2003) associated with a negative model of self leads to the perception that gifts are of higher value and more costly to provide, leading to higher likelihood of gratitude arousal. In contrast to this finding, results from Chapter 6 showed that attachment anxiety acted to inhibit the processing of gratitude information which is more consistent with the hypothesis that attachment insecurity, overall, is negatively related to gratitude. This is

³ The inclusion of attachment security and avoidance acts to account for the variability in gratitude predicted by model of others (represented by avoidance) and positive models of others and positive models of the self (represented by security),

more consistent with the argument that attachment anxiety would negatively predict gratitude because of the tendency to be preoccupied (Bartholomew & Horowitz, 1991; Mikulincer et al., 2003) and experience more negative emotionality (Mikulincer et al., 2003) which deters positive emotional arousal (Mikulincer et al., 2003; Wood et al., 2010). Given the two contrasting findings, it is suggested that this tendency to experience more gratitude by highly anxious individuals, reported in Chapter 4, would be specific to situations where a benefit to the self can be clearly observed (as represented by the Gratitude Ratings scale which contained numerous scenarios where participants rated their feelings of gratitude if certain benefits were received). In other words, it is suggested that, when it is clear for a highly anxiously attached person that someone has provided them with a benefit, they report more feelings of gratitude than less anxious people because they attribute the gift to be of more value to them and of higher cost to provide. Taken together, the findings from this thesis reveal a complex relationship between attachment anxiety and gratitude that appears to vary depending on the contextual information. More research is required to explore this relationship.

In summary, in relation to empirical evidence for the attachment account of gratitude, the series of studies presented showed that attachment theory is a viable framework for studying gratitude and that attachment processes account for some variability in gratitude arousal and in individual differences in the propensity to experience gratitude. Complete empirical examination of the development of trait gratitude was beyond the scope of this research program. However, the premise of an attachment account of the development of trait gratitude is clearly articulated and detailed in this thesis in order to facilitate further future research and empirical testing.

An attachment account of the link between gratitude and well-being, considered in the context of current theories

Apart from offering an account of the development of trait gratitude, the attachment framework also offers an account of the relationship between gratitude and well-being. Four theories currently exist that offer an explanation for the link between gratitude and well-being (see Chapter 1 for a review). These are the Schematic Hypothesis, the Coping hypothesis, the Positive Affect hypothesis, and the Broaden-and-build hypothesis. This section discusses the different accounts and contrasts this with the attachment perspective on gratitude and well-being.

The positive affect hypothesis offers that gratitude is related to well-being due to its positive valence. In particular, grateful people are habitually exposed to more positive emotions which protect against mental illness (Diener, 1984). Although there are research studies to show that positive affect is linked to well-being (e.g., Watson & Naragon-Gainey, 2010) and that gratitude is associated with habitual experiences of positive emotion (e.g., Baron, 1984; Kashdan, Mishra, Breen, & Froh, 2009; Naito, Wangwan, & Tani, 2005) suggesting that part of the relationship between gratitude and well-being may be mediated by positive affect, there are studies that show that gratitude is uniquely related to well-being beyond positive affect (McCullough et al., 2002; Wood, Joseph, Lloyd, et al., 2009; Wood, Maltby, Gillett, et al., 2008; Wood, Maltby, Stewart, Linley, et al., 2008). Thus, evidence indicates that positive affect appears to partially account for the relationship between gratitude and well-being. The attachment account of gratitude is not incompatible with this explanation.

Wood and colleagues (2008) developed the Schematic Hypothesis to explain the finding that grateful people tended to view help as more beneficial to them which lead

to increased gratitude and consequently, increased well-being. They proposed that grateful people had schematic biases which influenced how they interpret help giving situations. Their research demonstrated that grateful people perceived help as of higher cost to the benefactor, help was more valuable to them, and the benefactor was more altruistic and genuine than non-grateful people. A limitation of this approach is it does not offer an explanation for how grateful people develop these schematic biases or how schematic biases function or why they exist. From an attachment perspective, this schematic bias is present through the functions of working models of self and others where individual differences in working models stem from the internalisation of interpersonal experiences with others in the world (Bartholomew & Horowitz, 1991; Lyddon & Sherry, 2001; Main, 1990). From the attachment approach, the schematic bias present in grateful people relates to having positive working models of self and others. Model of other contains expectations that others in the world are trustworthy and well-intentioned which impacts on a person's expectations of others' intentions in context, affecting gratitude arousal (Bartholomew & Horowitz, 1991). Further, the thesis findings indicate that negative models of self may be associated with higher gratitude and from an attachment perspective, this could be interpreted as meaning that people who have lower feelings of self-efficacy, self-esteem, might make biased attributions where the gift is considered to be more valuable to them, and seen as more costly to provide, thus leading to the higher likelihood of arousal of gratitude. As can be seen, the attachment approach accounts for the schematic bias through the function of working models and can offer an explanation for how the schematic bias develops.

Wood and colleagues (2007a) proposed that grateful people have higher well-being than non-grateful people because they tend to engage in adaptive coping

strategies. The research showed that grateful people tended to approach rather than avoid problems; they sought instrumental and emotional support in times of stress; and were less likely to disengage and use substances in the face of problems. Again, this approach is limited in that it does not offer an explanation for why grateful people tend to use adaptive coping strategies. The coping strategies engaged in by grateful people overlap with those engaged in by securely attached people. Securely attached people tend to seek instrumental and emotional support in times of stress (Ognibene & Collins, 1998; Terzi, 2013) because significant others in their lives are responsive and available to them, leaving them less likely to engage in other maladaptive coping strategies. Secure people tend to be proactive in their problem solving (Mikulincer et al., 2003; Mikulincer & Shaver, 2007b) because they have had experiences in the past that reinforce this approach (Mikulincer et al., 2003). The attachment account of gratitude and coping would argue that grateful people tend to engage in positive coping strategies because they are also securely attached to people who have developed adaptive coping strategies through their interpersonal interactions with significant others in times of need (Mikulincer et al., 2003). Further the attachment account offers that these significant others provide a secure base and sense of felt security allowing the grateful individual to have more resilience.

The broaden-and-build hypothesis provides a more in-depth account of the link between gratitude than those mentioned earlier. It stipulates that during stress free periods, gratitude functions to broaden-and-build one's resources by building social bonds which can be used as a valuable resource in times of need (Fredrickson, 2004). Specifically, gratitude broadens thought-action repertoire that create ideas for how to repay the kindnesses received, allowing the grateful person to become skilful at

repaying kindness. This skill set helps to enhance their social relationship because the skills reflect the ability to show love and appreciation. There is evidence to support this position. Gratitude has been shown to facilitate prosocial behaviours by motivating the grateful person to show their gratitude (e.g., Algoe, Haidt, & Gable, 2008; Bartlett & DeSteno, 2006; Mikulincer & Shaver, 2008; Tsang, 2006; Watkins, Scheer, Ovnicek, & Kolts, 2006). Further, Gordon and colleagues (2012) found evidence illustrating a process where gratitude acts to enhance relationship intimacy and satisfaction. The researchers found that people who were appreciative of their partners were more attentive to their needs and were observed to be more responsive and committed in dyadic interactions with their partner. Over time, the expression of gratitude creates and strengthens social bonds (Emmons & Shelton, 2012) and interpersonal relationships increasing a person's social resources. One limitation of the broaden-and-build approach is it does not clearly specify how gratitude relates to well-being except through the mediating effect of social relationships. Another limitation is that it is focused on describing the function of the emotion and does not account specifically for the functions of trait gratitude. The attachment approach is compatible with the broaden-and-build hypothesis and proposes that gratitude occurs more frequently when individuals feel secure which is a phase that is facilitative of the broadening and building of resources (Mikulincer et al., 2003; Mikulincer & Shaver, 2007b; Peterson & Park, 2007).

Attachment theory also offers an additional explanation for the link between gratitude and well-being through attachment security. An attachment theory of gratitude suggests that attachment security is associated with the tendency to feel gratitude and therefore part of the link between gratitude and well-being could be mediated by the

relationship between security and well-being. Attachment security has been linked to well-being through a number indicators such as improved interpersonal relationships (e.g., Collins & Feeney, 2004; Hazan & Shaver, 1987; Ognibene & Collins, 1998), better coping styles (e.g., Mikulincer, Florian, & Weller, 1993; Ognibene & Collins, 1998; Terzi, 2013), reduced levels of psychopathy (e.g., Mikulincer & Shaver, 2007b; Peterson & Park, 2007), higher self-esteem and self-efficacy (e.g., Bartholomew & Horowitz, 1991; Mikulincer et al., 2003), presence of positive affect, and facilitation of broadening and building of resources (e.g., Mikulincer et al., 2003; Mikulincer & Shaver, 2007b). Since attachment security and gratitude are related, it is likely that a portion of the relationship gratitude has with well-being is accounted for by attachment security.

Theories of Gratitude

The research from this thesis shows that the attachment system contributes to explaining a modest part of the gratitude phenomenon but does not provide a complete account of gratitude. This indicates that there are other factors that contribute to gratitude. Research shows that the Big Five dimensions account for some variability of gratitude in daily mood (e.g., McCullough et al., 2004). Specifically, Agreeableness and Extraversion have been shown to predict a small amount of variability in gratitude in daily mood. Unfortunately it is currently unclear how the Big Five dimensions acts to influence gratitude. McCullough and colleagues (2004) offered that it is likely related to how these factors impact on the perception of the presence of determinants of gratitude arousal. The researchers offered that Agreeableness predicted gratitude in their university sample because it may have contributed to enhancing the appreciation of available benefactors since Agreeableness has been shown to be related to perceiving

others in a benevolent fashion. Extraversion was thought to predict gratitude in a sample of adults with neuromuscular disorder because it may be related to increasing exposure to others and thus increasing the likelihood of exposure to benevolent others. This explanation is plausible but requires further empirical testing. Moreover, it is unclear whether factors of the Big Five would contribute to the development of trait gratitude on top of accounting for daily gratitude fluctuations.

Another factor that could contribute to gratitude is social affiliation, which is also identified as a fundamental behavioural system similar to the attachment behavioural system (Bemporad, 1984). Research evidence shows that gratitude is associated with numerous factors such as prosociality (Bartlett & DeSteno, 2006), agreeableness, extraversion (McCullough et al., 2004), and relationship maintenance and increased intimacy (A. M. Gordon et al., 2012) which are suggestive of a link with the affiliation system. The affiliation system (Bemporath, 1984) is closely linked to the attachment system as both are argued to act to increase survival likelihood through proximity seeking behaviours directed at others (Gillath & Karantzas, 2015). However, the affiliation system is active in the broaden-and-build cycle (when the attachment system is deactivated) and acts to build social connections and resources through seeking proximity with others. Affiliation may be related to gratitude in that, the emotional experience and expression of gratitude may form a behavioural strategy that acts to build social relationships and connections. Research has shown that the expression of gratitude acts to maintain and increase intimacy in relationships (A. M. Gordon et al., 2012), increase caring behaviours, prosocial behaviours (Bartlett & DeSteno, 2006; Tsang, 2006) and increase acts of reciprocity and altruism (McCullough, Kimeldorf, & Cohen, 2008). An affiliation account of gratitude is compatible with Fredrickson's

(2004) hypothesis that gratitude functions to build social resources within the broaden-and-build cycle of behavioural systems. Moreover an affiliation perspective of gratitude overlaps with the find-remind-and-bind theory (Algoe, 2012) of gratitude which proposes that gratitude has evolved to strengthen the relationship with a responsive partner and is important for forming and maintaining significant relationships. Algoe and colleagues argue that the expression of gratitude helps to signal communal relationship norms and facilitate an upward spiral of mutually responsive behaviours between the recipient and the benefactor. The affiliation account differs from the find-remind-and-bind account in that applies to general social relationships not just intimate relationships. Overall, a common element of the various accounts of gratitude relate to the idea that gratitude is important in the interpersonal context and thus factors that are thought to contribute to gratitude are likely to lie within the relational domain such as attachment and affiliation processes. Although there are research on gratitude in the context of relationships and social affiliations, there is no known research that has directly studied the affiliation system (as conceptualised by Bemporath (1984)) and gratitude. Future research in this direction is required to assess this possibility as it is important to explore and investigate the factors contributing to gratitude in order to continue to develop a more complete understanding of gratitude.

Implications for Clinical and Positive Psychology Interventions

A significant motivation to pursue an in-depth understanding of gratitude is to help realise the potential of gratitude to improve psychological health and well-being. A growing body of evidence demonstrates that gratitude interventions are effective at improving mood and well-being (see Wood et al., 2010 for a review). However, currently little is empirically known about the mechanisms involved that relates

gratitude interventions to well-being, although a number of hypotheses have been proposed (Emmons & Mishra, 2011; Wood et al., 2010). This thesis research program contributes to the clinical and positive psychology literature by offering insights into the link between gratitude interventions and well-being from an attachment perspective. The following section details mechanisms that are within the explanatory scope of the attachment framework including cognitive processes, trait development processes, and the effect of priming on intervention.

Link with well-being through cognitive processes

One mechanism that may lead gratitude interventions to increase well-being relates to the idea of cognitive reframing which is consistent with an attachment account. In particular, gratitude interventions can be seen as positive cognitive reframes. For example, the gratitude list intervention involves listing a number of things that one feels grateful for in the day. Researchers have found that when done over a two week period, the intervention significantly improved participants' sense of well-being and life-satisfaction compared to control groups (e.g., McCullough, Tsang, & Emmons, 2004). The findings suggests that the gratitude cognitive reframe acts to change the person's perspective and reorient their focus on to the benefits they have received or currently have (Wood et al., 2010; Wood, Maltby, Stewart, & Joseph, 2008), allowing them to appreciate the contrast between having and not having, and thus, feeling positive about their current situation. Cognitive reframing is typically employed in clinical psychology (e.g., Foa et al., 2005; Mattick & Peters, 1988), particularly in Cognitive Behavioural Therapy to achieve therapeutic results, enhancing mental health and well-being (e.g., Butler, Chapman, Forman, & Beck, 2006). It is an evidence based method that has been shown to be effective in improving mental health (Butler et al.,

2006). Moreover, Lambert and colleagues (2009) found that positive reframing mediated the relationship between gratitude and sense of coherence which relates to the belief that life is manageable, meaningful, and comprehensible (Antonovsky, 1993). Moreover, sense of coherence has been shown to be linked to attachment (e.g., Staniforth & Wilkinson, 2007) and a number of positive life outcomes such as good mental (e.g., Lundberg & Peck, 1994) and physical health (e.g., Jorgensen, Frankowski, & Carey, 1999). Therefore, gratitude interventions seem to be linked to well-being through the effect of positive reframing on sense of coherence.

Another possible link between positive reframing and well-being is through the process of rewriting of people's working models of self and others. Specifically, gratitude exercises reorient focus to the positive, particularly to focusing on elements related to gratitude such as the value of what one has, the value of the actions of others, the positive intentions of others, and the cost and effort required to provide the benefit. The positive focus on these elements can act to validate the self as a valued person because others in the world have noticed and made an effort to provide a benefit. Indeed, McCullough and colleagues (2001) found that grateful people report feeling more loved and cared for by others than non-grateful people. This effect can act to increase feelings of self-esteem and self-liking. Further, the focus on the positive intentionality of others and the provision of benefit may lead to positive perceptions of the benefactor and with repeated reframing can generalise to positive perceptions of others in the world. In an experimental study, Algoe and Haidt (2009) found that people in their grateful condition reported more positive perceptions of the benefactor than people in their joy condition. This reframe and reorientation would create a sense of security and well-being due to the momentary effect of having positive feelings and

perception about the self and others. With repetition, over time, the reframe could act to shift negative working models of self and others to contain more positive memories and experiences, leading to a shift towards more secure attachment and thus increased well-being (Gillath et al., 2008). Overall, it is suggested that gratitude interventions may improve well-being through the effect of positive reframing which improves sense of coherence and likely creates a feeling of security related to increased self-esteem and positive perceptions of others in the world.

Findings from the experimental studies in this thesis suggest another possible mechanism linking gratitude to well-being. The results suggest that attachment security may mediate the relationship between gratitude interventions and well-being through a priming effect. The experiments on secure priming demonstrated that attachment security and gratitude are found within the same cognitive information network, that when feelings of security are induced, information related to gratitude is activated. Because they are linked (congruent), when gratitude is presented first instead, in the case of gratitude interventions, it is equally plausible that security information is then activated and made salient. It is possible then, for the gratitude intervention to also elicit thoughts and feelings related to attachment security, through the priming effect, which acts to spread the positive effects of feelings of attachment security.

Extending the duration of gratitude intervention effects

An attachment informed approach to gratitude interventions could help improve the length of positive intervention effects that are currently rather short lived. The duration of gratitude interventions tend to last between two weeks to a month, which is a relatively short time frame (Emmons & Mishra, 2011; Wood et al., 2010). The well-being effect also slowly declines over time (Duckworth et al., 2005; Seligman et al.,

2005). This suggests that the interventions elicit a mood effect as opposed to a momentary change in state or a longer term change to trait levels. Given that the interventions commonly require participants to keep a diary or list of things to feel grateful about for the duration of a week or so, the mood effect is expected. It would be desirable to achieve a longer more permanent change, to strive for a change to trait gratitude rather than just a gratitude mood.

From an attachment perspective, these exercises do not have a more permanent effect because it takes more time and repetition of these experiences to transform one's current internal working models of others and self to orient to a gratitude style of focus. Ainsworth's (Ainsworth, 1973, 1985a) study on infant attachment style showed that individual differences in attachment patterns of behaviour are not consistently observable until about the 12-18 months. It seems that the expression of attachment behaviours is related to cognitive and biological development and it also suggests that it takes at least 12-18 months for a solid internalisation of the models to emerge to impact on emotion and behaviour (Baldwin, 2007).

The attachment framework offers ideas regarding how to extend the benefits of gratitude interventions by employing processes that are associated with the formation of chronic attachment styles which are clearly detailed in attachment theory. In brief, repeated experiences are internalised into working models of the world which act to provide expectations of current and future events thus influencing cognition, emotions and behaviour (Carnelley & Rowe, 2007; N. L. Collins, 1996). Therefore, extension of the duration of the gratitude intervention effect requires repetition of these interventions over time, over a duration of one to two years, so that there are enough experiences to

form a substantial mass within the working model of the world and reshape it so that a grateful perspective becomes the dominant approach.

Strengths

Two significant strengths of this thesis is noted. Firstly, it has a strong theoretical grounding and uses a theory of interpersonal functioning that is established and well-validated. This allows for confidence in the validity of the constructs studied and allowed inferences to be made from the results to extend beyond the studies that they were derived from. Further the strong theoretical grounding results in the clear articulation of assumptions that can be systematically tested. This logical approach facilitates ease and efficiency for other researchers in the field to assess the validity and reliability of the arguments and results made in this thesis and to use the account as a foundation to design future empirical research on this subject matter. Secondly, the thesis was built on an empirical research program which contained multi-method studies, including correlational and experimental methods, allowing for exploration of different levels of experience (cognitive, affective, trait) and providing a more in-depth understanding of the constructs studied. The use of experimental designs helps address the questions in this thesis and allows for causal inferences to be made between the independent and dependent variables studied. Additionally, the use of priming designs helped removed social desirable responding relating to gratitude which allows for a more realistic representation of the true relationship between variables.

Limitations

Limitations related to each study were presented in the corresponding empirical chapter. Those that relate the general research program are re-presented in this section

and ideas for future research directions are detailed. The first limitation relates to research samples. The participant samples employed were recruited from undergraduate university students who are not necessarily representative of the general population. The age of the sample was also relatively young, and the results seem to indicate that there is a weak relationship between age and state gratitude, although this relationship is subsumed when trait gratitude was included in the model. In any case, even though the particulars of the sample used in this study did not appear to affect the integrity of this study in carrying out the aim and testing the hypotheses relating to attachment and gratitude, it is worthwhile always to attempt to gain a sample that is representative of the general population to allow high confidence in generalising results. It would be desirable to see future research studies collect data from samples that differ from this one, perhaps with a wider age range or recruited from the community to complement the findings from these studies.

Second, the attachment processes examined in this research program were predominantly limited to those measured by the Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2011). Although these are the most commonly used, and arguably among the most studied attachment individual difference dimensions, there are other facets of attachment functioning and other measures of attachment processes that were not directly captured in this study. For example, individual differences in attachment functioning can be observed at the cognitive level where differences in working models of self and others have been shown to influence people's perception of situations (e.g., Bartholomew & Horowitz, 1991; Scharfe & Bartholomew, 1994). Further, the ECR and its variants measure insecure attachment and this is acknowledged as a weakness in the

self-report literature. A key premise of the link between attachment security and gratitude is based on the functions of working models of attachment. Future research could directly assess how working models of self and others relate to gratitude using the Relationship Questionnaire (Bartholomew & Horowitz, 1991) which operationalises attachment individual differences on working models of self and others. Further, four attachment prototypes can be discerned from the RQ which can be used to explore how different attachment styles relate to gratitude and can be used to test how different combinations of working models of self and others impact on the arousal of gratitude and the development of gratitude. Further, the research in this thesis relied on self-report measures of attachment which may limit the attachment processes being captured. Other measures of attachment such as interviews like the Adult Attachment Interview (AAI) (George, Kaplan, & Main, 1985), are thought to capture different attachment processes. For example, the AAI reflects a person's state of mind by capturing a person's narrative of their childhood attachment experiences and the meaning they make from these experiences (Crowell & Treboux, 1995; Roisman et al., 2007).

A third possible limitation pertains to general concerns relating to the use of online studies. With online studies, researchers cannot control the participant's environment in the same way that they can in the laboratory. This introduces variability in individual differences in context at the time of participation and can affect the reliability and accuracy of results. Therefore, special care must be taken in the initial study design phase to determine if an online format is appropriate for the study of the constructs of interests. Although Study 4 and 5 of this thesis was an online format, manipulation checks and measurements were included in the study to discern whether participants were engaging in the study in an appropriate manner. Specifically, to check that the

priming effect was properly administered, participants screen and mouse clicks were timed to record the length of time they took to read the visualisation text. Following from this, questions were asked, and text responses were required of participants to determine if they had processed the visualisation/prime task. Additionally, to determine if participants completed the test in one sitting, the length of time participants took to complete the online study was recorded so that the researcher could view the time and rule out those that took longer than expected such as 3 or 24 hours duration. Further, knowing that there was some added uncertainty relating to online studies, this research program included a replication study to test the reliability of the first online study results. As both show the same pattern of results it suggests that the variables being studied were appropriate for online studies and the manipulation checks were effective.

Future Research Directions

This thesis set out to explore the relationship between attachment processes and gratitude and to test the viability of the attachment theory as a framework for studying the gratitude construct to address the gap in our understanding of gratitude. The studies presented provide evidence for the viability of an attachment theory of gratitude and provide novel information relating to how attachment processes interact with gratitude. However, this is only the first step in developing and exploring a theory of gratitude. More research is required to test the hypothesis derived from the attachment account of gratitude. For instance, the findings from this thesis provides evidence that attachment security is linked to gratitude arousal but further research is required to examine the role attachment security plays in the development of trait gratitude. Future research could assess if repeated experiences of felt security would result in the development of the tendency to feel gratitude. There is a body of research that demonstrates that repeated

priming of attachment security has a pervasive positive effect on functioning. Research has shown that repeated priming of attachment security produces positive effects on parent child relationships (Sohlberg & Birgegard, 2003), stress (Dandeneau et al., 2007), self-esteem, expectations towards relationship partners (Carnelley & Rowe, 2007), mood, and compassion towards others (Gillath & Shaver, 2007). The effects of priming have been shown to last beyond the priming session with effects being present as long as a week after the priming was administered (Gillath & Shaver, 2007). The next step in testing an attachment theory of trait gratitude development is to determine if repeated security inductions leads to a generalisation of feelings gratitude to other scenarios or contexts. Security inductions could easily be administered and repeated within a day, over a week, month, or year. One option is, future research enquiries could explore the effects of repeated security inductions by observing the frequency and span of gratitude by comparing a group that has had repeated security induction over a week compared to a group that was administered security induction once. This line of research would help determine if attachment security plays a precursor role in the development of trait gratitude.

With regard to security induction methods, two methods of attachment security induction were used in the studies in this paper (word priming and visualisation), it would be useful to establish the effects of other types of security induction on gratitude arousal to determine if there is variability in impact of security on gratitude depending on the way in which attachment security is achieved. Numerous methods have been developed to induce attachment security including subliminal or supraliminal exposure to names of attachment figures (Mikulincer et al., 2005), pictorial representations of security (Bowles & Meyer, 2008; Mikulincer, Gillath, et al., 2001), visualisations of

security related information (e.g., Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Bartz & Lydon, 2004), and memory recall of secure experiences (Rowe & Carnelley, 2003). For a review of attachment security induction methods see Gillath, Selcuk and Shaver (2008) or Mikulincer and Shaver (2007b).

This thesis found that the subliminal method of activating attachment security was not as effective as the supraliminal method. The findings highlight a number of issues that are relevant for future research considerations. First, through *post hoc* interpretation, the pattern of results associated with the subliminal priming was considered to be a *reverse priming effect*. That is, for the Lexical Decision paradigm and the Stroop Colour Naming task, the relationship between attachment security and gratitude appeared opposite to what is expected for the paradigm. It was noted in Chapter 6 that because the interpretation was a *post hoc* account, conclusions based on this interpretation can only be tentative. The findings raised the question of whether the relationship between attachment security and gratitude was actually reversed under subliminal priming.

The literature on subliminal cognitive priming effects shows that atypical priming effects such as the *reverse priming effects* are not uncommon (Musch & Klauer, 2003). Researchers are still exploring the factors that lead to unexpected, atypical priming effects (e.g., Frings et al., 2010; Hermans, De Houwer, & Eelen, 2001; Perea & Rosa, 2002; Petkar, 2011; Raz, Kirsch, Pollard, & Nitkin-Kaner, 2006). Some experimental factors that have been found to influence priming effects include the visibility of prime presentation (e.g., Banse, 2001), target word frequency of occurrence (Chan, Ybarra, & Schwarz, 2006), and, the time and duration of prime presentation and the length of time between the presentation of the prime and the appearance of the target (Spruyt et al.,

2007). Of relevance to the findings from this thesis is that, some studies have shown that under supraliminal priming, for the Stroop task, an interference effect (slower RTs compared to control) is observed with congruent prime and target pairs but this pattern is reversed when the prime is subliminally presented so that faster response times are found for congruent prime and target pairs (Frings et al., 2010; Hermans et al., 1994; McKenna & Sharma, 2004; Wyble et al., 2005). Researchers investigating the *reverse priming effect* argue that this reflects the affective prime's ability to reduce the Stroop interference effect for congruent information under unconscious information processing (e.g., Banse; 2001, Hermans, 1996; Wentura, 1999).

As yet, the *reverse priming effect* under subliminal priming has not been reported in the attachment security priming literature, although it has been observed by Banse (2001) who studied affective priming in close relationships and examined cognitive priming effects related to relationship schemata. The lack of report may be due to the fact that there are only a small number of studies that use subliminal cognitive priming methodology such as the Lexical Decision Task and the Stroop colour naming task (Baldwin et al., 1993; Banse, 1999; Mikulincer et al., 2000, 2002; Pierce & Lyddon, 1998). Therefore the attachment security priming literature does not have the breadth of empirical data to assist in the interpretation of the findings from this thesis with regard to the subliminal priming studies.

This research program addressed the uncertainty associated with the atypical priming results in the Lexical and Stroop studies by designing a subsequent study that employed a supraliminal priming method to determine the nature of the relationship between attachment security and gratitude at the supraliminal level. The findings from this study showed that the relationship between security and gratitude was as expected

and support the interpretation that the opposite relationship between security and gratitude found in the subliminal prime presentation studies was indicative of a *reverse priming effect*.

The question of whether the relationship between attachment security and gratitude is reversed under subliminal priming would be most directly addressed by conducting methodological studies. For example a future research effort could rerun the Lexical Decision and Stroop colour naming studies outlined in Chapter 5 and 6 and include in each study another condition where the primes are presented supraliminally instead. For these two studies, this effectively means that in the additional condition, the primes will be presented without any masks and for a longer period of time so participants are able to perceive it. The pattern of results for the subliminal condition and the supraliminal condition can be contrasted to see if one is the reverse of the other. This design was not implemented in this thesis research program because this type of study was not completely in line with the focus of the research aims. It was thought that, for the purposes of the thesis, the supraliminal studies presented in Chapter 7 would address the question adequately enough and also gain further information relating to attachment and gratitude at the affective level which would not have been possible if more of the Lexical and Stroop studies were conducted.

Lastly, the discourse on implications and theoretical accounts of gratitude has highlighted a number of areas that may prove useful to pursue in future including the examination of the possible bidirectional relationship between gratitude and security. As shown in this thesis, attachment security has a direct influence on gratitude. Research evidence seems to indicate that gratitude can also influence attachment through attachment related variables such as significant relationships, perceptions of others, and

perceptions of self. Indeed, researchers have found that gratitude is associated with enhancing relationship quality through increasing the recipient's focus on the other person's needs and motivating them to be more available and responsive to the other (A. M. Gordon et al., 2012). Others have found that grateful people feel more loved and cared for by others (McCullough et al., 2001) and report more positive perceptions of the benefactor (Algoe & Haidt, 2009). Evidence from the priming studies within this thesis suggests that attachment security and gratitude are found within the same information network which indicates that both could act as primes for the other. This is consistent with the idea of a bidirectional relationship between gratitude and security in the context of interventions and well-being. If this bidirectional relationship is present, gratitude interventions could work to facilitate feelings of attachment security. More research on this relationship is required.

Conclusion

Gratitude is a higher order positive emotion with state, mood and trait levels of experience with an abundance of research showing its link with well-being and demonstrating the value of gratitude in positive psychology. A review of the literature highlights the inadequate theoretical understanding of the construct and limited empirical investigations into understanding the mechanisms involved in the development of trait gratitude and the link between gratitude and well-being. Although a number of theories and hypotheses have been proposed relating to gratitude and well-being, they are limited in scope and lack the empirical support base. It was argued that attachment theory can be a useful framework for the study of gratitude through its account of individual differences in functioning, personality development, and well-being. Accordingly, the thesis set out to address the lack of an empirically validated

theory of gratitude by proposing an attachment perspective of gratitude, and, designed a research program to test the viability to the framework. The first study presented in Chapter 4, tested whether individual differences in attachment was related to state and trait gratitude using a cross-sectional design. The findings showed that attachment processes were linked to gratitude with attachment security as the strongest predictor among attachment variables. Attachment security was found to be moderately linked to gratitude. Chapters 5-7 presented experimental studies designed to test that attachment security is causally linked to gratitude and facilitates gratitude arousal. Results from Chapters 5 and 6 showed a weak relationship between attachment security and gratitude and, individual differences in attachment avoidance and anxiety acted to inhibit the processing of gratitude information. These findings provided tentative support that attachment security predicted gratitude within the cognitive domain. Chapter 7 presented two studies with independent samples that tested whether attachment security facilitated gratitude arousal at the affective level of experience. The first study provided clear evidence to show that attachment security was associated with higher likelihood of gratitude arousal than positive emotion, feelings of insecurity, and neutral conditions. The second study replicated the results of the first in an independent sample, and provided support for the hypothesis that attachment security is facilitative of gratitude arousal and may play a role in the development of trait gratitude.

Aside from demonstrating the viability of the attachment framework for studying gratitude, the findings from this thesis contribute important information on the nature of the relationship between attachment and gratitude. The findings suggest that attachment processes may play a role in gratitude development both at the normative and individual differences level of attachment functioning. In general, the findings show that normative

attachment security is related to increased likelihood of gratitude arousal, and that attachment security is associated with more gratitude experiences. Individual differences in attachment avoidance and anxiety inhibit the processing of gratitude information indicating that attachment insecurity is related to decrease or repression of gratitude experiences, and lastly, attachment security style is associated with higher trait gratitude. Overall, the thesis has contributed to the literature by providing a theoretical account of gratitude that is supported by empirical evidence from the studies within the research program. The theory provides an explanation for the development of trait gratitude and offers novel insights into the link between gratitude and well-being from an attachment perspective. Importantly, this research program is among the few that have attempted to address the gap in our understanding of the development of trait gratitude and the link between gratitude and well-being, and in doing so, it has set a foundation for future research endeavours investigating gratitude and attachment.

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APPENDICES

APPENDIX A

Measures used in all studies

1. Experiences in Close Relationships - Revised - General Short Form (Brennan, Clark, & Shaver, 1998; Fraley, Waller, & Brennan, 2000) - Plus Secure items (ECR-GSF with Secure items) (Wilkinson, 2010).
2. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003)
3. Appreciation Scale - short form (Adler & Fagley, 2005)

APPENDIX A: Measures used in all studies

1. Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items)

Thinking about all of the people in your life. Please indicate the extent to which you agree with each statement.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I prefer not to show others how I feel deep down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often worry that other people close to me don't really love me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it relatively easy to get close to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it difficult to allow myself to depend on other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often worry that other people don't care as much about me as I care about them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable depending on others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very comfortable being close to other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes people change their feelings about me for no apparent reason.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable having others depend on me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is usually easy for me to discuss my problems and concerns with other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My desire to be close sometimes scares people away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am easier to get to know than most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It helps to turn to others for support in times of need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My relationships with people make me doubt myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not often worry about being abandoned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am nervous when people get too emotionally close to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I show my feelings to people I care about, I'm afraid that they will not feel the same about me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not like people getting too close to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it easy to depend on other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am afraid that once somebody gets to know me, he or she won't like who I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know that others will be there when I need them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy for me to be affectionate with other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It makes me mad that I don't get the affection and support I need from other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry about being alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable sharing private thoughts and feelings with other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry a lot about my relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often worry that I do not really fit in with other people .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable depending on other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find that other people don't want to be as close as I would like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident about relating to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX A: Measures used in all studies

2. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003)

Below are statements people have made about themselves. Please indicate the extent to which you agree or disagree with these statements?

	Strongly Disagree		Somewhat Disagree		Neutral		Somewhat Agree		Strongly Agree
I couldn't have gotten where I am today without the help of many people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life has been good to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There never seems to be enough to go around and I never seem to get my share.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oftentimes I have been overwhelmed at the beauty of nature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Although I think it's important to feel good about your accomplishments, I think that it's also important to remember how others have contributed to my accomplishments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really don't think that I've gotten all the good things that I deserve in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Every Autumn I really enjoy watching the leaves change colors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Although I'm basically in control of my life, I can't help but think about all those who have supported me and helped me along the way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that it's important to "Stop and smell the roses."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More bad things have happened to me in my life than I deserve.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of what I've gone through in my life, I really feel like the world owes me something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that it's important to pause often to "count my blessings."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think it's important to enjoy the simple things in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel deeply appreciative for the things others have done for me in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For some reason I never seem to get the advantages that others get.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think it's important to appreciate each day that you are alive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX A: Measures used in all studies

3. Appreciation Scale - short form (Adler & Fagley, 2005)

Here are some things people have said about themselves. Indicate the extent to which you agree or disagree with these statements?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I remind myself to think about the good things I have in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give thanks for something at least once a day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I stop and notice the things around me I feel good and content.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The problems and challenges I face in my life help me to value the positive aspects of my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Here are some things people have said about themselves. Indicate the frequency with which the items occur for you?

	Never	a few times in my life	About once a year	About once a month	Once a Week	About once a day	More than once a day
I count my blessings for what I have in this world.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about how fortunate I am to have basic things in life like food, clothing, and shelter.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really notice and acknowledge the good things I get in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have moments when I realize how fortunate I am to be alive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I reflect on how lucky I am to be alive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do things to remind myself to be thankful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I remind myself to appreciate the things around me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I remind myself to appreciate my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B

Study 1 Materials

Measures used– See Appendix A

- a. Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items)
- b. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003)
- c. Appreciation Scale - short form (Adler & Fagley, 2005)

Additional Measures Used

1. The Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) – State and Trait Form
2. Gratitude Ratings Scale

APPENDIX B: Study 1 Materials

1. The Positive and Negative Affect Schedule – State Form

This scale consists of a number of words that describe different feelings and emotions. Read each item and indicate to what extent you feel this way right now, that is, at the present moment.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B: Study 1 Materials

The Positive and Negative Affect Schedule (PANAS) -Trait Form

This scale consists of a number of words that describe different feelings and emotions. Read each item and indicate to what extent you generally feel this way, that is, most of the time.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B: Study 1 Materials

2. Gratitude Ratings Scale

Please read the descriptions below and indicate the extent to which you agree or disagree with them.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel grateful for the love I receive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being with my loved ones makes me appreciate them more.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am grateful for the help I get from my friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel very appreciative of my close relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please read the descriptions below and indicate the extent of your feelings of gratitude in each particular situation.
How Grateful would you feel if:

	Very ungrateful	Ungrateful	Slightly ungrateful	Neutral	Slightly Grateful	Grateful	Very Grateful
A friend buys you a coffee.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You partner (or girl/boyfriend) gives you a compliment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your mother tells you she loves you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A distant relative leaves you \$1000 in her will.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your university classes are canceled for the day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your boss tells you that you have been doing a good job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You find a \$2 coin on the footpath.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You partner (girl/boyfriend) looks after you when you are sick.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX C

Study 2 Materials

1. Information and Consent Form
2. Debriefing Information Sheet
3. Experimental design and procedure flow chart
4. Measures Used – See Appendix A
 - a. Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items)
 - b. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003)
 - c. Appreciation Scale - short form (Adler & Fagley, 2005)



Building 39
School of Psychology
The Australian National
University
ACT 0200

**A Study of Word Perceptions and Judgments
INFORMATION AND CONSENT FORM**

You are invited to participate in this research study. In this study, you will be asked to answer some questions with regards to various aspects of your life, relationships, and feelings about the future. In addition, you will be working on a computerized task involving the perceptions of words. The objective of this study is to learn about how particular perspectives and feelings that people have in different aspects of their lives influence their judgments of various kinds of words, and how these affect their attitudes and their overall well-being, relationships and cognitions.

Participation in this experiment should take about an hour. You will receive a **payment of \$10 or 1hr course credit** for your participation in this study.

Data from each participant is anonymous and will be kept and stored securely by the researcher; all material will be treated in a strictly confidential manner as far as the law allows. Data from this study may be used in student theses, presented at professional conferences, and/or published in professional journals. However, no participant will be identifiable in these presentation formats.

Your participation in this study is completely voluntary. You do not have to participate or may withdraw from participation in this study at any time without penalty.

If you understand the above and consent to participation, please indicate your consent below.

CONSENT FORM

I, _____, consent to taking part in the study above. I understand that my participation is completely voluntary, and that I may withdraw from the study at any time without penalty. The objectives and procedures of the project have been explained to me and I understand them. I have been advised that the results of the project may be published but that my personal details will remain confidential.

Your signature

____ / ____ / 2010
Date



Building 39
School of Psychology
The Australian National
University
ACT 0200

A Study of Word Perceptions and Judgments

DEBRIEFING INFORMATION

This is a multi-study project designed to examine the links between attachment security (feelings of safety and security in interpersonal relationships) and a range of 'positive' psychological outcomes including gratitude, optimism, positive mood, and interpersonal closeness.

Attachment theory argues that individuals are born with an inbuilt drive to seek safety and security through interactions with primary caregivers as infants and with romantic partners as adults. The attachment 'system' can be activated when interpersonal contexts are made salient. This activation may result from either negative situations (e.g., stress or threat) or through positive situations (e.g., expressions of love and support). This research is primarily concerned with how positive activation of the attachment system is related to positive psychological outcomes that are associated with enhanced well-being and interpersonal adjustment in young adults.

Two studies will be priming experiments where subliminally presented secure priming words (e.g., "secure", "love", "safe") will be contrasted to positive priming words (e.g., "happy", "success", "smile") and neutral words (e.g., "chair", "table", "bottle") in their ability to activate the secure attachment system and enhance accessibility to gratitude and positive expectancies of close relationships.

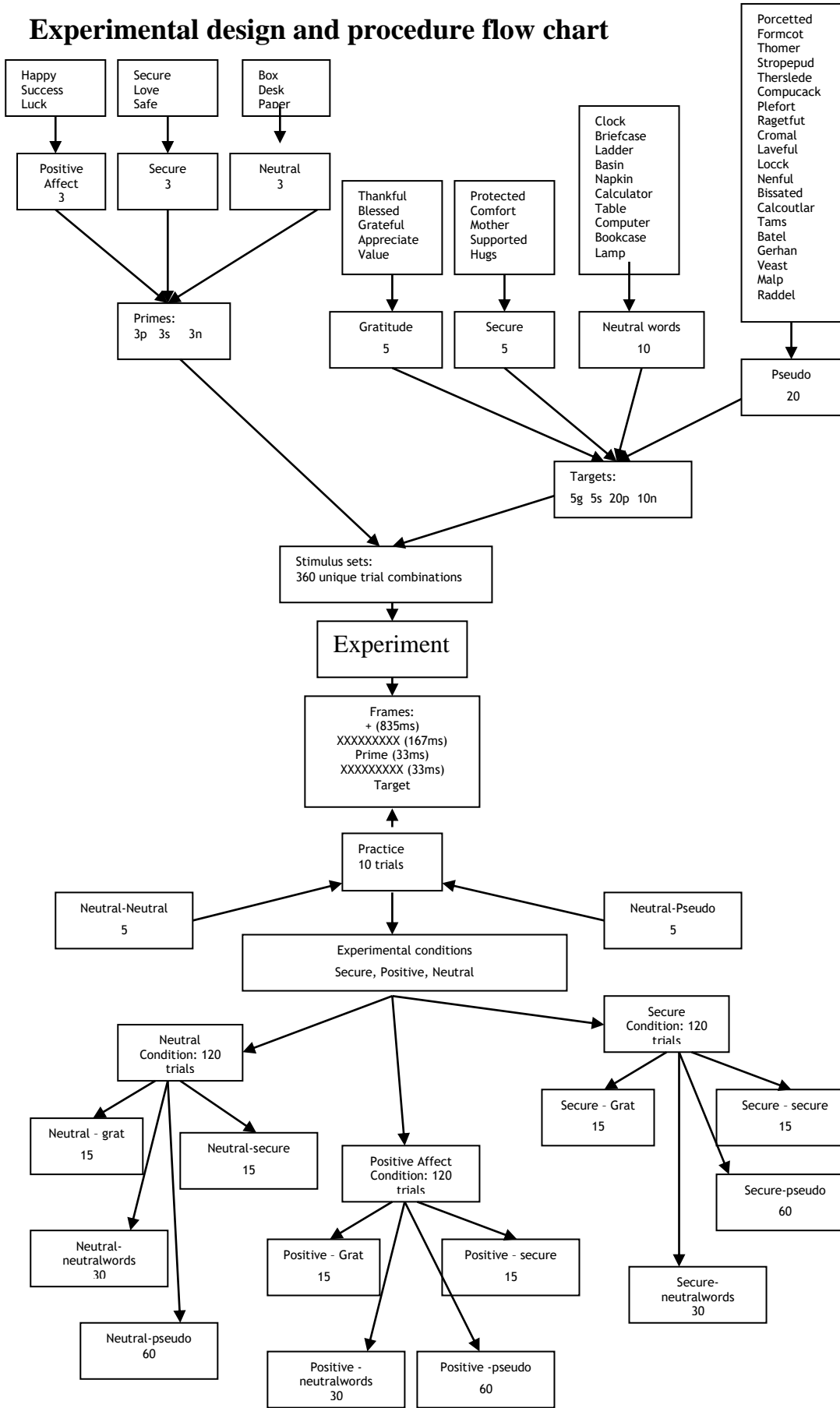
The results of this research may have implications for interventions aimed at enhancing psychological health and well-being using psycho-educational programs or individual interventions.

There are no known risks of participating in this research. The underlying theory and methods of this project are based on a history of published work in this area. If, after completing the research you find yourself upset about some of the things asked, then you might like to talk about these things with a university counsellor (Phone 6125 2442) or you can call Lifeline (Phone 131114) anytime.

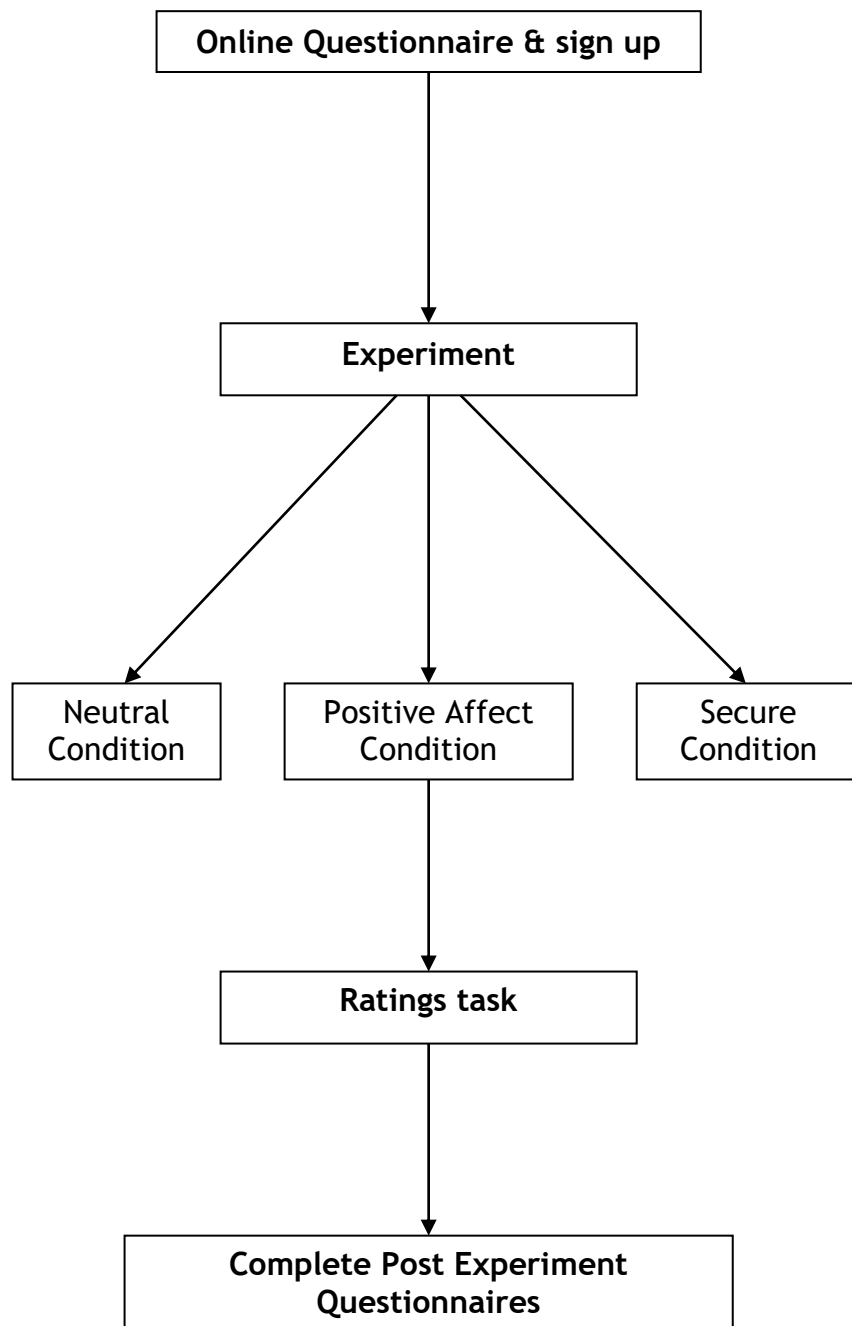
The chief researcher for this study is Ms Tram Dinh of the Department of Psychology, The Australian National University (Tram.Dinh@anu.edu.au Phone: 6125 5902). If you have any questions about the questionnaire or research study, please contact Dr. Wilkinson on 02 6125 2814 or call the ANU Department of Psychology on 02 6125 2795. If you have any concerns about the way the research was conducted please contact the Secretary, Human Research Ethics Committee, Research Office, Chancelry 10B, The Australian National University, ACT 0200 on (02) 6125 2900 (human.ethics.officer@anu.edu.au).

APPENDIX C: Study 2 Materials

Experimental design and procedure flow chart



APPENDIX C: Study 2 Materials



APPENDIX D

Study 3 Materials

1. Information and Consent Form
2. Debriefing Information Sheet
3. Experimental Design and procedure flow chart
4. Measure Used
 - a. Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (See Appendix A)
 - b. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003) (See Appendix A)
 - c. Appreciation Scale - short form (Adler & Fagley, 2005) (See Appendix A)
 - d. Gratitude Ratings Scale (See Appendix B)



Australian
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Building 39
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ACT 0200

A Study of Word Perceptions and Judgments

INFORMATION AND CONSENT FORM

You are invited to participate in this research study. In this study, you will be asked to answer some questions with regards to various aspects of your life, relationships, and feelings about the future. In addition, you will be working on a computerized task involving the perceptions of words and colour. The objective of this study is to learn about how different perspectives and feelings that people have in different aspects of their lives influence their judgments of different kinds of words, and how these affect their attitudes and their overall well-being, relationships and cognitions.

Participation in this experiment should take about an hour. You will receive a **payment of \$10 or 1hr course credit** for your participation in this study.

Data from each participant is anonymous and will be kept and stored securely by the researcher; all material will be treated in a strictly confidential manner as far as the law allows. Data from this study may be used in student theses, presented at professional conferences, and/or published in professional journals. However, no participant will be identifiable in these presentation formats.

Your participation in this study is completely voluntary. You do not have to participate or may withdraw from participation in this study at any time without penalty.

If you understand the above and consent to participation, please indicate your consent below.

CONSENT FORM

I, _____, consent to taking part in the study above. I understand that my participation is completely voluntary, and that I may withdraw from the study at any time without penalty. The objectives and procedures of the project have been explained to me and I understand them. I have been advised that the results of the project may be published but that my personal details will remain confidential.

Your signature

____ / ____ / 2011
Date



**Australian
National
University**

A Study of Word Perceptions and Judgments

DEBRIEFING INFORMATION

This is a multi-study project designed to examine the links between attachment security (feelings of safety and security in interpersonal relationships) and a range of 'positive' psychological outcomes including gratitude, optimism, positive mood, and interpersonal closeness.

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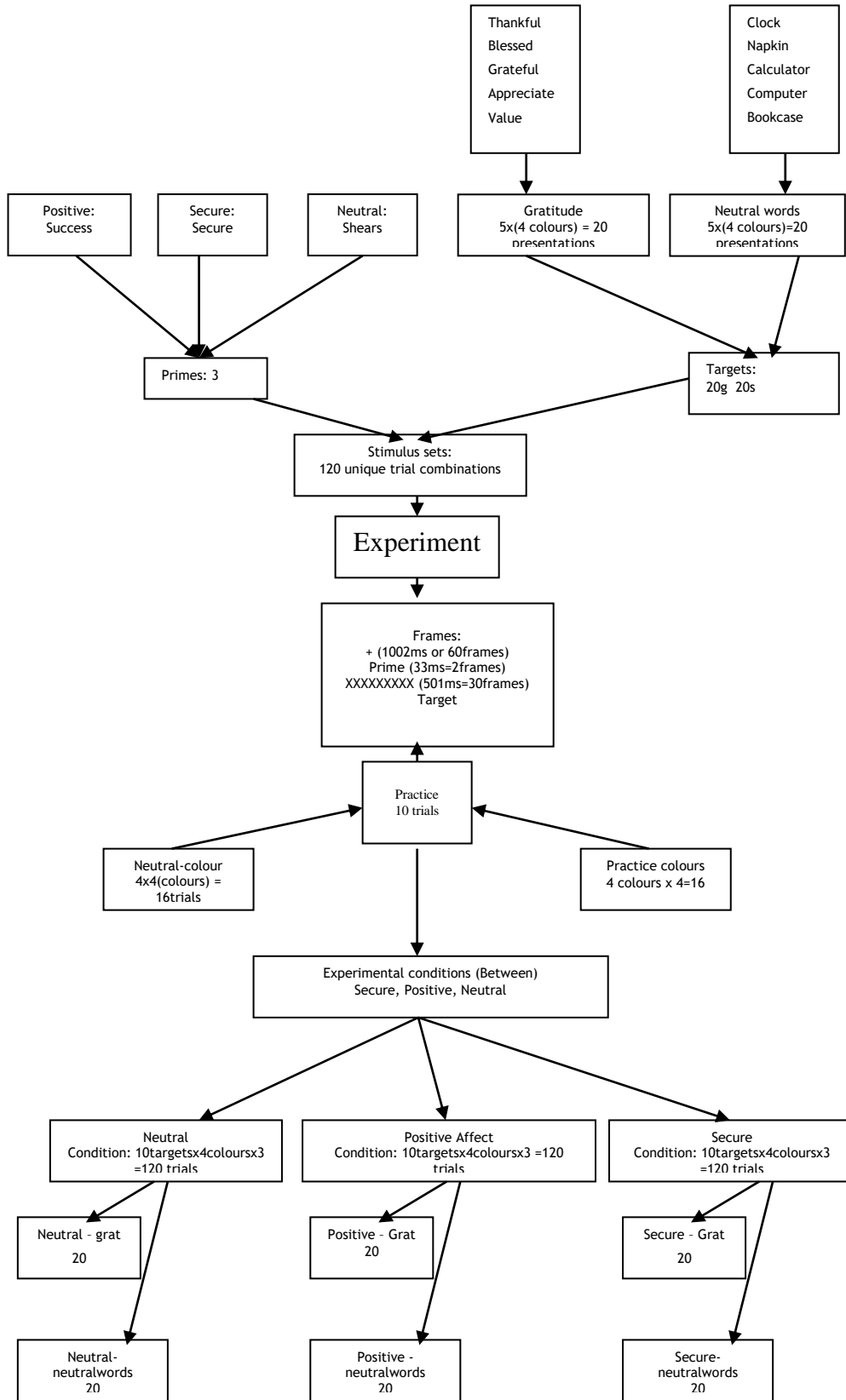
Two studies will be priming experiments where subliminally presented secure priming words (e.g., "secure", "love", "safe") will be contrasted to positive priming words (e.g., "happy", "success", "smile") and neutral words (e.g., "chair", "table", "bottle") in their ability to activate the secure attachment system and enhance accessibility to gratitude and positive expectancies of close relationships.

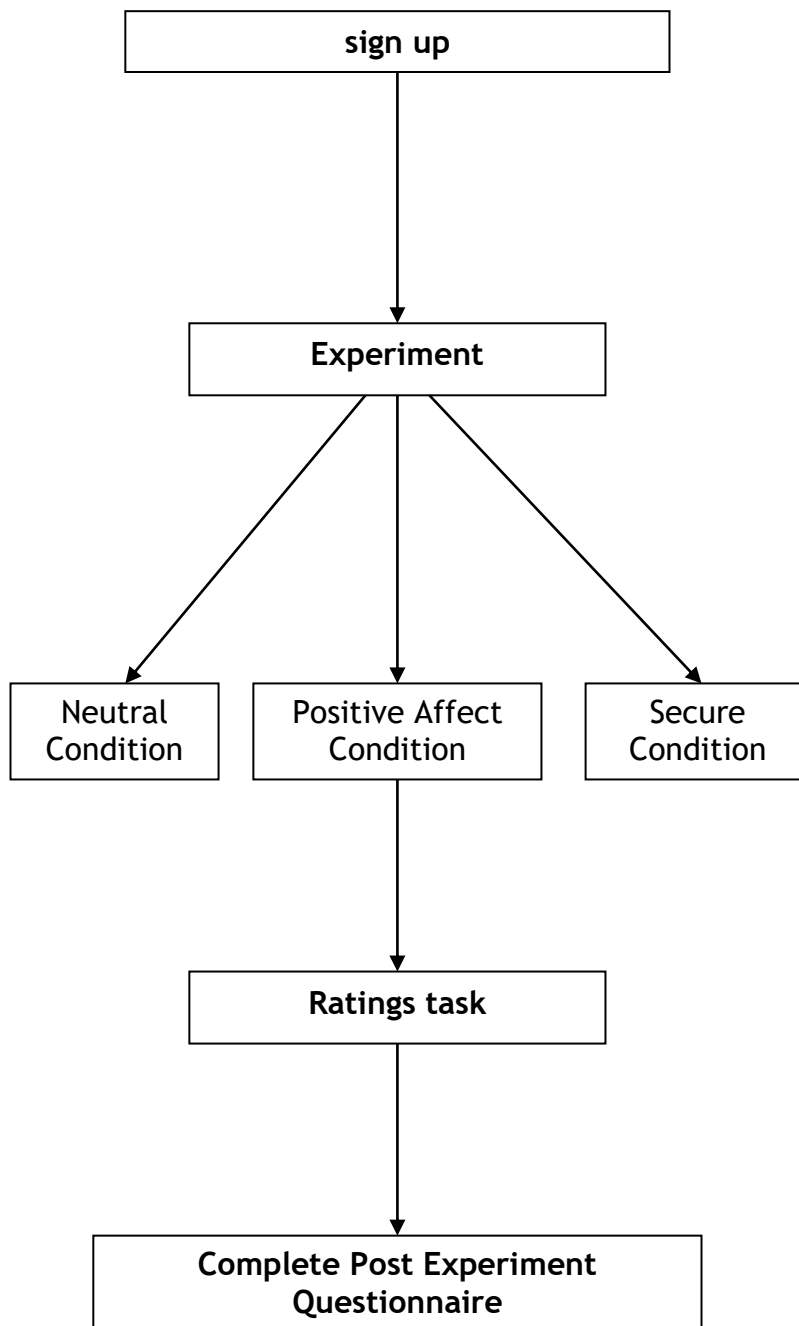
The results of this research may have implications for interventions aimed at enhancing psychological health and well-being using psycho-educational programs or individual interventions.

There are no known risks of participating in this research. The underlying theory and methods of this project are based on a history of published work in this area. If, after completing the research you find yourself upset about some of the things asked, then you might like to talk about these things with a university counsellor (Phone 6125 2442) or you can call Lifeline (Phone 131114) anytime.

The chief researcher for this study is Ms Tram Dinh of the Department of Psychology, The Australian National University (Tram.Dinh@anu.edu.au Phone: 6125 5902). If you have any questions about the questionnaire or research study, please contact Dr. Wilkinson on 02 6125 2814 or call the ANU Department of Psychology on 02 6125 2795. If you have any concerns about the way the research was conducted please contact the Secretary, Human Research Ethics Committee, Research Office, Chancelry 10B, The Australian National University, ACT 0200 on (02) 6125 2900 (human.ethics.officer@anu.edu.au).

Experimental design and procedure flow chart





APPENDIX E

Study 4 and 5 Materials

1. Participant Information
2. Debriefing Information
3. Measures Used
 - a. Experiences in Close Relationships - Revised - General Short Form - Plus Secure items (ECR-GSF with Secure items) (See Appendix A)
 - b. Gratitude, Resentment, and Appreciation Test - Revised (GRAT-R) (Watkins, Woodward, Stone, & Kolts, 2003) (See Appendix A)
 - c. Appreciation Scale - short form (Adler & Fagley, 2005) (See Appendix A)
 - d. Gratitude Ratings Scale (See Appendix B)

Participant Information

Project Title: Individual Differences and Wellbeing

Researchers:

Tram Dinh, Co-investigator
Postgraduate Student
Researcher School of Psychology
College of Medicine, Biology and the Environment
Australian National University

Dr Ross Wilkinson, Primary Investigator
Senior Lecturer
College of Medicine, Biology and the Environment
Australian National University

About the study:

In this study, you will be asked to answer some questions with regards to various aspects of your life, relationships, and feelings about the future. In addition, you will be asked to complete a visualization task involving use of your imagination. The objective of this study is to learn about how different perspectives and feelings that people have in different aspects of their lives influence their attitudes and their overall well-being, relationships and cognitions.

Your participation in this study is completely voluntary. You do not have to participate and may withdraw from participation in this study at any time without penalty. If you choose to withdraw, your data will not be used and will be destroyed. There are no known risks of participating in this research. The underlying theory and methods of this project are based on a history of published work in this area.

If, after completing the research you find yourself upset about some of the things asked, then you might like to talk about these things with a university counsellor (Phone 6125 2442) or you can call Lifeline (Phone 131114) anytime.

How the information is used:

Data from each participant in this research is **anonymous** and will be kept and stored securely by the researcher; all material will be treated in a strictly confidential manner as far as the law allows. Data from this study may be used in student theses, presented at professional conferences, and/or published in professional journals. However, no participant will be identifiable in these presentation formats.

APPENDIX E: Study 4 and 5 Materials

Credit for participation:

Participation in this study should take between 40 minutes to an hour. It is really important that you try to complete the study in one sit down session rather than doing a bit here and there. Please try to best to do this study in one sitting session. It won't take you long. We would really appreciate that. Thank you in advance.

If you are a first year psychology student you can obtain **Research Participation Credit of 1 hour** for this study. Details about collection will be provided at completion.

Contact, Queries, and Concerns:

If you have any questions about the study, you can contact Ms Tram Dinh (tram.dinh@anu.edu.au, 6125 5902) or Dr. Wilkinson (Ross.Wilkinson@anu.edu.au, 6125 2814).

The ethical aspects of this research have been approved by the ANU Human Research Ethics Committee. If you have any concerns or complaints about how this research has been conducted, please contact:

Ethics Manager
The ANU Human Research Ethics Committee
The Australian National University
Telephone: +61 (0) 2 6125 3427
Email: Human.Ethics.Officer@anu.edu.au

APPENDIX E: Study 4 and 5 Materials

Individual Differences and Well-being

Online POST Study Information

Thank you for completing the study.

This is a multi-study project designed to examine the links between attachment security (feelings of safety and security in interpersonal relationships) and a range of 'positive' psychological outcomes including gratitude, optimism, positive mood, and interpersonal closeness.

Attachment theory argues that individuals are born with an inbuilt drive to seek safety and security through interactions with primary caregivers as infants and with romantic partners as adults. The attachment 'system' can be activated when interpersonal contexts are made salient. This activation may result from either negative situations (e.g., stress or threat) or through positive situations (e.g., expressions of love and support). This research is primarily concerned with how positive activation of the attachment system is related to positive psychological outcomes that are associated with enhanced well-being and interpersonal adjustment in young adults.

The results of this research may have implications for interventions aimed at enhancing psychological health and well-being using psycho-educational programs or individual interventions.

In order to obtain Research Participation Credit you will need to send us the completion code that you were asked to write down at the end of the questionnaire. Please send your completion code to Ms Tram Dinh at tram.dinh@anu.edu.au and she will make the appropriate arrangements.

If you find yourself upset about some of the things asked in the online study then you might like to talk about these things with a university counsellor (Phone 6125 2442) or you can call Lifeline (Phone 131114) anytime.

If you have any questions about the study, you can contact Ms Tram Dinh (tram.dinh@anu.edu.au) or Dr. Wilkinson (Ross.Wilkinson@anu.edu.au, 6125 2814) or call the ANU Research school of Psychology on 02 6125 2795.

If you have any concerns about the way the research was conducted please contact the ANU Ethics Manager:

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