



2017

Effect of mindfulness on early mother-infant interaction and the transmission of attachment

Judy Pickard
University of Wollongong

Follow this and additional works at: <https://ro.uow.edu.au/theses1>

University of Wollongong

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Recommended Citation

Pickard, Judy, Effect of mindfulness on early mother-infant interaction and the transmission of attachment, Doctor of Philosophy thesis, School of Psychology, University of Wollongong, 2017.
<https://ro.uow.edu.au/theses1/103>

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

Effect of mindfulness on early mother-infant interaction and the transmission of attachment

Judy Pickard
University of Wollongong, jpickard@uow.edu.au

Certification

I, Judy A. Pickard, declare that this thesis, submitted in fulfillment of the requirements of the award of Doctor of Philosophy, in the School of Psychology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Judy A. Pickard

Date: 7 March, 2017

Abstract

Background: Attachment theory (Bowlby, 1982) proposes that the development of internal working models through early infant - caregiver relationships provide understanding of the self and others. Bowlby asserted that the gradual or sometimes sudden uptake of new information through conscious awareness was necessary for the continuing validity of the internal working models. Three studies explored the construct of mindfulness as facilitating the integration of new and novel information into working models. Method: Study 1 (N=151, mean age 21, 74% female) investigated mindfulness and emotional regulation as sequential mediators in the relationship between attachment style and depression using the Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991), Five Facet Mindfulness Questionnaire (FFMQ) (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), Difficulty in Emotional Regulation Scale (DERS) (Gratz & Roemer, 2004) and Depression Anxiety Stress Scale (DASS)(Lovibond & Lovibond, 1995). Studies 2 and 3 studied 41 mothers (mean age 31.3 years) in the perinatal period to test measures of mindful awareness as facilitating an alternate social information-processing pathways. Interview and observation data was coded using the Linguistic Inquiry Word Count (LIWC) (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007) and NCAST Parent-child interaction (PCI) Feeding and Teaching Scale (Summer & Spietz, 1994a; Summer & Spietz, 1994b). Results: Study one found full mediation between attachment style and depression for secure, preoccupied and dismissive attachment, whereas partial mediation was found for fearful attachment. Study 2 found that attachment history and the mindfulness subscale, *non-reactivity to inner experiences*, predicted maternal response to infant distress, supporting the potential for mindfulness to allow new information to be attended to, resulting in

more attuned responding. Study 3 demonstrated consistent support for maternal cognitive style, indicated by linguistic markers, in predicting response to infant distress; and identified the competing roles of mindful awareness of current experience versus entanglement with attachment information in sensitive maternal responding. Despite limitations in design, these studies using longitudinal and mixed method designs provided further understanding for the integration of new information into internal working models, effecting attachment related outcomes.

Acknowledgments

It is hard to believe that I am here.

This journey began on the 1st February, 2012 when I sat talking to my father and mentioned that I was thinking of doing a PhD. His response was brief. He said, “There’s no doubt about you, love”. A simple statement that was so reflective of the faith that had underpinned my upbringing. Dad passed away the following day and whilst I didn’t officially start for another six months, any chance that I wouldn’t complete this thesis went with him. It has been comforting to know that he knew and of course, mum has been excited and proud enough for both of them.

Firstly, I would like to thank the participants of the studies, the Illawarra Born mothers and babies who generously gave up their time and allowed me to witness the forming of their unique and special relationships. Their willingness to participate in research not only made my study possible but also hopefully will encourage further research in this important area. I would also like to thank the students who participated in study 1; their contribution was fundamental to the larger focus of the thesis.

A huge thank you to Michelle Townsend for her tireless commitment to Illawarra Born, and to ensuring that my PhD would happen. Without Michelle steering the project through its many stages, engaging the participants and managing all the logistics it is hard to imagine how it would have all come together. On top of that, Michelle was always encouraging and thoughtful throughout the process. Thank you also to Alexandra Brassel for continuing the study through the following stage

and to both Alexandra and Annaleise Gray for their assistance in data collection in my absence. That was no small thing.

It is hard to thank my supervisor Brin Grenyer enough. In the early months of this PhD I caught myself regularly feeling incredibly grateful that I was part of a study that I found so interesting and exciting. Neither my gratitude nor my enthusiasm has waned over time. Somehow Brin provided the scope for me to work autonomously, developing my research skills and growing in confidence whilst balancing that skillfully with the right amount of support and guidance when I needed it. I am indebted to Brin and excited about the prospect of continuing to learn from him.

I would also like to thank Peter Caputi, my secondary supervisor for not only sharing his knowledge and expertise but for doing it in a manner that always felt supportive and non-threatening. I am particularly grateful to Peter for taking my goals seriously and for working consistently with me to ensure that I met them, regularly fitting me into his busy schedule and for checking in on how I was progressing. I couldn't have stayed on target without his commitment.

Thank you to my family and friends for their ongoing interest and support, for understanding my commitment and providing encouragement along the way. In particular I'd like to thank my dear friend Natalie Glaser, for always checking in on "the unmentionable" and to my PhD buddy, Carla Walton. I hope I've helped you as much as you've helped me. To Michael for his continual support, his unwavering enthusiasm to celebrate every milestone I reached and for listening to my woes without ever taking them so seriously that he suggested I give up.

This list of acknowledgments wouldn't be complete without mentioning my beautiful little dog Billie. Billie literally sat by my side for hours on end as I worked away at this thesis. With her company I never felt like a lonely PhD student and whilst mostly very patient, she was also good at reminding me when it was time to take a walk break.

And finally, to the three people who have taught me more about attachment than any amount of reading could have done, Jordan, Jazz and Abbey. I started this process as my three children were finishing school and starting on their own pathways. I liked it, I liked that we had a shared understanding of the highs and lows of studying and I liked that sometimes we studied side by side. I liked that it seemed to make sharing spare time and holidays even more enjoyable and special. I am incredibly blessed by the children I have raised, they provide immeasurable meaning to my life, they inspire me and they give me unbelievable joy. Through the course of this study I have reminisced on their infancy and sometimes longed for them to be babies again but always I am excited for every new stage with them. I would like to thank my three beautiful adult children for their love and support, for asking me questions about my study that always told me they had listened to my previous answer. Most importantly, I would like to thank them for being who they are and for being in my life.

Table of contents

Effect of mindfulness on early mother-infant interaction and the transmission of attachment.....	1
Certification.....	2
Abstract.....	3
Acknowledgments.....	5
Table of contents	8
List of publications and presentations from this thesis	10
Publications	10
Conference presentations.....	10
Chapter one	13
Introduction	13
Preamble.....	13
1.1 Attachment theory	15
1.1.1. Maternal sensitivity.	20
1.2 Cognitive or social information processing associated with attachment related information.....	22
1.3 The role of mindfulness.....	29
1.4 Directions for the current thesis.....	34
Chapter two	38
2.0 Study one: Mindfulness and emotional regulation as sequential mediators in the relationship between attachment security and depression	38
2.1 Abstract	39
2.2 Introduction.....	40
2.2.1 Current study.....	44
2.3 Method	45
2.3.1 Participants.	45
2.3.2 Measures.....	46
2.3.3 Procedure.....	48
2.3.4. Data Preparation and analysis.....	48
2.4. Results	49
Table 1. Mean Standard deviations and Spearman Correlations between variables	50
Figure 1. Model of mindfulness and emotional regulation as sequential mediators between attachment style and depression.....	51
Table 2. Sequential mediation effect of mindfulness and emotional regulation in the relationship between attachment and depression.....	52
2.5 Discussion.....	54
2.6 Conclusions, limitations and future directions.....	56
Chapter three	58
3.0 Study two: Observing the influence of mindfulness and attachment styles through mother and infant interaction: a longitudinal study.	58
3.1 Abstract	59
3.2 Introduction.....	60
3.3 Method	65
3.3.1. Participants.	65
3.3.2. Measures.....	66
3.3.3. Procedure.....	68
3.3.4. Data analysis.	69

3.4. Results	70
Table 1. Mean, Standard deviations and ranges for Mindfulness Subscales at 30 weeks gestation.....	70
Table 2. Mean, standard deviations and ranges for NCAST subscales at 7 – 10 weeks postpartum.....	71
Table 3. Mean, standard deviations and ranges Relationship Questionnaire – Clinical Version	72
3.5. Discussion.....	73
3.6. Conclusion	78
Chapter four	79
4.0 Study Three - Top-down and bottom-up: the role of social information processing and mindfulness as predictors in the cross-generation transmission of attachment	79
Abstract	80
Introduction.....	81
The current study	87
Method:.....	88
2.1 Participants	88
2.2. Measures	89
2.3 Procedure	92
Analysis.....	94
Results.....	94
Table 1.Demographic data for the participants N = 30	94
Table 2: Mean, standard deviations and ranges for variables of interest: pronoun use, mindfulness subscales and maternal/ infant variables N = 30	97
Table 3. Relationship between the prenatal variables (LIWC and FFMQ) and Postnatal maternal/ infant variables (NCAST) N = 30	98
Table 4. Maternal response to infant distress predicted by a regression model comprising mindfulness, plural pronouns and attachment style. N = 30	102
Discussion.....	103
Chapter Five	109
Overall summary and future directions	109
Preamble.....	109
5. 1 Strengths and limitations.....	109
5.2. Integration of results.....	111
5.3 Implications.....	118
5.4 Summary and future directions	120
References	122
Appendix	132
Appendix A	132
Developed questions	133
Appendix B	135
Five Facet Mindfulness Questionnaire (Baer, et al., 2006)	135
Appendix C.....	138
Difficulty in Emotional Regulation Scale (Gratz & Roemer, 2004).....	138
Appendix D.....	140
Relationship Questionnaire – Clinical Version (RQ-CV) (Holmes & Lyons-Ruth, 2008).....	140
Appendix E.....	142
DASS (Lovibond & Lovibond, 1995).....	142
Appendix F.....	144
Table 1. Study 2. Spearman correlations between NCAST variables and relationshipstyles N = 37	144

List of publications and presentations from this thesis

Publications

Pickard, J. A., Caputi, P., & Grenyer, B. F. S. (2016). Mindfulness and emotional regulation as sequential mediators in the relationship between attachment security and depression. *Personality and Individual Differences*, 99, 179-183. doi: 10.1016/j.paid.2016.04.091

Pickard, J., Townsend, M., Caputi, P., & Grenyer, B. F. S. (2017). Observing the influence of mindfulness and attachment styles through mother and infant interaction: A longitudinal study. *Infant Mental Health* doi: 10.1002/imhj.21645

Pickard, J. A., Townsend, M. L., Caputi, P. & Grenyer, B. F. S. (*in press*) Top-down and bottom-up: the role of social information processing and mindfulness as predictors in the cross-generation transmission of attachment. *Infant Mental Health Journal*, Accepted 11 August, 2017.

Conference presentations

Pickard, J., Grenyer, B. F. S., & Townsend, M. (2015). *The role of mindfulness in attachment and early interaction*. Paper presented at The inaugural Early Start Conference, Improving Children's Lives: Translating research for practice, policy and community, University of Wollongong.

Pickard, J., Grenyer, B. F. S., & Townsend, M. (2015). *Investigating the*

relationship between attachment history and depression: the mediating role of mindfulness. Paper presented at the The Inaugural Early Start Conference, Improving Children's Lives: Translating research for practice, policy and community, University of Wollongong.

Pickard, J., Grenyer, B. F. S., & Caputi, P. (2015). *How being mindful affect the words we use?* Paper presented at the 8th Australian & New Zealand Conference of the Association of Contextual and Behavioural Sciences, Victoria University, Wellington.

Pickard, J. A., Townsend, M. Caputi, P. & Grenyer, B. F. S. (2016) A longitudinal study exploring the role of mindfulness and reflective functioning in the social interactions between mothers and babies. Poster presented at the Association for Contextual and Behavioural Sciences World Conference 14, Seattle, Washington.

“The mind is everything. What you think you become.”

Buddha

Chapter one

Introduction

Preamble

Our understanding of the world is shaped by our previous experience, which provides a template or internal model to help us understand ourselves and others, and so predict future events. Previous research has enhanced our understanding of the importance of these internal working models in affecting the interpretation of events and directing behaviour (Dykas & Cassidy, 2011). The relationship expectations we have of ourselves in relation to others are thought of as an internal working model of attachment relationships. Literally, we understand the world from an early age by experiencing it ourselves and through the eyes of others, usually our care givers, who teach us lessons about interpersonal trust and security (Fonagy, 2001). These interactions appear key to understanding a significant proportion of the variance in this cross-generation transmission of attachment. This chapter provides background to the core constructs posited to be involved in this process and hence, of inherent value to reducing the negative impact of poor early care experiences across generations. The key constructs are: attachment theory, cognitive or social information processing associated with attachment related information, and mindfulness.

The earliest care relationships have significant enduring effect on a range of health and well-being variables across the life span (Sroufe, Egeland, Carlson, & Collins, 2005a). The importance of identifying both preventative and intervention strategies that reduce the impact of negative attachment history across generations is

unquestionable. The early work of Bowlby (1982) and Ainsworth (1979b) provided a wealth of understanding regarding an individuals' developing experience of the world, and of themselves, through their experience of safety and security with primary caregivers. The on-going impact was emphasised by Ainsworth's categorisation of specific attachment profiles and Bowlby's theory of cognitive processing, which effectively maintain pre-conceptualisations and provide habitually driven behaviours. This foundation of understanding provides clear guidance for research into possible preventative and intervention entry points. These mechanisms include the interruption of cognitive processing pathways and behaviour change. To date, research has identified that changes in maternal behaviour through therapeutic intervention can positively effect the mother-infant dyad (Van IJzendoorn, Juffer, & Duyvesteyn, 1995) and more recently, the commonality between secure attachment profiles and mindfulness has been highlighted (Goodall, Trejnowska, & Darling, 2012; Pepping, Davis, & O'Donovan, 2015; Shaver, Lavy, Saron, & Mikulincer, 2007; Siegel, 2007a).

On a superficial level, how changes in maternal behaviour would affect mother-infant dyads appears clear. However, where cognitive processing strategies rely heavily on past learning, the ability to attend to and integrate new information is less simple. For change to be noted in early mother-infant dyads, or indeed future relationships, alternative cognitive processing pathways need to be enabled. Given our current knowledge regarding secure attachment and mindfulness, it seems reasonable to suggest that new learning requires current moment awareness, i.e., mindful awareness. The following section provides background to the core

constructs that appear to be involved in interrupting the cross-generation transmission of attachment, beginning with a brief review of attachment theory.

1.1 Attachment theory

Attachment theory (Bowlby, 1982) attributes the development of behavioural systems in infants as a direct response to the need for safety. It posits the perceived responsiveness of the caregiver is crucial to the experience of security felt by the infant and that this is driven by an innate desire in the infant for survival. Bowlby drew on ethological research and identified specific behavioural patterns that typically occurred on separation and reunion. They included three phases that the child commonly transitioned through: protest, despair and detachment. He noted that instinctive behavioural patterns resulted in the predictable outcome of increased proximity to mother. Interestingly, in subsequent relationships, these behavioural patterns function to maintain early conceived expectations for care.

Attachment theory purported the establishment of a secure base was determined by the experience of parental responsiveness, serving both as a safe haven in times of distress and, a sound foundation from which to explore; thus it is integral to an infants' sense of security (Cassidy, Jones, & Shaver, 2013). The development of attachment behaviour was then directly related to acquiring protection from predators, and increasing the probability of proximity to the secure base as needed, e.g. following a distressing event (Sroufe, et al., 2005a). This was supported by direct observational studies clearly identifying a relationship between responsiveness to an infant's social needs and attachment, (Ainsworth, Blehar,

Waters, & Wall, 1978; Schaffer & Emerson, 1964a). Observations conducted by Schaffer and Emerson (1964a) identified responsiveness to crying and maternal initiated social interaction as the primary variables consistently related to strength of attachment. Similarly, Ainsworth et al (1978) indicated two variables: maternal sensitivity to infant signals, and amount and type of social interaction, as predominantly influential in attachment.

Bowlby (1982) described an integrative process whereby the infant internalises the experiences of caregiving to develop their own internal capacities for self-soothing and emotional regulation. Furthermore, the early attachment experiences, and their internalisation, form secure base scripts that serve as a template for the development of internal working models. The internal working models provided a belief system that infants then applied to their understanding of self and their expectations for future relationships.

An interactive dynamic was identified as existing between two competing systems; the attachment system and the exploratory system (Cassidy, 2008). Exploration is one of the core developmental tasks of infancy, to facilitate learning and develop mastery in preparation for further stages of development (Sroufe, et al., 2005a). Essentially, Bowlby described the attachment system as a set of behaviours that were activated to seek proximity to the caregiver during times of perceived threat. He depicted this as a dynamic process whereby the attachment system was deactivated at times when there was no perceived danger and the caregiver was available. Deactivation referred to the continued existence of the attachment system whilst the presence of attachment related behaviours diminished (Ainsworth, Bell,

& Stayton, 1974). As the attachment system was deactivated, the exploratory system would become active; allowing the infant to explore their environment, hence the relationship between the two systems was conceptualised as being mutually inhibiting. The presence of a secure attachment relationship was related to increased exploration, with these early experiences enhancing the cognitive, emotional and social development of the infant (Ainsworth & Bell, 1970; Ainsworth, et al., 1978). The existence of the two distinct systems and their relative activation seemingly plays an important role in the infants' capacity for integrating new information and developing contextually appropriate responses. In addition, a third system, the fear system, functioned to modulate the former two. Essentially, where danger was perceived by the fear system (Bowlby, 1973), activation of the attachment system occurred and exploration was reduced. Recently, the importance of developing balance between the systems of attachment and exploration was investigated to determine its contribution to the transmission of attachment across generations. The study reported that both maternal sensitivity and maternal behaviour in developing an infants' autonomy uniquely contribute to fully mediate the relationship between coherence, measured by the Adult Attachment Interview (AAI) (George, Kaplan, & Main, 1985) and infant attachment (Bernier, Matte-Gagne, Belanger, & Whipple, 2014).

Four dimensions of infant-mother interaction are reportedly related to the balance between the attachment and exploratory systems. They are sensitivity-insensitivity, acceptance-rejection, co-operation-interference and accessibility-ignoring (Ainsworth et al, 1974, p106). Ainsworth et al reported mothers rated higher on sensitivity were found to work with greater synchronicity with their infant,

simultaneously facilitating development. Their infants displayed socially desirable behaviours earlier than infants of mothers who scored low on maternal responsiveness.

Attachment theory considers early care experiences as formative through the development of internal working models, however it also incorporates a transactional model (Sameroff, 2009), which proposes that new experiences render attachment styles as non-linear, or open to deviation (Sroufe, 2005). It is proposed that at any juncture the individual is affected by their history and current external circumstances (Bowlby, 1982). However, with new experiences being typically interpreted from associated past experiences the integration of new information presumably requires deactivation of the attachment system, and activation of the exploratory system.

Each phase of development is considered as capacity building for future needs (Sroufe, 2005a) whereby the mastery of certain age specific competencies prepares for the developing complexities inherent in adolescent and adult relationships, and one's own growing autonomy. The primary challenge of infancy is to navigate novel experiences whilst developing one's internal capacities for emotional regulation (Sroufe, et al., 2005a). The availability of a sensitive caregiver to manage and contain the inevitable variations in arousal acts as an external source to regulate the infant's emotional experience and serve as a model by which the infant learns to manage or regulate their own emotions internally. This arguably reflects the developing modulation of the attachment and exploratory systems. For change to

occur in attachment related schemas and behaviour, it would seem that a similar process would need to occur at any point along the lifespan.

In the presence of insensitive or unavailable caregivers, the development of emotional regulation skills is thwarted. Bowlby proposed that the working models had a complementary relationship whereby when one gained confidence in the ability of another to provide comfort and assistance in regulating emotions, expectation and mastery was then gained in one's own regulatory capacity (Sroufe, 2005) The combination of one's own growing competence with regulation experience in a dyadic relationship underpins the development of emotional regulation skills. This was well supported in the Minnesota study (Sroufe, et al., 2005a), which found secure attachment histories related to "ego resilience", higher self-esteem and confidence. Ego resilience is described as a measure of emotional regulation, referring to one's ability to be flexible in the expression of emotions, demonstrate appropriate contextual containment, tolerate frustration and recover from distress. Furthermore, the experience of secure attachment was significantly related to increased social competence throughout childhood and into adulthood (Sroufe, 2005, p.357).

In the transition to parenthood the caregiver is required to shift from their own protection seeking, to now provide the same for a child (George & Solomon, 2008). It is asserted that this is a linear process that requires the mother's own attachment schema to integrate the experience of care giving and identity change (Bryan, 2000). This process, including the maternal experience of herself as a caregiver, as well as the birth itself, requires further investigation. Maternal sensitivity has

received much attention as integral to the transmission of attachment across generations (Ainsworth, 1979a; Atkinson et al., 2005; Van IJzendoorn, et al., 1995).

1.1.1. Maternal sensitivity.

Maternal sensitivity refers to the mothers' ability to perceive infant signals, interpret accurately and respond in an appropriate and timely manner (De Wolff & Van IJzendoorn, 1997; Mesman, Oster, & Camras, 2012). This core tenet of attachment theory is reported to be cross cultural with a shared perspective of what constitutes an ideal mother and the importance of contingent learning for the infant (Mesman et al., 2016).

A specific example of the importance of responsiveness is illustrated in research on infant crying (Ainsworth & Bell, 1977; Bell & Ainsworth, 1972). Infant crying is one of the first manifestations of proximity seeking behaviour, and coupled with maternal responsiveness, is considered critical to infant survival. Research findings indicated that higher levels of maternal responsiveness to crying were related to a decrease in crying in the first year, with a concomitant increase in alternative effective means of communication. Conversely, lower levels of responsiveness appeared to establish a negative cycle whereby infants were observed to cry more than their counterparts, and a subsequent further reduction in maternal response was noted (Ainsworth & Bell, 1977; Ainsworth, et al., 1974).

Maternal sensitivity is a significant variable in the cross generational transmission of attachment styles (Van IJzendoorn, 1995). This has been further emphasised by

intervention studies that affect responsive behaviours without having significant impact on adult mental representation. However, the relationship remains unclear (Atkinson, et al., 2005). Furthermore, there remain questions regarding the longevity of changes achieved through intervention studies addressing behavioural changes (Van IJzendoorn, et al., 1995), in regards to the ongoing ability of the parent to be able to respond to the developing child. This may be affected by the challenges inherent to the changing landscape in caring for older children. Such challenges may trigger the parents' own mental representation of attachment, with its ensuing behavioural strategies of dealing with attachment related information. Hence, an understanding of the cognitive processes underlying the transition gap is needed.

Given the data which supports cross generational transmission of attachment, it continues to be important to identify other variables that may be inherent to mother-infant interaction, affecting maternal sensitivity, or playing their own mediating role (Pederson, Gleason, Moran, & Bento, 1998b). Further to this, more recent studies have explored cognitive processing (Crowell & Feldman, 1988; Dykas & Cassidy, 2011; Laurent & Ablow, 2012), emotional regulation (Goodall, et al., 2012) and mindfulness (Ryan, Brown, & Creswell, 2007; Shaver, et al., 2007). All three variables have been reported to represent a significant effect on the transmission of attachment; therefore it would seemingly indicate an interacting relationship. The nature of this interaction has not been fully explored, and yet potentially represents important understanding for the health of current and future generations. A brief review of current understanding regarding cognitive processing strategies for avoiding potentially painful attachment information is provided in the following

section. It is necessary to understand the nature of this defensively driven cognitive process before considering a more exploratory pathway.

1.2 Cognitive or social information processing associated with attachment related information

Within attachment theory, a parent's mental representation of relationships is considered to influence their relating and interactions with the infant (Pederson, et al., 1998b). It has been hypothesised that the cross-generational transmission of attachment is, in part, a consequence of the effect that maternal mental representations play on maternal sensitivity and responsiveness (Van IJzendoorn, 1995; Van IJzendoorn & Bakermans-Kranenburg, 1996). This is influenced by the mothers past and present attachment experiences. Internal working models are cognitive structures that relate to the ability to identify and discriminate between one's own mental state and that of someone else, commonly referred to as theory of mind (Botbol, 2010).

Bowlby (1982) coined the term internal working models to describe a representational system that serves as a template, and allows one to interpret or predict interactions with others, based on previous experience or similar contexts. Information gathered through experience, over time, with a caregiver is used to construct a general picture of the caregiver in regards to sensitivity, responsiveness and availability. Given that the working models develop in an interpersonal context, the process was believed to be mutually confirming of both self and other, e.g., if mother is loving, self is loved (Bretherton & Mulholland, 2008). Whilst internal

working models are considered relatively stable over time, they are updated with developmental changes but can also be affected by experience, e.g., significant breaches of trust or abandonment, or conversely, positive later attachment experiences with partner or therapist, (Bowlby, 1973; Sroufe, et al., 2005a). The development of internal working models of self and other are considered to have a significant impact on the processing of social information (Dykas & Cassidy, 2011). Specifically, the functions of the working models include: storing of event related attachment information, drawing predictions about future relational interactions from this information, and developing a representation of self. Social information processing is generally argued to be under subjective scrutiny and hence, varies in accuracy. This is supported by neurocognitive findings that indicate variations in neural activation correlate with attachment style (Laurent & Ablow, 2012).

Information processing is considered to take place on a conscious and sub conscious level. Bowlby referred to the 'defensive exclusion' of information that may be perceived as psychologically painful to the individual (1980). Essentially, this requires the individual to subconsciously filter out potentially painful information from further processing. This deactivation of processing can be performed partially or completely, limiting the memory of the event, disconnecting the emotional content from the cognitive component or blocking from perception any sensory information. Alternatively, an individual may divert the focus of distress to an alternative source, including towards self. The experience of being supported through distressing events and emotions is considered more likely for individuals with secure attachment history; hence the strategy of defensive exclusion is less

likely to be employed, allowing for more open cognitive processing. This cognitive process indicates the availability of another pathway that appears likely to be associated with the exploratory behaviour system mentioned previously. More open cognitive processing would seemingly afford exploration, and integration of new information with contextually appropriate behavioural responses.

The ability to evaluate individuals is considered paramount to social navigation. Research by Hamlin, Wynn & Bloom (2007) posited that preverbal infants demonstrate their capacity to evaluate others through reaching behavior and length of eye gaze. A series of visual experiments depicting helping and hindering behaviors illustrated a 6 month old infant's preference for characters that were seen as 'helpers' by increased reaching and gazing behaviour. Further to this capacity for social evaluation, the development of social expectation was indicated at 9 months of age through an increased propensity to focus on behaviours that violated expectations, i.e. images that approached figures previously depicted as unhelpful or hindering were associated with longer eye gaze. This finding was further supported in a study by Biro, Alink, van Ijzendoorn & Bakermans- Kranenburg (2014), reporting that infant eye gaze was affected by emotional signals associated with the separation of small animated figures from large figures. The study reported that increased gazing was associated with violation of expectation, i.e. failure of the large figure to return to the small figure when paired with a crying sound. Conversely, no difference was reported in infant monitoring between crying and laughing conditions where the large figure returned to the small figure.

With little known to date regarding the actual early stages of development for internal working models monitoring the eye tracking of infants has been used to explore the early development of secure based scripts (Biro, Alink, Huffmeijer, Bakermans-Kranenburg, & van IJzendoorn, 2015; Johnson et al., 2010).

From the premise that internal working models provide probabilistic expectations regarding future outcomes, the studies presented a number of animated scenarios related to the responsiveness of ‘parent’ figures to ‘infant’ figures. It was predicted that infant attachment style would affect the length of eye gazing according to expectation, i.e., in the case of a secure infant there would be expectation that the ‘parent’ figure would be responsive to the ‘infant’ figure. Where the response was novel or counter-intuitive, e.g., the parent was not responsive; eye-gaze would be maintained for longer. The results confirmed the hypothesis for both secure and insecure styles. Further to this, Johnson et al., (2010) predicted that secure and insecure-ambivalent infants would be similar in their expectation regarding ‘infant’ behaviour in seeking a responsive ‘parent’. Again the hypothesis was supported, finding that secure and insecure-ambivalent infants looked longer at the ‘infant’ that did not approach the ‘parent’, whereas the converse was true for their insecure-avoidant counterparts. In sum, variability in eye-gazing was reported to reflect the infant’s internal working models, where longer eye-gaze was indicative of scenarios that did not fit the expectations of the infant’s attachment style (Biro, et al., 2015; Johnson, et al., 2010).

Outcomes from memory related studies have found that individuals with an insecure attachment profile are more likely to employ avoidant strategies to block attachment related information in the attentional stage (Fraley, Garner, & Shaver, 2000). This

was also found in a study exploring response to emotionally laden words (Dewitte, Koster, De Houwer, & Buysse, 2007) The findings support the process of defensive exclusion and question the resulting effect on a mothers' ability to accurately interpret and respond to her infant's cues.

The propensity for maternal internal models to affect care giving behaviour and subsequently impact on child behaviour has been explored (Crowell & Feldman, 1988). Their results indicated that maternal behaviour during an observed play session was in accordance with behaviours typified by the different adult attachment categories. Specifically, mothers classified as autonomous were more likely to exhibit helpful behaviour whereas those classified as preoccupied were more likely to be controlling and confusing. Mothers classified as dismissive appeared more detached. Van Ijzendoorn (1995), proposed that the specific mental representational style of the mother will influence her response when attachment related information is triggered, for example: a dismissive parent may reject their infant's attachment behaviour as it may trigger their own mental representation, which through defensive exclusion of information, may result in rejection of the infant establishing an insecure-avoidant pattern. Likewise, a preoccupied individual may be inconsistent with their parenting, leading to confusion in the infant and facilitating an insecure-ambivalent style. Adults classified as secure are more likely to demonstrate consistent, appropriately sensitive behaviour, whereas frightened or frightening behaviour may account for a disorganized attachment style.

The narratives drawn from the AAI are reported to provide information regarding processing styles (Dykas & Cassidy, 2011). Individuals classified as secure are thought to be able to provide reflections regarding appropriate care and sensitivity

by caregivers as they draw from real life experience. However, in accordance with the transactional model underpinning attachment theory (Bowlby, 1982; Sroufe, 2005) some individuals classified as secure are able to demonstrate the capacity to openly process information and reflect on experiences, despite the absence of a sensitive caregiver. This is referred to as “earned secure” (Hesse, 2008; Siegel, 2007a). Evidence for change was also identified by Cohn, Silver, Cowan, Cowan & Pearson (1992), in their study, females classified as insecure were able to form healthy styles of relating when their partner was classified as secure, however in the case of an insecure-insecure dyad, communication tended to be more conflictual, with a reduced level of overall functioning (Cohn, et al., 1992). This finding suggests some level of transformation from a negative childhood working model to more positive expectations in adult intimate relationships, learnt through the integration of positive new experience. In this instance it seems reasonable to suggest that the connection with a securely attached partner creates a safe place to begin exploring alternate ways of relating, conversely in the absence of safety negative processing biases and behaviours are maintained.

Bowlby (1980) referred to the processing of sensory information as a multi stage process. He indicated that two channels were simultaneously involved in the processing of sensory information, later to be merged. Whilst sensory information in one channel undergoes automatic analysis of content, a second channel of processing is responsible for linking the sensory information to past experiences, and for developing expectations regarding its meaning. The presence of the two channels process is clearly advantageous in expediting the processing of information, however the incorporation of meaning from past events allows for

significant error in the current context. Furthermore, Bowlby suggested that sensory information could be processed outside of one's awareness and hence, unconsciously influence behaviour and mood.

In sum, Bowlby (1980) suggested that information could then follow one of three paths, i.e.: it could be excluded without evidence of having been present; be temporarily held outside of consciousness and able to influence judgment, mood and behaviour, or it could become highly processed and enter conscious awareness, stored in long term memory to be utilised in decision making. The latter pathway would seemingly require attention to current moment and regulation of emotions to allow for integration of experience.

Recent studies have confirmed the process of defensive exclusion (Laurent & Ablow, 2012; Musser, Kaiser-Laurent, & Ablow, 2012) by identifying variations in anatomical features and neural activity related to attachment history. Furthermore, growing knowledge in the area of neural plasticity has supported the non-linear trajectory of attachment styles. In line with this, mindfulness has been validated as allowing the successful disengagement from the habitual processing of information described above (Siegel, 2007b). Siegel purports that the change in focus of attention through mindful awareness results in a varied pattern of activity, which over time strengthens the related synaptic clefts and creates alternate trait like behaviours.

In essence, habitually driven behaviours result from defensive cognitive processing of internal experiences, which effectively exclude the awareness of new information

and inhibits appropriately responsive behaviour. A mutually inhibiting pathway is presumably required to allow for a more open processing of experience and fostering of more helpful behaviours, thereby interrupting the transmission of insecure attachment across generations. This alternate pathway is consistent with processing associated with secure attachment, and it appears reasonable to suggest is also more likely where mindful awareness is high. This thesis proposes that the specific mental process known as mindfulness may play a role in the open processing of new information related to attachment. The need to clarify the potential role of mindfulness could advance our understanding of how attachment internal working models can be modified. This is particularly significant when considering the ongoing physical, psychological and social costs of an insecure attachment.

1.3 The role of mindfulness

Mindfulness is defined as, “the awareness that emerges from paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p.145). Brown, Ryan and Creswell (2007b) refer to ‘awareness’ as the direct recognition of sensory information and concurs with Bowlby (1980) that the conscious awareness of stimuli may be held briefly, if at all, prior to a cognitive or emotional reaction. Furthermore, they identify a discriminative process whereby the stimuli are labelled according to previous experience as good, bad or otherwise, and are then incorporated into existing cognitive schemata. The effect of such processing, with the attaching of judgments and labels to information, is energy and time efficient;

helpful in maintaining order and stability of a pre-conceived self and other. The negative effect of this efficient and automatic processing is the overlay of bias from previous experience, which incorporates current information into schematic organisation; hence, the stimulus is rarely experienced, *as it is*. Processing from a conceptual position incorporates a reflexive awareness where issues that are salient to the self are attended to more readily, and are incorporated in cognitive accounts of the self. Consequently, this automatic processing can serve to consolidate internal working models and attachment styles.

In contrast, mindfulness refers to the purposeful awareness of current experience from both a non-judgmental and non-reactive stance (Baer, et al., 2006). It involves the ability to stay present, and in contact with current experience, to allow an open processing of information without an overlay of bias from previous experience. The integration of new information affords the opportunity to foster new, and potentially more effective behavioural choices. Further, this provides new information regarding intrapersonal and interpersonal aspects of self.

Sroufe et al., (2005a) indicate that the organisation of attachment behaviours are largely functional, e.g. avoidant attachment behaviours serve to decrease contact with painful experiences such as rejection, and yet increase the potential for proximity to the caregiver when critically needed. Contact with previously conceived threatening stimuli in contemporary experience, e.g., new relationships can be considered risky and/or difficult. The emphasis of a nonjudgmental stance in mindfulness mitigates this risk by separating awareness from previous association,

and thereby decreasing the potential for behavioural responses that are conceptually reactive (Hayes et al, 1999; Linehan, 1993).

It is generally held that some level of internal and external attention is required to facilitate self-regulation (Brown, et al., 2007b). That is; an awareness of one's internal states as well as awareness of surroundings, is necessary for effective functioning rather than reflexive behaviour. Brown et al., (2007b) further discriminate between types of awareness. They refer to reflexive self-awareness as the tendency to attend to information that is salient to self, serving to maintain and further develop the conceptualised self. Whereas they describe mindful awareness as a process of observation, whereby the content of a situation, internal and external, is noticed *as is*, and is not directed by individual goals. A separation between the conscious experience and self-relevant cognitive appraisal is thought to occur.

From the above operational definition, maternal mindfulness may be associated with increased emotional regulation and maternal sensitivity; facilitating a secure attachment in the infant, and the development of mindfulness and increasing the emotional regulatory capacity of infants, (Rutherford, Wallace, Laurent, & Mayes, 2015; Siegel, 2001). This supposition has been supported by recent studies (Goodall, et al., 2012; Leigh, 2013; McDonald et al., 2016; Pepping, et al., 2015; Shaver, et al., 2007). However, where there is consistent findings emerging regarding association between attachment style, mindfulness, emotional regulation and psychological health, a clear understanding of the relationship between these variables requires further exploration (McDonald, et al., 2016). A more recent study

reporting on the origins of dispositional mindfulness by Pepping and Duvenage (2016) found that childhood experiences of parental warmth was positively associated with attachment security and dispositional mindfulness. The findings suggest that parental support facilitates the capacity to focus on current moment awareness. Conversely, parental rejection was positively associated with attachment insecurity and low dispositional mindfulness, supportive of Bowlby's theory of defensive exclusion which posited the blocking of potentially painful information (Bowlby, 1980).

It is proposed that increased mindfulness can result in improved social functioning through a reduction in defensive responding on cognitive, emotional and behavioural levels (Brown, Ryan, & Creswell, 2008). Brown et al., (2008) indicate that where an individual identifies with an internalised construction of self, based on previous experiences, perceived attributes, belief systems and roles, they are more likely to interact with the world as though their mental representations are real. This reification of self is proposed to have two significant implications; first, when individuals engage in social exchange, real or imagined, self-related thoughts and feelings are generated. Consequently, the interaction is perceived and influenced through each individual's own internal mental representation with significant potential for bias. Second, conceptual processing has a discriminatory function where experiences are labeled as good, bad or neutral. Brown et al., (2008) suggest that even where the experience is labeled as 'good', potential problems may exist, e.g. arousal of fear that the experience or interaction will end. Therefore they propose that a more open processing of information through mindful awareness in

social situations can provide factual information that may lead to more novel and flexible responses.

Mindfulness has been associated with interpersonal and intrapersonal benefits, including reduced rejection sensitivity and less anticipatory anxiety (Peters, Eisenlohr-Mohl, & Smart, 2016), and improved interpersonal functioning, acceptance of partner, and reduced relationship stress (Carson, Carson, Gil, & Baucom, 2004).

Mindfulness has been suggested as an important internal maternal resource amidst its inherent ongoing stresses during the transition to parenthood (Snyder, Shapiro, & Treleaven, 2012). Furthermore, Snyder et al., draw on previous research supporting a relationship between mindfulness and increased self-awareness, facilitating the development of a more coherent narrative and hence, an “earned” secure attachment style (Siegel, 2007a). They propose this as a potential variable in the interruption of the cross generational transmission of attachment.

Whilst there has been significant scientific interest in both attachment theory and mindfulness as independent research entities, there is a growing call for studies exploring the relationship between attachment and the influence of mindfulness in interpersonal functioning, particularly in the earliest relationships (Siegel, 2007a; Snyder, et al., 2012).

To this end, two recent studies investigating mindful parenting have provided support for its positive effect on developmental outcomes. Firstly, an online study

investigated the effect of parental dispositional mindfulness on parenting practices and subsequent psychopathology across developmental stages (Parent, McKee, Rough, & Forehand, 2016). As expected, higher dispositional mindfulness was associated with positive parenting practices, however contrary to predicted, only negative parenting practices were associated with youth internalising and externalising problems. Parent et al., (2010) suggest that negative, rather than positive, parenting practices is a mediator of child behavioural problems and indicate the need to reduce critical and reactive parenting. Further, a recent Portuguese study explored the relationship between mindful parenting and its influence on child and adolescent security and child well-being (Medeiros, João Gouveia, Canavarro, & Moreira, 2016). The authors report that the child's perception of parental security was positively associated with parental mindfulness, as was child well-being. Whilst both studies were cross-sectional, limiting the ability to draw causal links and used self-report measures, the findings support a growing impetus for further research into the positive effect of maternal mindfulness on attachment style.

1.4 Directions for the current thesis

Our existing knowledge of the negative effect of insecure attachment over time, combined with our understanding that attachment styles can change over time, requires active research. To this end, there is a growing body of work regarding the intriguing and possible overlap between secure attachment style and mindfulness, in that they may share a common pathway for processing social information or at least may potentially modify each other. Given the current evidence regarding mindfulness in interpersonal relationships and supporting neurological studies

reviewed here, further research is needed in understanding the role of mindfulness as potentially facilitative of a more integrative social information processing pathway, that may in turn effect positive physical, psychological and social health outcomes across generations. Clear empirical evidence in this area would be valuable in the development of clinical interventions and support services for at risk groups. However to date we are unaware of studies that have utilised either longitudinal or observational data exploring the role of mindfulness in mediating a social information processing pathway that can effect maternal infant interaction, or potentially interrupt the transmission of insecure attachment across generations.

An intriguing possibility relates to whether mindfulness may have a role at the prevention and intervention level, or whether it might contribute to the amelioration of the affect of negative early care experiences. Extrapolating from the above reported benefits of mindfulness on interpersonal relationships and social functioning, the following thesis proposes to study mindfulness as a potential mediator of maternal behaviour, and will explore this relationship over time during the perinatal period.

Fear and avoidance of potentially painful attachment information is suggested to activate the process of defensive exclusion, whereas mindfulness allows for exploration of current experience. Specifically, through the ability to remain present in the current context and engage in open and receptive information processing, it is suggested that the mother will demonstrate a more attuned understanding of her infant, responding in a timely and appropriate manner during distress. Furthermore, it is hypothesised that higher levels of maternal mindfulness will positively affect

infant response to caregiver. Mindfulness may therefore be thought of as a facilitative condition that is conceptually related to the process in CBT known as 'exposure' i.e. facilitating exposure to feared interpersonal triggers to reduce avoidance and reduce anxiety, or in psychodynamic therapy known as 'working through' i.e. insight and mastery of repeating negative relationship patterns, in the service of challenging and changing them to more healthy patterns.

The studies reported here will include a mixed method approach, including interview, direct observation and self-report data. Study 1 is a cross-sectional study exploring the underlying concept regarding the role of mindfulness as a mediator in the relationship between attachment style and negative developmental outcomes. Specifically the aims of study 1 are to investigate the role of mindfulness and emotional regulation in mediating the relationship between attachment style and mental health outcomes, and to identify a possible sequential pathway for processing social information that may mitigate the negative cognitive bias associated with insecure attachment history. Study 1 will therefore provide a theoretical basis for the two subsequent studies regarding an alternate social information-processing pathway. Studies 2 and 3 are longitudinal studies exploring the predictive value of maternal mindfulness and social information processing, associated with attachment style in the early mother-infant relationship. First, study 2 will investigate the relationship between prenatal maternal levels of mindfulness and attachment history as predictive of maternal response to distress. Further, the study will explore the influence of prenatal attachment history and maternal mindfulness on early infant response to the caregiver. Finally, the aims of study 3 are twofold: to first explore the contributing role of both cognitive processing and

mindful awareness with attachment style prenatally in predicting maternal response to infant distress. Second, to investigate the role of cognitive processing style, as measured through linguistic markers, and mindfulness with attachment style in predicting early indicators of infant response to caregiver. In sum, the following studies seek to investigate a possible role of mindfulness in attachment, and theorize it as a possible agent of change, interrupting cross-generational transmission.

Chapter two

2.0 Study one: Mindfulness and emotional regulation as sequential mediators in the relationship between attachment security and depression

This chapter has been published as a paper in the journal *Personality and Individual Differences*. It is presented without alteration in this thesis.

Pickard, J. A., Caputi, P., & Grenyer, B. F. S. (2016). Mindfulness and emotional regulation as sequential mediators in the relationship between attachment security and depression. *Personality and Individual Differences*, 99, 179-183. doi: 10.1016/j.paid.2016.04.091

2.1 Abstract

Depression is a significant global health issue that has previously been associated with negative early care experiences and insecure attachment styles. This has led to much interest in identifying variables that may interrupt this relationship and prevent detrimental personal, social and economic outcomes. Recent research has indicated associations between the two seemingly distinct constructs of secure attachment and mindfulness, with similar positive outcomes. One hundred and forty eight participants completed an online survey exploring a possible sequential cognitive processing model, which predicted that higher levels of mindfulness and then emotional regulation would mediate the relationship between attachment and depression. Full mediation was found in regards to secure, preoccupied and dismissive attachment, whereas partial mediation was identified in the case of fearful attachment. The results support the possibility of an alternative cognitive processing pathway that may interrupt the association between negative early care experiences and concomitant negative mental health outcomes. Further exploration of this relationship is indicated.

Key words: mindfulness, emotional regulation, attachment theory, depression, sequential mediation model.

2.2 Introduction

Depression is a significant global health issue affecting quality of life, mortality and morbidity (Kessler & Bromet, 2013). By 2020, it is predicted to represent approximately 15 percent of the global burden of disease (Murray & Lopez, 1996). Previous research has identified a well-established link between attachment styles and developmental outcomes, including mental health, e.g. depression; physical health and social outcomes (Bifulco et al., 2004; Bowlby, 1980; Schore, 2001; Sroufe, 2005; Sroufe, et al., 2005a). According to Bowlby (1980), depression is associated with a perceived helplessness in developing and sustaining relationships, reportedly formulated from negative early care experiences instrumental in the development of internal working models that see one as unlovable and unworthy (Cummings & Cicchetti, 1990). Consistent with Bowlby (1980), Roepke and Seligman (2015) report negative prospections, i.e., mental representations of future scenarios, similarly underpinned by a pessimistic template, as the primary causal variable in the development and maintenance of depression. These perspectives match Beck's influential discoveries about cognitive distortions (Beck, 1963). The effect of preconceived beliefs on the aetiology of depression clearly indicates the importance of contrary mental activities such as current moment awareness, to allow an individual to experience self as an effective agent of change and reduce the incidence of depression. Increased mindfulness has previously been proposed to result in improved social functioning through a reduction in defensive responding on cognitive, emotional and behavioural levels (Brown, et al., 2008; Carson, et al., 2004). The current study explores the possible role of mindfulness and emotional

regulation as sequential mediators in the cognitive process between attachment and depression.

Attachment styles were initially differentiated by Ainsworth, Blehar, Waters & Wall (1978) identifying distinct categories of relationship between infants and their primary caregiver. The availability and accessibility of a sensitive caregiver was associated with a secure attachment style, typically characterised by effective emotional regulation. Conversely, the absence of a sensitive caregiver reportedly results in an insecure attachment style associated with largely ineffective strategies for need fulfillment. The insecure attachment styles are differentiated into three categories: insecure-ambivalent, insecure-avoidant and insecure-disorganised attachment styles (Ainsworth, et al., 1978; Main & Cassidy, 1988) and are associated with poorer mental health outcomes, including depression (Cummings & Cicchetti, 1990; Sroufe, 2005). Adult classifications, i.e. secure, preoccupied, dismissive and fearful, paralleling those identified in childhood, support the continuity of attachment history (Bartholomew & Horowitz, 1991). Further, preoccupied and fearful attachment styles have been associated with a higher propensity for postpartum depression, mediated by low self-esteem and self-critical thoughts (Lee & Koo, 2015). The authors attribute this association to the ‘negative self’ model characteristic of these attachment styles (Bartholomew & Horowitz, 1991). Conversely, a dismissive style, associated with a ‘positive self’ model was not found to be significantly related to depression (Reis & Grenyer, 2004). The significant impact on mental wellbeing, health and social outcomes behooves us to identify variables that may alter attachment styles and/or their impact.

Internal working models reportedly provide a set of rules for processing attachment related information (Bowlby, 1973; Bretherton & Mulholland, 2008; Dykas & Cassidy, 2011). Bowlby (1980) referred to the “defensive exclusion” of potentially painful information. Essentially, this requires the individual to filter out such information from further processing. This strategy is seemingly less utilised by an individual with a secure attachment history, allowing for more open processing. Furthermore, secure individuals are reported to process non-attachment related information in a positively biased manner and insecure individuals, with a negative bias (Dykas & Cassidy, 2011).

Essentially, the internal working models provide expectation for future outcomes (Bretherton & Mulholland, 2008). An individual with a secure history tends to anticipate being capable in eliciting care and hence, confident in tolerating and recovering from difficult emotions. In their review of attachment and social processing, Dykas and Cassidy (2011) identify competence as including the ability to acknowledge, accept and recover from distressing emotions; a process consistent with mindful awareness and emotional regulation; supportive of literature identifying commonality between the constructs: secure attachment and mindfulness (Goodall, et al., 2012; Siegel, 2007a).

To interrupt the relationship between attachment styles and depression it is seemingly important to allow for the incorporation of new information regarding current context, which may then afford new experiences of lovability and worthiness. Automatic processing has been referred to as a “top down” approach, where schemas, memories, cognitions and emotions interpret and influence

understanding of sensations and hence, shape experience, conversely mindfulness is the maintenance of awareness, to take in and process information *as it is*, in the current context (Siegel, 2007a). It implies an open processing, without bias, affording a flexible response and deviation from organised behavioural patterns (Brown, et al., 2007b). Kabat-Zinn (2003) indicates the importance of a curious mind in allowing one to process new experiences openly, a stance contrary to that engaged in when connected to pre-conceptualisations. This allows for the incorporation of novel information into schemas or working models, which may alter attachment style or limit their influence. Further, a more contextually appropriate response may provide new information regarding self. Behavioural manifestation of this is perhaps witnessed in the secure young child through exploratory behaviour, which occurs through the experience of safety, allowing deactivation of the attachment system (Cassidy, 2008).

Siegel (2007a) highlights the overlap of outcome measures related to attachment security and mindfulness, specifically referring to the prefrontal cortex and its role in modulating fear, response flexibility, self-regulation, attunement, empathy and emotional balance. This is supported by a British online survey (Goodall, et al., 2012) reporting a potential bidirectional relationship between mindfulness and attachment security, suggesting that increased mindfulness skills could reduce the behaviours more characteristic of insecure attachment styles. Further they indicate a conceptual overlap between aspects of dispositional mindfulness and emotional regulation, namely; the awareness of internal experiences and acceptance of emotional response. The authors highlight the importance of emotional awareness in reducing the cognitive bias common to a more automatic processing style. A further

study by Pepping, Davis and Donovan (2013) reported that the relationship between mindfulness and attachment security was fully mediated by emotional regulation difficulties. This is consistent with the underlying premise that a secure attachment results from the internalisation of soothing care experiences and facilitates the development of self-regulation strategies (Snyder, et al., 2012; Sroufe, et al., 2005a; Thorberg & Lyvers, 2010). Following the Minnesota longitudinal study, Sroufe (2005) reports infant attachment as critical to the development of emotional regulation and other functional capacities.

2.2.1 Current study.

Mindfulness has been associated with a range of positive emotional and social variables, including wellbeing (Baker, Huxley, Dennis, Islam, & Russell, 2015; Mitchell & Heads, 2015), relationship satisfaction (Jones, Welton, Oliver, & Thoburn, 2011) and a decrease in emotional distress factors, e.g. depression and anxiety (Pepping, O'Donovan, Zimmer-Gembeck, & Hanisch, 2014); findings that share similarity with a secure attachment history. Mindfulness is proposed to provide opportunity for perspective and space between thoughts, emotions and possible behavioural choices. Further it allows one to see that an emotion will pass, facilitating tolerance (Snyder, et al., 2012). This understanding of mindful awareness is akin to the full processing of social information and self-regulation proposed for securely attached individuals (Bowlby, 1980; Dykas & Cassidy, 2011). Given the commonality shared between the two constructs, mindfulness and secure attachment, and their relationship to emotional regulation, the following study seeks to explore a possible sequential mediation model of mindfulness and emotional

regulation in the relationship between attachment style and depression. It is proposed here that the ability to disengage from previous associations allows for a less conceptually reactive response thereby reducing negative prospectors and ameliorating psychological distress, namely, depression. It is hypothesised that mindfulness and then emotional regulation has an indirect effect on the relationship between attachment and depression.

2.3 Method

2.3.1 Participants.

One hundred and fifty-one participants (111 female and 40 males ranging in age from 18 to 52 years, $M = 21.28$, $SD = 5.89$), enrolled in a first year psychology course at a regional university completed an online survey to receive credit for their course requirements. The Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995) mean scores for the total sample revealed moderate depression (18.68, S.D. 9.45), severe anxiety (16.25, S.D. 7.65), and moderate stress (20.18, S.D. 10.12). This is consistent with studies reporting a two-fold increase in prevalence of distress amongst university students compared with the general population; representing a high risk population (Stallman, 2010). Of the 151 participants, 61 (40.4%) selected a secure attachment style as the category of ‘best fit’ on the Relationship Questionnaire (Bartholomew & Horowitz, 1991), 29 (19.2%) preoccupied, 40 (26.5%) fearful and 21 (13.9%) as dismissive.

2.3.2 Measures.

Five facets Mindfulness Questionnaire (FFMQ), (Baer, et al., 2006).

The FFMQ is a 39 item scale measuring five identifiable facets of mindfulness. They include: (i) Non reactivity, (ii) Observing/noticing/attending, (iii) Acting with awareness, (iv) Describing/labelling with words and (v) Non-judging of experience. It is rated on a 5 point Likert-type scale ranging from 1(never or very rarely true) to 5 (very often or always true). According to Baer et al (2006) the FFMQ demonstrated adequate to good internal consistency with alpha values ranging between .75 and .91 with modest correlations between factors.

Relationship Questionnaire (RQ)(Bartholomew & Horowitz, 1991).

The continuous items of the RQ were used to identify attachment style. The RQ consists of four short paragraphs that describe relationship attitudes. Each paragraph is rated on a 7-point Likert-type Scale ranging from 1 (does not describe me at all) to 7 (describes me exactly). For example the preoccupied item states: “I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don’t value me as much as I value them”. Reliability estimates for the RQ scales have been reported for attachment classifications as fair (kappas of approximately .35) and moderate for ratings ($r = .50$) (Crowell, Fraley, & Shaver, 2008).

Difficulty in Emotional Regulation Scale (DERS) (Gratz & Roemer, 2004).

The DERS is a 36-item scale comprised of six factors assessing the different facets of emotional regulation. Each item is rated on a 5-point Likert type scale ranging from 1 (almost never) to 5 (almost always). It generates a total score as well as six factor scores. The six distinct dimensions include: (i) non acceptance of emotional responses, (ii) difficulties in engaging in goal directed behaviour, (iii) impulse control difficulties, (iv) lack of emotional awareness, (v) limited access to emotional regulation strategies, (vi) lack of emotional clarity. Gratz and Roemer (2004) reported the DERS has high internal consistency ($\alpha = .93$) and Cronbach alpha coefficients of .80 for each subscale. Additionally, the authors state that the scale has good test-retest reliability ($r_{p1} = .88$), as well as adequate predictive and construct validity.

Depression Anxiety Stress Scale (DASS) (Lovibond & Lovibond, 1995).

The DASS is a 42-item scale measuring levels of depression, anxiety and stress. It provides information regarding the experience of emotional disturbance across the three states. Items are scored on a four point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time) and relates to the preceding week. The DASS 42 is reported to have good reliability across the three scales; with alpha values of: Depression 0.81; Anxiety 0.73, Stress; 0.81(Lovibond & Lovibond, 1995).

2.3.3 Procedure.

Ethics approval was attained from the Human Research Ethics Committee (Health and Medical Science). Participants were recruited through the university's online research participation website and provided consent prior to completing the online survey. Participants received one credit point following completion of the survey.

2.3.4. Data Preparation and analysis.

All data was analysed using SPSS 22. Where data was missing on only one variable within a measure for a participant it was replaced using the series mean method in SPSS. Where more than two variables were missing from a measure the participant was not included in the analysis. Three participants failed to adequately complete the DASS and were removed from the study ($n = 148$).

Spearman's correlations were conducted between variables to provide a preliminary confirmation of expected associations. Following, sequential mediation analysis was conducted using PROCESS macro for SPSS (Hayes, 2009). The mediation analyses in this study were conducted separately for each attachment dimensional score. Mindfulness and then emotional regulation were entered in the mediation analysis. Process involves a boot-strapping procedure developing estimates of indirect effects. Hayes (2009) recommends using at least 5000 resamples to generate a 95% bias corrected confidence interval (CI). Where the confidence interval does not include zero, the null hypothesis is rejected. Hayes further notes that a variable may play a mediatory or indirect role between two variables, which

do not initially appear associated. He accounts for the possibility of an indirect effect by observing that the total effect is a sum of many different paths and may include two or more indirect paths working in opposite directions. The bootstrapping method reduces the probability of power issues.

2.4. Results

Descriptive statistics and correlations are provided in Table 1. All correlations were in the predicted direction. Mindfulness was found to have a significant positive association with secure attachment and a negative association with both preoccupied and fearful attachment. Conversely, a significant negative association was found between difficulties in emotional regulation (DERS) and secure attachment whereas DERS was positively associated with all three insecure attachment styles. A significant negative association was noted for depression with both secure attachment and mindfulness, whilst it had a significant positive association with DERS, preoccupied and fearful attachment. A non-significant negative association was noted between depression and dismissive attachment.

Table 1. Mean Standard deviations and Spearman Correlations between variables

	Mean	SD	1	2	3	4	5	6	7
1. Secure	4.80	1.94	-						
2. Preoccupied	3.88	1.98	-.16	-					
3. Dismissive	3.85	1.88	-.09	-.17*	-				
4. Fearful	4.21	1.87	-.55**	.09	-.08	-			
5. FFMQ	122.75	19.43	.28**	-.34**	.16	-.43**	-		
6. DERS	88.28	21.92	-.27**	.35**	-.19*	.48**	-.80**	-	.
7. Depression	18.68	9.46	-.26**	.37**	-.13	.42**	-.51**	.66**	-

N = 148, * p<.05, **p<.01

Given the high correlations between the FFMQ and DERS further analysis was conducted to ensure they were in fact separate constructs contributing to the model. The Non acceptance and Awareness factors of the DERS, which appear to share similarity with the FFMQ were removed and the mediation analysis conducted again (Pepping, et al., 2014). The pattern of results remained unchanged indicating both variables contributed to the sequential mediational model.

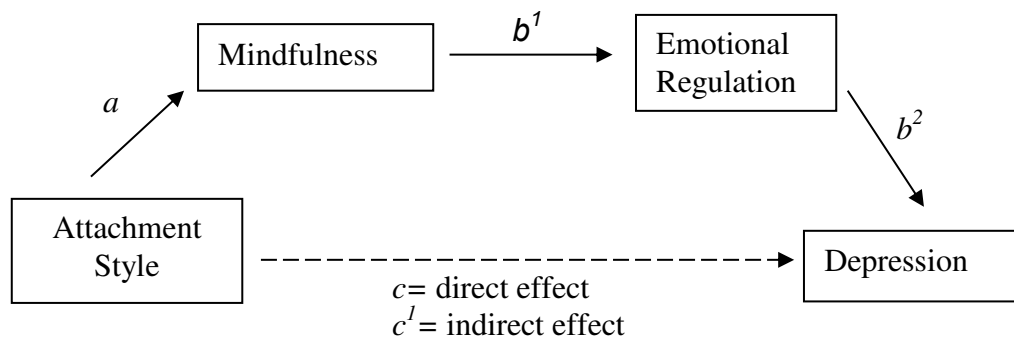


Figure 1. Model of mindfulness and emotional regulation as sequential mediators between attachment style and depression

Table 2. Sequential mediation effect of mindfulness and emotional regulation in the relationship between attachment and depression

Model Pathways		β	SE	t	p	LL95%CI	UL95%CI
Secure	a	3.06	.80	3.83	<.001		
	b^1	.86	.06	-14.16	<.001		
	b^2	.31	.04	6.98	<.001		
	c	-.36	.33	-1.12	.26		
	c^1	.81	.25			-1.39	-.39
Preoccupied	a	-3.42	.76	-4.48	<.001		
	b^1	-.85	.06	-13.77	<.001		
	b^2	.31	.04	6.91	<.001		
	c	.33	.31	1.02	.31		
	c^1	.88	.27			.44	1.51
Dismissive	a	1.93	.84	2.31	<.05		
	b^1	-.88	.06	-14.80	<.001		
	b^2	.31	.04	7.07	<.001		
	c	-.35	.32	-1.11	.27		
	c^1	-.52	.26			-1.14	-.08
Fearful	a	-4.72	.76	-6.21	<.001		
	b^1	-.81	.06	-12.59	<.001		
	b^2	.29	.04	6.54	<.001		
	c	.88	.36	2.46	.01		
	c^1	1.09	.26			.67	1.72

a = predictor, b^1 = first mediator, b^2 = second mediator, c = direct effect, c^1 =

indirect effect.

The sequential mediating role of mindfulness and emotional regulation (please see Figure 1) was then explored for each of the attachment classifications. Results are provided in Table 2. There was a significant indirect effect of secure attachment on depression through mindfulness and difficulty in emotional regulation, indicating that the process of mindfulness and then difficulty in emotional regulation fully mediates the relationship between secure attachment and depression.

The sequential mediation analysis exploring the relationship between preoccupied attachment and depression also revealed a significant indirect effect through mindfulness and difficulty in emotional regulation, again indicating full mediation. A partial mediation relationship was indicated in regards to fearful attachment and depression. The total effect was reduced slightly.

According to Hayes (2009) a causal link may still be present despite a seemingly absent association between two variables. Spearman's correlations indicated that dismissive attachment was not associated with depression or mindfulness however the indirect effect was investigated to ensure a significant influence of mindfulness and emotional regulation in the relationship between dismissive attachment and depression was not missed. The mediation analysis revealed a significant association between dismissive attachment and depression. Further there was a significant indirect effect of dismissive attachment on depression through the sequential process of mindfulness and difficulty in emotional regulation, representing full mediation.

Due to truncated variability, further analysis was conducted to explore age and gender as potential confounding factors. The results were largely consistent with the overall findings.

2.5 Discussion

The aim of the current study was to explore the relationship between attachment styles and depression through the mediators of mindfulness and emotional regulation. The results confirmed previous studies indicating association between the key variables (Goodall, et al., 2012; Pepping, et al., 2014; Siegel, 2007a). Further, the analysis revealed that a sequential relationship between mindfulness and emotional regulation fully mediated the relationship between three of the identified attachment styles: secure, preoccupied and dismissive. Dismissive attachment was initially found not to be associated using spearman's correlations with either depression or mindfulness. According to Hayes (2009) the seemingly absent relationship may be explained by the sum of different paths with variables that work in opposing directions, in this example, given the characteristics associated with a dismissive attachment style it would seem reasonable to suggest the use of distraction or distancing strategies. The sequential mediation analysis revealed a significant negative relationship between dismissive attachment and depression that mindfulness and emotional regulation did in fact fully mediate. Interestingly, mindfulness and emotional regulation was only found to play a partial mediation role in the case of fearful attachment. This is potentially reflective of the complexity and severity associated with an individual's history, resulting in this attachment style.

Whilst not included in this study, preliminary analysis was conducted to explore a sequential mediation relationship between attachment style, anxiety and stress, yielding similar effects to depression. These findings further support the role of mindfulness and emotional regulation in ameliorating negative mental health outcomes. We recommend further exploration of this in the future.

Previous research has reported that a negative bias, commonly associated with insecure attachment styles, is significantly related to the increased prevalence of depression (Bowlby, 1980; Roepke & Seligman, 2015). Defensive exclusion (Bowlby, 1980) effectively limits the opportunity to fully process information contrary to beliefs, essentially confirming negative expectations. Conversely, mindfulness awareness and secure attachment, coupled with the development of emotional regulation capacities (Sroufe, 2005) suggests an alternate processing style, where new information is attended to and influences emotional and behavioural outcomes. This alternate path was explored in this study. It was proposed that the initial ability to be mindful in a situation afforded the opportunity for emotional regulation, facilitating an open processing of *what is* and affecting the outcome of depression. This process was confirmed by the current study. The finding suggests an understanding of the process whereby the impact of insecure attachment styles on cognitive processing can be overridden to ameliorate negative developmental outcomes.

The significance of this lies in understanding the role of internal working models in perpetuating poorer outcomes, even across generations (Alhusen, Hayat, & Gross, 2013; Burke, 2003) and gives meaning to intervention studies identifying the

positive impact of mindfulness on mental health and relationships (Barnes, Brown, Krusemark, Campbell, & Rogge, 2007; Brown, et al., 2007b; Carson, Carson, Gil, & Baucom, 2007; Shaver, et al., 2007).

2.6 Conclusions, limitations and future directions

To our knowledge this is the first study to explore a sequential processing model that may interrupt the negative cognitive bias associated with insecure attachment and depression. Whilst the results are encouraging, there are several limitations to the study. Firstly, the sample was comprised of first year psychology students with mean scores indicating a moderate level of depression, a further study using a non-university based sample would be beneficial in establishing the generalizability of these results to the wider population. Secondly, it is unknown from the sample the percentage of participants who were actively engaging in meditation practice.

Further, the sample was unevenly distributed in regards to gender and age.

Supplementary analysis was largely consistent with the overall findings; however given the small male sample it is difficult to draw conclusions regarding a gender effect, thereby representing an area for future research. The cross sectional design of this study limits the ability to derive potential causal links between the variables. However the findings provide a guide for future research, which may include mixed method or longitudinal design, more able to elicit conclusive sequencing of the variables. The inherent difficulty in measuring mindfulness, particularly in a young child creates difficulty in conclusively identifying mindfulness as a mediator between insecure attachment and depression however the commonality established

between high mindfulness and secure attachment, as well as an understanding of the balance between the attachment and exploratory system strongly support the hypothesis. Nevertheless the findings suggest an important consideration in developing effective interventions to interrupt the association between negative early care giving and poorer developmental outcomes, such as depression; which represents significant global health, social and economic costs with the potential to cross generations.

Chapter three

3.0 Study two: Observing the influence of mindfulness and attachment styles through mother and infant interaction: a longitudinal study.

This chapter has been accepted for publication in the Journal of Infant Mental Health. It is presented here with the addition of Table 2 and Table 3. Further analysis is also included as Appendix F, Table 1.

Pickard, J. A., Townsend, M., Caputi, P. & Grenyer, B. F. S. (*in press*) Observing the influence of mindfulness and attachment styles through mother and infant interaction: A longitudinal study. *Infant Mental Health Journal*. Accepted 7th December, 2016.

3.1 Abstract

The cross-generational influence of attachment security or insecurity on caregiving is well established. Recently, research has focused on mindfulness as a potential variable to interrupt the transmission of insecure attachment and disrupt its effect across generations. Thirty-six pregnant female participants' completed the Five Facets Mindfulness Questionnaire and Relationship Questionnaire – Clinical Version at 30 weeks gestation. Following the infant's birth, mothers and their babies participated in a video-recorded feeding session at 7-10 weeks postpartum. It was predicted that a secure attachment style and higher levels of mindfulness measured prenatally would be associated with greater maternal responsiveness postpartum. The hypothesis was supported in regards to both the secure and insecure (fearful and profoundly distrustful) attachment styles. Mindfulness did not mediate the relationship between attachment and maternal distress. The mindfulness subscale, *non-reacting* was significantly associated with maternal response to distress. These findings support the role of prenatal mindfulness skills and attachment security for later postnatal maternal sensitivity to baby.

Key words: attachment theory, mindfulness, maternal sensitivity, mother and infant interaction, cross-generation.

3.2 Introduction

The importance of early care giving experiences in the development of attachment styles and its propensity to cross generations is well established (Ainsworth, 1979b; Bowlby, 1982; Cassidy, 2008; Sroufe, et al., 2005a). This relationship, coupled with associated poorer developmental outcomes noted with an insecure attachment profile, has generated much research interest in factors influencing the stability of attachment styles and related behaviours (Besser & Priel, 2005; Brockington, 2011; Feeney, 2000; Roisman, Padrón, Sroufe, & Egeland, 2002; Sroufe, et al., 2005a; Thorberg & Lyvers, 2010). Recently, research has identified the role of mindfulness in influencing the impact of attachment style (Pickard, Caputi, & Grenyer, 2016) and in the transmission of attachment (Goodall, et al., 2012; Shaver, et al., 2007; Siegel, 2007a). Mindfulness is defined as “the awareness that emerges from paying attention on purpose, in the present moment, and non-judgementally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p.145). By definition, mindful awareness creates a space where an individual is able to process current experience, which may then afford a choice of behavioural responses that are more contextually appropriate, rather than driven by preconceived beliefs. From this point, the current study proposes mindfulness as a vehicle for maternal responsiveness that promotes attuned mother-infant interaction, e.g. through maternal response to distress, and positively effects developmental outcomes.

Attachment theory (Bowlby, 1982) proposed that an individual’s early experiences of care generates internal working models or templates which provide conceptualisations of self and other, influencing one’s expectations and

effectiveness in need fulfilment. Bowlby further described an integrative process, whereby infants internalise the experiences of caregiving to develop their own internal capacities for self-soothing and emotional regulation. Where an infant's early experience provides a feeling of safety and security through the availability and accessibility of a sensitive caregiver, the individual is reportedly likely to develop a secure attachment style. Conversely, the absence of positive early caregiving experience is argued to result in an insecure profile. The internal working models originating in childhood were considered to be relatively stable and consolidated through associated behavioural patterns, reinforcing preconceived beliefs. However, Bowlby's model (1982) was underpinned by a transactional model (Sameroff, 2009), and hence was proposed as dynamic in nature, able to be altered at any juncture (Sroufe, 2005).

Previous research has identified the importance of maternal responsiveness to infant cues in the formation of secure attachment (Ainsworth, 1979a), with a mother's ability to be appropriately flexible in her repertoire of responses, as instrumental in the infant's development of self-efficacy (Bigelow et al., 2010; Mesman, et al., 2012). Further studies reported maternal timing or contingent responding are important in creating a social interaction, thereby enhancing the infant's experience of self as a social agent (Henning & Striano, 2011). Interestingly, Ghahremani et al. (2006) reported that maternal responsiveness was increased for infants with high perceived soothability. The authors attributed this observation to an increased sense of maternal self-efficacy or competency, conversely infants considered high in distress and difficult to soothe were associated with decreased maternal responding and perceived helplessness.

A mother's mental representation of relationships is considered to influence her capacity for sensitivity and responsiveness, (Pederson, Gleason, Moran, & Bento, 1998a) and has been proposed as a mediator of cross-generational transmission of attachment (Van IJzendoorn, 1995). However, the role of maternal sensitivity serving as a mediating factor between maternal mental representation and infant attachment is inconclusive and has since been proposed by Atkinson et al. (2000) to be more accurately considered as a moderating factor. The authors call for further research to determine what factors serve to elicit greater sensitivity from caregivers and in so doing, allow a mother to act contrary to her own attachment style. This position is supported by intervention studies that have directly targeted maternal behaviour. The findings indicate a maternal capacity to override attachment representations, resulting in greater impact on infant attachment, than efforts to alter maternal attachment style (Van IJzendoorn, et al., 1995).

Overall there remains a lack of clarity regarding the role of maternal behaviour in predicting infant attachment. Responding to the inconclusive findings regarding the effect of maternal behaviour, Cassidy, Jones & Shaver (2013) call for further research investigating maternal response to distress as a predictor of infant attachment and more specifically, its contextual effect, i.e. is maternal response to distress only influential in the event of attachment related distress or is there also an effect where the distress is non-attachment related?

Bowlby (1980) identified a cognitive processing strategy which served to block out or disconnect from potentially painful attachment related information. He referred

to this as ‘defensive exclusion’, employed more commonly by individuals with an insecure attachment history and affecting behaviour. Subsequently, when attachment systems are activated, the mother’s ability to stay present to the infant may be compromised, limiting the processing of information and potentially resulting in the misinterpretation of infant’s cues, poor attunement or inadequate responsiveness (Bowlby, 1973; Dykas & Cassidy, 2011). Conversely, mindfulness has the potential to override the maternal representations and facilitate an awareness of infant signals with appropriate and sensitive response. It can be conceptualised as an internal maternal resource during the transition to parenthood, and amidst its inherent ongoing stresses (Snyder, et al., 2012). Furthermore, Snyder et al. (2012) draw on previous research supporting a relationship between mindfulness and increased self-awareness, facilitating the development of a more coherent narrative, and hence an ‘earned’ secure attachment style (Siegel, 2007a). They propose mindfulness as a potential variable in the interruption of the cross generational transmission of attachment.

Mindful awareness is a process of observation, whereby the content of a situation, internal and external, is noticed *as is*, and is not directed by individual goal (Brown, et al., 2008). A separation between the conscious experience and self-relevant cognitive appraisal is thought to occur. In the instance of mother-infant interaction, this separation may allow for more empathic and contingent responding. From this operational definition, maternal mindfulness may be associated with increased maternal sensitivity, facilitating a secure attachment and the development of mindfulness skills, increasing the emotional regulatory capacity of infants (Siegel, 2001). The relationship between mindfulness, emotional regulation and attachment

security was investigated through an online survey (Goodall et al, 2012). The authors reported a bidirectional relationship between mindfulness and emotional regulation, as well as mindfulness and attachment. They proposed that increased mindfulness may allow an individual to disengage or reduce behaviours typically characteristic of particular attachment styles, e.g. avoidance. Further, Pepping (2013) reported the relationship between mindfulness and attachment was fully mediated by difficulties in emotional regulation, further clarifying that the overlap between the constructs did not significantly account for this relationship.

Whilst there has been substantial scientific interest in both attachment theory and mindfulness as independent research entities, there is a growing call for studies exploring the relationship between the two constructs, particularly in the earliest relationships (Siegel, 2007a; Snyder, et al., 2012). The importance of a secure attachment style in the healthy development of infants and subsequent levels of functioning and wellbeing is well established (Bowlby, 1982; Cassidy, 2008; Sroufe, et al., 2005a) and may share association with the growing body of research supporting the psychosocial and neurological benefits of mindfulness (Brown, et al., 2007b; Shaver, et al., 2007; Siegel, 2007a). The current study explores the relationship between prenatal measures of maternal attachment and mindfulness and postnatal early infant interactions through direct observation. To our knowledge, the use of behavioural observations and prediction using both mindfulness and attachment measures is original and has not been previously investigated. The longitudinal design of the study provides the opportunity to explore how prenatal attachment and mindfulness might predict postpartum interaction between mothers and babies. In particular we focus on the outcome variable, maternal response to

distress. Given the fundamental importance of early care experiences to development, the ability to predict postpartum behaviour potentially offers significant insight into possible prevention and intervention strategies. Additionally, as mindfulness is comprised of distinct facets (Baer et al, 2006), the current study will explore the individual mindfulness subscales to determine their possible association with attachment. It is hypothesised that mothers reporting a secure attachment profile and high mindfulness levels will demonstrate higher level of responsiveness to infant cues or maternal sensitivity. Further, it is proposed that mindfulness will mediate the relationship between attachment style and maternal sensitivity.

3.3 Method

3.3.1. Participants.

Forty-one pregnant females (mean age 31.3 years; *SD* = 4.6 years) volunteered to participate by informed written consent following institutional board approval of the study. Seventy-eight percent reported the pregnancy was planned. Eighty-one percent reported having completed further education beyond school, with 77 % reporting a household income of greater than the average of the population (Wenlei, 2014). Complete data are available for thirty-six of the participants (mean age = 31.45 years; *SD* = 4.56 years; range = 22-41 years).

3.3.2. Measures.

Five facets Mindfulness Questionnaire (FFMQ), (Baer, et al., 2006).

The FFMQ is a 39 item scale comprised of five subscales: i. Non reactivity, ii. Observing, iii. Acting with awareness, iv. Describing, v. Nonjudging. An example item from the Non reactivity scale is, “I perceive my feelings and emotions without having to react to them”. Ratings are made on a 5 point Likert-type scale. The authors report modest correlations between factors with alpha values ranging between .75 and .91 indicating adequate to good internal consistency (Baer, et al., 2006).

Relationship Questionnaire – Clinical Version (RQ-CV) (Holmes & Lyons-Ruth, 2008).

The RQ-CV is a five item questionnaire rated on a 7 point Likert type scale, ranging from “does not describe me at all” to “describes me exactly”. The RQ-CV provides five statements describing relationship styles that correspond with attachment categories. It includes the four items of the Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991), with a further item identifying a profoundly distrustful relationship style (Holmes & Lyons-Ruth, 2008). For example the secure item reads, “It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don’t worry about being alone or having others not accept me”.

Reliability estimates for the RQ-CV scales have been reported to have kappas of approximately .35 for relationship categories and alpha values of .50 for ratings (Crowell, et al., 2008, p. 616). The ‘profoundly distrustful’ item has been demonstrated to share variance with dismissing-avoidance and fearful avoidance, reported as $r=.45$ and $r=.29$ respectively (Holmes & Lyons-Ruth, 2008).

NCAST Parent-child interaction (PCI) Feeding Scale (Summer & Spietz, 1994b).

The NCAST PCI Feeding Scale contains six subscales, four subscales pertain to the mother’s behaviour: i. Sensitivity to cues, ii. Response to child’s distress, iii. Social-emotional growth fostering and iv. Cognitive growth fostering. Two subscales describe the infant’s behaviour: v. Clarity of cues and vi. Responsiveness to caregiver. The subscale includes 73 binary items (Summer & Spietz, 1994b). There are 15 caregiver and 3 child contingent items within the feeding scale, and the scale is indicated for use from birth to 1 year. Scores of less than 50 are considered indicative of possible difficulties in the caregiver-infant interactions (Farel, Freeman, Keenan, & Huber, 1991). The scale includes items such as: “Caregiver makes soothing non-verbal efforts” and “Child vocalizes during feeding”. It is reported to have good internal consistency. Reliability of the caregiver subscales range from (.60) to (.69) with a total parent score of (.83). Infant reliability subscales scores range from (.56) to (.58), with a total child score of (.73). Combined reliability is reported .86. Reliability for contingency items is reported to be lower than for the independent items (.73) for parent and (.19) for child. The

authors explain this as a consequence of the nature of the item, i.e. dependent on the behaviour of the other in initiating a response (Summer & Spietz, 1994b). Test retest reliability is higher for the Total Parent score (.75) and lower for the Total Child score (.51). This is reported to be indicative of the greater stability of caregiver behaviour whereas the child scores also reflect developmental change. Accreditation for using the NCAST protocol requires six days of training and a reliability assessment. Accredited raters were used in this study.

3.3.3. Procedure.

Time 1 (30 weeks gestation) - Participants attended the university clinic to provide health related information with informed written consent. Following this step, they were invited to complete an online survey that included the RQ-CV (Holmes & Lyons-Ruth, 2008), and FFMQ (Baer, et al., 2006).

Time 2 (7-10 weeks postpartum) - Participants attended the clinic with their baby. All mothers were invited to participate in a video recorded feeding session. The following instructions were provided to all participants:

“We are interested in observing your infant in his or her early stages of development. During the first year, the feeding session is one of the main opportunities for us to observe your baby’s early social interactions. With your consent, we would like to video-record you feeding your baby. Please feed your baby, as you would normally do at home. The cameraperson will not interact with you at all during the feeding session. Please let us know whenever you are finished

feeding your baby. You are able to stop the feeding session or ask us to stop videoing you at any time.”

All participants agreed to the video-feed session however one feeding session was missed as the infant was sleeping.

Video-coding – Following the feeding sessions the videos were coded using the NCAST protocol (Summer & Spietz, 1994b). Five of the videos were co-scored by the researcher who was accredited in the NCAST protocol and an NCAST trainer, to ensure consistency. The remaining videos were all then scored independently by the accredited researcher and NCAST trainer to ensure reliability. Acceptable reliability was found between total NCAST scores. The average measure intra class coefficient was .77, 95% CI [.54, .88], $df = (35)$, $F = (4.52)$ $p < .001$.

3.3.4. Data analysis.

All data was analyzed using SPSS 22. In the case where data was missing on only one variable within a measure for a participant, Little’s Missing Completely at Random (MCAR) test (Little, 1988), was conducted. The variables were determined to be missing at random and were then replaced within subscales using expectation maximisation. In the instance where more than two variables were missing on a scale the data was excluded from the analysis. A Shapiro–Wilk’s test indicated that the data were skewed hence non-parametric analysis was then conducted.

3.4. Results

Mean and standard deviations for the mindfulness subscales are provided in Table 1. The mean scores are representative of high levels of mindfulness associated with an educated sample (Baer et al., 2008). The mindfulness subscale scores were used as Baer et al (2006) proposed that mindfulness is a multi-faceted construct.

Table 1. Mean, Standard deviations and ranges for Mindfulness Subscales at 30 weeks gestation.

Subscale	Mean	SD	Range
Observing	28.03	6.06	14 - 39
Describing	31.22	5.02	18 - 39
Acting with awareness	27.29	3.84	19 - 40
Non reactivity	20.74	3.62	13 - 36
Non-judgement	31.32	6.65	10 - 40
N = 36			

Spearman correlations were conducted to investigate the relationship between the attachment styles and mindfulness subscales with the NCAST maternal response to distress scale ($n = 36$). All results were in the direction predicted by the hypothesis. A significant positive association was found between secure attachment and observed maternal response to distress $r = .41$, $p < .05$, whereas a significant negative association was found for fearful attachment, $r = -.43$, $p < .001$ and profoundly distrustful attachment $r = -.46$, $p < .001$. A significant relationship was

found in regards to the mindfulness subscale *non-reactivity to inner experience* and response to distress $r = .34, p < .05$.

The mindfulness subscale *describing/ labelling with words* correlated with three of the relationship styles; secure $r = .37, p < .05$, preoccupied $r = -.47, p < .001$ and fearful $r = -.50, p < .001$ in the expected directions, whereas the dismissive relationship style was significantly associated with non-reactivity to inner experience $r = .34, p < .05$.

Table 2. Mean, standard deviations and ranges for NCAST subscales at 7 – 10 weeks postpartum

Subscale	Mean	SD	Range
<i>Caregiver</i>			
Sensitivity to cues	14.11	1.75	9 - 16
Response to distress	10.01	1.01	8 - 11
Social Emotional growth fostering	11.43	2.36	5 - 14
Cognitive Growth Fostering	5.92	2.36	1 - 9
Caregiver total	41.49	5.78	26 - 50
<i>Infant</i>			
Clarity of cues	12.43	1.28	9 - 14
Responsiveness to caregiver	6.89	1.78	3 - 10
Infant total	19.35	2.75	13 - 24
N = 37			

The frequency distributions for the NCAST maternal/ infant total score indicated limited variability. As noted in the sample demographics, the cohort were self-selected and found to be homogenous, i.e. high functioning in regards to education and socio economic status. This feature may have had a significant effect on the outcome data.

Further, Spearman correlations conducted between the mindfulness subscales and NCAST subscales also indicated possible non-significant associations between the subscale *acting with awareness* and the *total caregiver score*, $r = .32$, $p = .06$ and the *fostering cognitive growth score* $r = .31$, $p = .07$.

Finally, the subscales relating to infant behaviour were examined in regards to relationship style. A significant positive association was found between preoccupied attachment and infant response to caregiver, $r = .34$, $p < .05$. Total infant response was in the same direction, $r = .31$ $p = .06$.

Table 3. Mean, standard deviations and ranges Relationship Questionnaire – Clinical Version

Relationship Style	Mean	SD	Range
Secure	67.03	22.71	20 - 100
Preoccupied	19.72	17.56	0 - 50
Dismissive	42.16	27.09	0 - 90
Fearful	28.22	25.80	0 - 100
Profoundly distrustful	12.43	17.22	0 - 60
N = 37			

A mediation analysis was conducted, using PROCESS macro for SPSS (Hayes, 2009), to explore the role of the mindfulness subscale, *describing* as a possible mediator between relationship style and maternal response to distress. All

relationship styles were analysed individually. As recommended by Hayes (2009), 5000 bootstrapping resamples were used in the procedure to determine the possibility of indirect effects, generating a 95% bias corrected confidence interval. Bootstrapping reduces the likelihood of power issues related to sample size. The mediation analysis did not yield any significant findings. The indirect effects on response to distress were: secure $b = -.0002$ BCa CI $[-.01, .01]$, preoccupied; $b = .002$, BCa CI $[-.02, .01]$, dismissive; $b = -.001$, BCa CI $[-.01, .01]$ fearful; $b = -.003$, BCa CI $[-.01, .01]$ and profoundly distrustful $b = .001$ BCa CI $[-.001, .001]$.

Further, in response to the significant correlations between preoccupied attachment and infant response to caregiver, a mediation analysis was conducted to explore response to distress as a mediator between the two variables. The indirect effect was non-significant, $b = -.004$ BCa CI $[-.02, .05]$.

3.5. Discussion

This study investigated the relationship between prenatal mindfulness levels and attachment style with later postnatal observed early mother and infant interaction. Despite the original design and nature of the study it is important to note the limitations including a small sample size which may have increased the potential for type I and II errors, clinical setting of data collection rather than naturalistic observations taken in a home environment, and limited variability of the sample as they were mostly educated professional volunteers. Despite these limitations, the longitudinal design of the study and the direct observational data provide significant value to understanding the relationship between attachment style, mindfulness and

early mother-infant interaction. The findings should be considered from this perspective.

Firstly, the mindfulness facet, *non-reactivity to inner experiences* showed a significant positive relationship to later maternal *response to infant distress*. Presumably this finding indicates that the mother's ability to contain her own internal experience allows for a more attuned response to the infant, providing significant insight into the mechanics of overriding attachment related behaviour. Further, the observational nature of the mother-infant interaction adds strength to this finding, indicating a notable difference in what we are able to witness in maternal behaviour that is predicted by mindfulness levels prenatally. This outcome provides a potentially valuable aspect for consideration when planning early therapeutic interventions targeting maternal behaviour and preventing the transmission of insecure attachment across generations. This approach is consistent with previous research by with Van IJzendoorn, et al (1995), which reported an increased therapeutic effectiveness in enhancing maternal sensitivity and infant attachment security by addressing maternal behaviour rather than strategies aimed at altering maternal mental representations.

Overall the results add to previous research showing an association between attachment style and maternal sensitivity, measured as response to distress (Van IJzendoorn, et al., 1995). Further, the mindfulness subscale '*describing/ labelling with words*' was found to be significantly associated with attachment style. Whilst previous research has reported association between the two constructs of attachment style and mindfulness, the current study focussed on the role of specific subscales

and identified the ability to describe one's feelings with words as being the significant contributor to the overall association.

Previous research identifying a propensity for attachment styles to cross generations (Sroufe, et al., 2005a) and a shared commonality between secure attachment style and mindfulness (Goodall, et al., 2012; Siegel, 2007a), led to the proposed formulation that mindfulness potentially created a space for mothers to disengage from previous conceptualisations, referred to by Bowlby (1982) as internal working models and default responding. This disengagement potentially facilitates the development of greater self-awareness, attunement with their infant and may afford more effective and appropriate responses (Snyder, et al., 2012). The results of the mediation analysis did not support this hypothesis. We believe this outcome was potentially affected by sample size and truncated variability however further research is indicated to further investigate these hypotheses.

The association found here between secure attachment style and maternal response to distress is consistent with previous research regarding maternal sensitivity and attachment style (Van IJzendoorn & Bakermans-Kranenburg, 1996). The NCAST assessment identifies both subtle and potent disengagement cues in the infant as indicators of distress or disconnection. Subtle disengagement cues are seen in most infants that are awake, they include: frowning, averting gaze and yawning. Subtle disengagement cues are generally employed by the infant to reduce and manage stimulation. Potent disengagement cues typically serve to communicate distress, discomfort or disconnection between the dyad. The response to distress scale is related directly to an infant's potent disengagement cues. Potent disengagement

cues include: crying, cry face, maximal head turning and sleeping. Hence, the difference in response to distress scores reported here is partially attributed to a difference between infant groups that displayed potent disengagement and those that did not. This positive association to secure attachment is considered indicative of greater attunement with the infant, which may have facilitated earlier intervention by the mother to prevent transition from subtle disengagement to potent disengagement. It is also related to improved responding at time of distress in comparison to the insecure relationship styles. The results support the previously reported commonality between attachment style and mindfulness. Here, whilst the mindfulness facet *non-reactivity to inner experience* is only directly related to a dismissive attachment style, the mindfulness facet and attachment styles: secure, fearful and profoundly distrustful independently predict maternal response to distress. As indicated by Cassidy et al (2013), greater understanding of the link between maternal response to distress and infant attachment, both generally and contextually is posited as an important area for future research. This study provides an indication of the prenatal predictors of maternal response to distress; further studies are suggested to determine the longitudinal effect on infant attachment.

The study also identified a significant association between the mindfulness subscale, *describing with words* and secure and insecure (preoccupied and fearful) attachment styles, in the expected direction. Mindfulness, by definition, creates greater awareness of inner experience and facilitates the process of describing the experience with words. This is contrary to the defensive exclusion of information reportedly associated with an insecure attachment profile (Bowlby, 1980); the current findings indicate that mindfulness and secure attachment share a more open

cognitive processing pathway. A significant association was identified between a dismissive relationship style and the *non-reacting* mindfulness subscale. This finding is consistent with the characteristics typical of this profile, e.g., distancing from emotional contact. In addition to the association between *response to distress* and *non-reactivity to inner experience*, the analysis did further indicate a medium effect between the *acting with awareness* subscale and the *total maternal* and *fostering cognitive growth* scores, although not significant. These findings suggest some general consistency between the *acting with awareness* self-reported facet of mindfulness and observed overall maternal behaviour that is appropriately responsive to the infant and facilitative of cognitive and social-emotional development. Given the data was generally supportive of the hypothesis, further exploration of the relationship appears warranted.

Whilst the effect of maternal relationship style on infant behaviour was not specified within the study hypothesis, an exploratory analysis indicated a significant positive association between a maternal preoccupied attachment style and infant response to caregiver, as well as the non-significant trend for *total infant behaviour*. *Total infant behaviour* included subscales assessing the infants' *clarity of cues* and *response to caregiver*. This is suggestive of early adaptation to a maternal style that is typically characterised by inconsistency in caregiving, requiring the infant to be more responsive or active in the relationship.

3.6. Conclusion

The current study sought to expand on existing research supporting the commonality between attachment style and mindfulness and their influence in the cross-generational transmission of attachment. To our knowledge this has previously only been explored through self-report measures. The current longitudinal study used self-report data and direct observation to better understand the relationship between mindfulness and maternal behaviour and identified that the mindfulness facet, *non-reactivity to inner experience* predicted observable differences in maternal response to distress. The results generally support previous research regarding attachment style and maternal sensitivity with small but interesting findings regarding maternal self-reported mindfulness facets and observed maternal/ infant interaction. To address the limitations of the current study a larger sample size with remuneration is suggested to encourage a wider variety of the population.

Chapter four

4.0 Study Three - Top-down and bottom-up: the role of social information processing and mindfulness as predictors in the cross-generation transmission of attachment

This chapter has been accepted as a paper in the journal *Infant Mental Health*. It is presented without alteration in this thesis.

Pickard, J. A., Townsend, M. L., Caputi, P. & Grenyer, B. F. S. (*in press*) Top-down and bottom-up: the role of social information processing and mindfulness as predictors in the cross-generation transmission of attachment. *Infant Mental Health Journal*, Accepted 11 August, 2017.

Abstract

Background: The cross-generational transmission of attachment appears to reflect a complex interplay of factors, which have been challenging to identify. The current longitudinal study explored the maternal cognitive model of relationships through language use, maternal mindfulness, and attachment style assessed prenatally, as predictors of maternal response to distress and infant behaviour at 6 months post-partum. Infant behaviour to the mother was also examined to provide an understanding of the evolving relationship. **Method:** Thirty-two females were interviewed prenatally regarding social and family experiences. At six months post-partum, each mother participated in a video-recorded session where she was asked to teach her infant a developmentally appropriate task. Videos were analysed using the NCAST Teaching Protocol. **Results:** Language use prenatally, as well as the mindfulness facets (acting with awareness and describing), predicted the mothers' ability to respond to infant distress, indicating greater attunement. Infant's response to mother and clarity of cues was also predicted by maternal pronoun use. **Discussion:** The study highlights the role of both internal working models reflective of interpersonal beliefs, cognitive models, and current moment awareness in maternal behaviour. The effect of maternal language on infant behavior arguably indicates the infant's integration of maternal internal working models.

Key words: mindfulness, attachment, Linguistic Inquiry Word Count (LIWC), social information processing, mother-infant

Introduction

Understanding the transmission of attachment styles across generations has presented as a significant challenge over the past two decades. Subsequent to a meta-analytic review by Van Ijzendoorn (1995) that reported a significant proportion of the variance in transmission was unexplained by maternal sensitivity, much research has focused on exploring the ‘transmission gap’ (Fonagy & Target, 2005; Meins, Fernyhough, Fradley, & Tuckey, 2001; Snyder, et al., 2012).

Attachment theory (Bowlby, 1982) is essentially a cognitive and dynamic model of relationships, underpinned by the development of internal working models that provide understanding of the world and expectations for future relationships, most importantly, regarding the availability and accessibility of a sensitive caregiver. The theory proposes that transmission of attachment is through the development of mental representations with probabilistic expectations that are reinforced over time (Cassidy, et al., 2013).

To develop a thorough understanding of the variables underlying attachment and its’ continuity it has become necessary to research more complex interactions between cognitive, physiological, social and genetic modalities. To this end, the current longitudinal study explores the interplay between established mental representations pertaining to relationship, as indicated through linguistic markers and current moment awareness or mindfulness, in their influence on maternal response to distress and infant behavior.

Research has identified that common amongst species of varying cognitive capacities there exists an innate tendency to seek safety in times of perceived threat,

with an amelioration of stress arising from the close proximity of a caregiver (Ainsworth, 1979b; Bowlby, 1982; Cassidy, 2008; Polan & Hofer, 2008). The development of self-regulatory capacities has been identified in offspring categorized as securely attached, indicating an internalization of understood capacity for tolerating stress. From a cognitive perspective this internalization has been conceptualized as a secure based script, which provides a causal-temporal framework for expectation regarding the outcome of attachment related events (Waters & Waters, 2006). Secure based scripts are reported to develop from attachment related experiences which afford the infant an opportunity to develop confidence in the availability of a sensitive caregiver in times of stress, both internal and external. Where an infant experiences his or her mother as attuned and able to provide safety, the infant develops mental projections that predict a positive support, attenuating the distress, e.g. “if I am scared, mum will comfort me”. The secure based scripts are considered the building blocks of the internal working models (Waters & Waters, 2006), which according to attachment theory also affect future relationships through habitually driven behaviors.

Significant insight into an individual’s cognitive and emotional world can be ascertained through verbal communication, both written and spoken (Pennebaker, et al., 2007). The linguistic markers contained within autobiographical narratives are considered to express information regarding identity, psychological features and relational factors (Groom & Pennebaker, 2002; Tani, Peterson, & Smorti, 2016). According to Bowlby (1982) attending to the language of others, e.g. caregivers, provides opportunity to draw from the internal models of others rather than solely

building one's own. This suggests that continuity of attachment is potentially affected by caregiver language.

Underlying Bowlby's (1982) position is the premise that attachment style and related internal working models are communicated through language. This is supported through recent studies that have explored word usage variations characteristic of attachment profiles (Borelli et al., 2013; Cassidy, Sherman, & Jones, 2012; Waters, Haydon, Steele, Roisman, & Booth-LaForce, 2016). These studies used the Linguistic Inquiry Word Count (LIWC) (Pennebaker, et al., 2007) to identify word frequency patterns in the Adult Attachment Interview (AAI) (George, et al., 1985). Overall the results were consistent with the traditionally rated scores on the AAI, identifying distinct patterns of linguistic markers that functioned to maintain or discontinue discourse in a way typically characteristic to the individual attachment categories. For example, studies by Cassidy et al., (2012) and Waters, et al., (2016) report an increased use of *negation* and *assent* words for individuals with a dismissive style when compared with a secure style. They propose this serves to limit discourse. Conversely, individuals classified with a preoccupied style were found to include more *hear*, *anger*, *causation*, *inhibition*, *swear* and *time* words. Cassidy et al., (2012) reported the increased frequency of the aforementioned word categories functioned to expand discourse, seek agreement from the interviewer and express emotionality. This interpretation is consistent with a preoccupied profile. In addition, Borelli et al., (2013) reported higher frequency of second person pronoun for individuals with a disorganized style.

Attachment styles reportedly provide templates for future relationship expectations and effect behavior. Such expectations play out in adult relationships through potentially biased communication that can affect relationship satisfaction. Previous research has investigated this position by exploring the relative use of single versus plural pronouns as indicators of relationship satisfaction. Pronouns replace nouns in sentences to refer to a person, place or thing. Single pronouns include words such as: I and you whereas plural pronouns include we and they. Greater use of *self* and *other* referencing single pronouns, e.g. “I” words and “you” words are reported to be predictive of less marital satisfaction in couples, whereas higher usage of “we” words and plural pronouns has been associated with greater couple satisfaction and improved couple health behavior (Sillars, Shellen, McIntosh, & Momegranate, 1997). Further, couples who used more “you” words engaged in more negative discourse, whilst the use of “me” pronouns versus “I” pronouns was reported to indicate passivity and reduced sense of responsibility (Simmons, Gordon, & Chambless, 2005); high “me and you” pronoun usage is suggested as a possible predictor of divorce and long term relationship dissatisfaction (Biesen, Schooler, & Smith, 2016; Buehlman, Mordechai, Gottman, & Fainsilber, 1992), as well as the expression of negativity and criticism by relatives (Simmons, Chambless, & Gordon, 2008) . Biesen et al, (2016) suggest “you” words can direct blame, whereas “me” words are used to deflect blame. The generalizability of these findings to other and future relationships has not been explored to our knowledge. However, following from Bowlby’s position that one can use the language of others to develop one’s own internal working models, the question is raised regarding the affect of maternal language, in particular pronoun use, on maternal infant interaction.

The other variable of interest in the current study is mindfulness. Contrary to the use of secure based scripts drawn through past experiences to interpret current events; mindfulness provides real time information regarding current experience, e.g., interpersonal interactions. Secure based scripts are considered to play a “top-down” approach whereas mindfulness relies on current sensory experience, which is in essence a “bottom-up” approach. Recent research has identified an association between the constructs of attachment security and mindfulness (Pickard, et al., 2016; Shaver, et al., 2007; Siegel, 2007a), indicating greater capacity for an individual who is classified as securely attached to stay present and process current moment events. Further, prenatal maternal reports of the mindfulness facet, non-reactivity to inner experience was found to be predictive of maternal response to distress at 7-10 weeks post-partum demonstrating an increased propensity to self regulate and respond sensitively (Pickard, Townsend, Caputi, & Grenyer, 2017). These findings are consistent with the underlying premise of defensive exclusion (Bowlby, 1980), which associates attachment security with a reduced likelihood for being entangled with attachment related history, or less guarded about potential contact with painful attachment references. Further, intervention studies such as Attachment and Biobehavioural Catch up (ABC) (Dozier & Bernard, 2017) focus on the development of nurturing responses to child distress. The intervention utilises parent-coaching strategies that provide immediate feedback to the parent regarding their response to their child. This essentially develops current moment awareness of appropriately responsive behavior.

The difference in time for reference information, past versus present, as well as the potential to develop mindfulness as a skill, would seemingly imply difference between the two constructs of secure base scripts and mindfulness. Mindfulness draws from both internal and external sensory awareness that may include but is not limited to, cognitions. According to Brown, Ryan and Creswell (2007a), “mindfulness is essentially about waking up to what the present moment offers”, (p. 272). Mindfulness is proposed to facilitate a self-regulatory capacity where the individual is able attend to stimuli through an open and non-evaluative stance resulting in positive mental health outcomes (Pickard, et al., 2016). Brown et al., (2007a) further propose that this neutral position facilitates unconditional attention that does not require effortful control to block preconceived cognitions. Subsequently, the space to generate a response that is not governed or restricted by potential social appraisal is created. Perhaps the association between a secure attachment and mindfulness represents the capacity to flexibly move between a cognitive and sensory model as indicated by Bretherton and Mulholland (2008) with both constructs then playing a role in attachment related interactions.

Attachment theory is underpinned by a transactional model (Sameroff, 2009) which according to Bowlby (1982) allowed for attachment styles to alter in response to life experiences, both favorably and unfavorably. ‘Earned security’ is the ability to make sense of childhood experiences and generate a coherent narrative despite early negative experiences (Siegel, 2007a). The development of an ‘earned’ secure profile is reliant on later supportive relationships and the capacity for self reflection. Mindfulness has been proposed as potentially facilitative of an earned secure

profile, providing new information and thereby interrupting the cross-generational transmission of attachment (Snyder, et al., 2012).

The current study

In a recent review of existing research contributing to the understanding of attachment theory, Cassidy et al (2013) suggest that future research should, in part, focus on variables that are particularly influential to maternal response to infant distress. This is a time of activation of the attachment system. The authors draw reference to the underlying premise of attachment theory, i.e., attenuation of fear in an infant through close proximity to a sensitive caregiver in times of distress leads to probabilistic expectations regarding future situations, which then form the basis of secure based scripts. Further, emerging research in animals with significantly less cognitive capacity demonstrate a similar attachment/response-to-distress relationship (Polan & Hofer, 2008), indicating that attachment experiences are not only held cognitively but may also have sensory representations. This would suggest that internal working models are developed from a combination of top down and bottom up information. Following from previous research investigating the linguistic markers of relationship functioning, the current longitudinal study investigates both the role of pronouns, an indicator of the maternal cognitive model of relationships, maternal mindfulness (current moment awareness) and attachment style as predictors of maternal response to distress and infant behavior. Further the study explores the consequent effect on infant behavior. The study proposes the following hypothesis:

Hypothesis 1 – Pronoun use pre-natally will predict observed maternal response to distress and infant response six months post partum. Specifically it is posited that high singular pronoun use (*I* and *you words*) will predict poorer levels of maternal response to distress and infant response to caregiver whereas plural pronoun frequency (*we* and *they words*) will exhibit a positive relationship with maternal response to distress and infant response to caregiver.

Hypothesis 2 – Mindfulness levels reported pre-natally will predict maternal response to distress and infant response to caregiver, six months post partum. High mindfulness will be positively associated with maternal response to distress and infant behavior to caregiver.

Hypothesis 3 – Pronoun usage, reflecting the ability to hold others in mind and mindful awareness measured pre-natally will both contribute significantly to maternal response to distress when controlling for attachment style at six months post partum, indicating the two variables as primary in the expression of attachment history.

Method:

2.1 Participants

Forty-one pregnant females volunteered to participate in the current study.

Complete longitudinal data was available for 30 participants. Please see table 1 for demographic information.

2.2. Measures

Social and family experiences interview. The interview contained questions related to reflections regarding experience with caregivers, current life experiences and expectations regarding the baby. The questions were designed to generate emotional content and prompt consideration of the future relationship with the baby and others. Sample questions include:

1. *‘What do you imagine parenting will be like for you? Prompt: What will you enjoy? What do you imagine will be challenging?’*
2. *How would you describe your relationship with your mother as a young child?*
3. *How would you describe your relationship with your mother now as an adult?*

Five Facets Mindfulness Questionnaire (FFMQ) (Baer, et al., 2006). The FFMQ is a 39 item self-report measure scored on a 5-point likert type scale. The measure discriminates between five facets of mindfulness. The facets: observing/noticing, describing with words, non-reactivity to inner experience, non-judging of experiences and acting with awareness. The authors’ reports good internal consistency for the five subscales with Cronbach’s alpha’s ranging between .75 to .91. Further, analysis indicated that the five facets are only modestly correlated with each other and are considered to independently measure distinct qualities of mindfulness (Baer, et al., 2008).

NCAST Parent Child Interaction (PCI) Teaching Scale (Summer & Spietz, 1994a). The NCAST Teaching Scale was developed to assess for problematic

patterns in interaction and communication between a mother infant dyad. The scale contains 73 binary items, with six subscales. The maternal subscales are: sensitivity to cues, response to distress, social emotional growth fostering and cognitive growth fostering. The child subscales are: clarity of cues and responsiveness to caregiver. The scale is reported to have good internal consistency with Cronbach's alphas ranging from .50 to .87. Test-retest reliability is reportedly high for the total parent score (.85) and moderate for total infant score (.55) (Summer & Spietz, 1994a). The authors suggest the lower infant score may be related to developmental change. Maternal response to distress is related to potent disengagement, e.g., crying, pushing away etc. Maternal behaviours such as, 'caregiver makes soothing non-verbal response, e.g. pat, touch, rock and caress, kiss' are endorsed on the scale. A full score is given when the infant does not display potent disengagement during the teaching session as it assumes the mother has been able to avert distress. An example of a response to caregiver item is: 'child shows subtle and/or potent disengagement cues within five seconds after caregiver changes facial expression or body movement'. Accreditation in the NCAST coding protocol requires six days of training and completion of a reliability assessment.

Linguistic Inquiry Word Count 2007 (LIWC2007) (Pennebaker, et al., 2007).

The LIWC2007 is a computerized word count program utilizing an internal reference dictionary containing 4500 words and word stems. The program identifies specific words from target text that is then allocated to the appropriate word category as well as appropriate sub dictionaries. For example, the word 'laughed' would be allocated to the 'positive emotion' category as well as the 'affective processes' and 'past tense verb' categories. Through recognising the first five letters of a word, referred to as a word-stem, words that carry the same meaning with

differing suffixes are allocated to the appropriate category. The LIWC counts target words and converts them into a percentage of total words used. The current study focussed on analysing the relative use of single and plural pronouns. Single pronouns included I-words identifying words such as 'I', 'me', 'her' and, you-words, namely: 'you', 'your', 'thou'. Plural pronouns included we-words, e.g. 'we', 'us' and 'our' as well as they-words, e.g. 'they', 'their' and 'they'd'. The total words within the pronoun dictionary are reported to be 116, with the specific abovementioned single and plural pronoun dictionaries ranging from 10 to 20 words. Cronbach's alpha for total pronouns was .91 (Pennebaker, et al., 2007).

Relationship Questionnaire – Clinical Version (RQ-CV) (Holmes & Lyons-Ruth, 2008). The RQ-CV contains five statements that describe relationship styles, consistent with adult attachment categories. The measure includes the initial four items from the Relationship Questionnaire – RQ (Bartholomew & Horowitz, 1991), with an additional item referring to a 'profoundly distrustful' relationship style. For example the statement pertaining to the preoccupied style reads: 'I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.'

Bartholomew & Horowitz (1991) reported good convergent reliability between the attachment prototypes and a semi structured attachment interview with appropriate classification for 92% of participants. Further, significant association with the Relationships Styles Questionnaire (Griffin & Bartholomew, 1994) supported good convergent and discriminant validity for the RQ (Reis & Grenyer, 2002). The

measure correlated in the expected direction with relationship dimensions included in the attachment interview including: coherence, emotional expressiveness and self confidence etc. Reliability for the RQ is reportedly kappas of .35 for relationship categories (Crowell, et al., 2008). The authors report the profoundly distrustful item explained 9% of the total variance and has a shared variance of $r = .45$ with the dismissing category and $r = .29$ with the fearful category (Holmes & Lyons-Ruth, 2008).

2.3 Procedure

Written explicit consent for all research procedures was attained from all participants following institutional review board approval.

Time 1 - Participants attended the university clinic at 30 weeks gestation for an audio-recorded interview with the researcher. Participants then completed the FFMQ (Baer, et al., 2008) and the RQ-CV (Holmes & Lyons-Ruth, 2008).

Time 2 – Participants attended with their infants at 6 months post partum for a video-recorded teaching session with their infant. The mothers were asked to instruct the child in a task that they were not yet competent in; this was designed to increase the demand on the dyad. The following instructions were provided to the participants:

“We would like to observe your infant in their early stages of learning. With your consent we would like you to choose an activity from the provided list and attempt to teach this activity to your child. Please read the list carefully and choose the first activity that your child is unable to perform. We would then like to video-record

you teaching your child this activity. It is not important whether or not your child is able to perform the task; we are most interested in watching any attempts they make with the task. Please let us know when you feel that your child has completed the activity or at any point that you feel you would like to stop. The cameraperson will not engage with you during the task”.

Interview coding

The audio-recorded interviews were transcribed verbatim, prepared according to the LIWC2007 instructions and then analyzed using the LIWC2007 (Pennebaker, et al., 2007). The categories related to single and plural pronouns were included in the analysis.

Video-coding

Following completion of the teaching session all video recordings were coded using the NCAST Teaching manual (Summer & Spietz, 1994a) by the first author who is accredited in the NCAST protocol. To ensure reliability for the coding procedure, 16 (50%) of the videos were blindly scored by an accredited NCAST trainer.

Excellent reliability was found between the total NCAST scores. The average measure intra class coefficient for the NCAST scores in the study was .87, 95% CI [.62, .95].

Analysis

All data were analyzed using SPSS 22. A Shapiro-Wilks test indicated the research variables were all normally distributed. Pearsons correlations were then conducted to identify the relationship between pronoun use and mindfulness with observed maternal infant behavior at 6 months post partum. The key NCAST variables explored were maternal response to distress, infant response to caregiver and clarity of cues. The decision to select the abovementioned NCAST scales was made in accordance with the underlying premise of attachment theory, which proposes that maternal response to infant distress is more critical to the development of attachment styles than non-distress related maternal behavior (Cassidy, et al., 2013). Hence, the additional maternal related NCAST variables e.g. fostering cognitive growth were not included in the analysis.

Results

Table 1. Demographic data for the participants N = 30

Variable	
Age (SD)	
31.69 (4.19)	
RQ-CV	
- secure	21 (61.6%)
- preoccupied	1 (3.1%)
- dismissive	6 (18.1%)
- fearful	3 (9.4%)
- profoundly distrustful	0 (0%)
- missing	1 (3.1%)

Pregnancies	
- primipara	19 (59.4%)
- multipara	13 (40.6%)
Planned Pregnancy	
- Yes	25 (78.1%)
- No	7 (21.9%)
Marital Status	
- Married	24 (75%)
- Never married	8 (25%)
- Separated/ divorced	(0%)
- Widowed	(0%)
Highest Qualification	
University degree	27 (84.4%)
TAFE certificate	4 (13.3%)
Higher School Certificate	1 (3.3%)
Annual Household Income	
Less than \$100,000	11 (34.4%)
\$100,000 - \$140,000	10 (31.3%)
Over \$140,000	11 (34.4%)

Table 2 summarizes the descriptive statistics of the key research variables. To determine the appropriate fit of the sample to the general population the mean scores for the NCAST subscales for the participants were compared with the normative sample identified in the scale psychometrics (Summer & Spietz, 1994a).

The study mean scores were all within one standard deviation of the normative data. Similarly the five mindfulness subscale scores were all within one standard deviation of meditating and highly educated reference samples (Baer, et al., 2008). The meditating sample indicated at least 1-2 regular meditation practices per week.

Table 2: Mean, standard deviations and ranges for variables of interest: pronoun use, mindfulness subscales and maternal/ infant variables N = 30

Variable	Mean	SD	Range
LIWC			
Single Pronoun -			
I	6.25	1.33	2.8 - 9.83
You	.97	.51	.06 – 2.21
Plural Pronoun -			
They	.89	.47	.09 – 1.93
We	1.66	.90	0 – 3.82
FFMQ -			
Observe	28.19	6.00	14 - 39
Acting with awareness	27.75	4.18	21 - 40
Describing with words	30.14	9.14	18 - 39
Non judgment	31.35	6.78	10 - 40
Non reactivity	21.53	4.33	13 - 36
NCAST -			
Mother Response to distress	8.03	1.86	4 - 11
Infant Clarity of cues	9.00	.84	7 - 10
Infant Response to caregiver	9.16	1.94	5 - 12

Table 3 summarizes the correlations between pronoun use, mindfulness subscales and the observed maternal and infant NCAST scores. The results were all in the expected direction.

Table 3. Relationship between the prenatal variables (LIWC and FFMQ) and Postnatal maternal/ infant variables (NCAST) N = 30

	1	2	3	4	5	6	7	8	9
<i>Prenatal</i>									
LIWC									
1. I	-								
2. You	.02	-							
3. We	-.19	-.08	-						
4. They	-.04	.15	.22	-					
FFMQ									
5. Acting with awareness	-.24	.03	.02	.08	-				
6. Describing with words	.01	.18	.23	.17	.19	-			
<i>Postpartum</i>									
7. Response to distress	.04	.32	.16	.43*	.41*	.38*	-		
8. Infant clarity of cues	-.41*	-.02	.36*	-.16	.05	-.14	-.19	-	
9. Response to caregiver	-.39*	.11	.32	.41*	.09	.19	.17	.49**	-

Plural Pronouns (see table 3) - Firstly, high plural pronoun use (*they-words*) was positively associated with maternal response to infant distress, i.e. no potent disengagement or increased maternal responsive behavior. A similar pattern was also identified in regards to the observed infant variables; a significant positive association was found between infant response to caregiver and plural pronoun use (*they-words*). Further, a significant positive relationship was also found in regards to a second plural pronoun category, (*we-words*) with infant clarity of cues.

Single Pronouns (see table 3) - Results relating to single pronoun use (*I and you words*) indicated no significant relationship for maternal response to distress. However a significant negative relationship was identified in regards to both infant clarity of cues and infant response to caregiver with singular pronoun use (*I-words*). These findings indicate that high use of *I-words* prenatally were associated with postnatal reduced infant response to caregiver and reduced clarity of cues. Similarly, a negative relationship between the mindfulness subscale, *Non-judging* and the single pronoun "*I-words*", $r = -.48, p = .01$ was found.

We tested the association between prenatal mindfulness and antenatal maternal infant behavior. We found a significant positive association between both FFMQ *acting with awareness* and FFMQ *describing with words* with *maternal response to distress*. No association was found for maternal mindfulness levels and infant behavior (see table 3).

Following the results identified in Table 3 multiple regression analyses were conducted to identify the contribution of the research variables when controlling for

attachment style. Due to the small sample size and relatively low statistical power only three variables were included in the analyses at one time. Further, as none of the participants had endorsed the profoundly distrustful prototype as category of ‘best fit’, the attachment style was not included in the analyses. Therefore, it was decided to test four separate models relating to each of the attachment styles (see table 4). The mindfulness subscale ‘acting with awareness’ and plural pronoun category ‘they’ was included in the models as the strongest predictors in the bivariate analyses. A post hoc power analysis indicated acceptable power for the four models, ranging between .86 and .97, reducing the risk of Type II error.

Table 4 shows that all four of the regression models were significant in predicting maternal response to distress. However, the plural pronoun category (*they-words*) was the only consistent contributor to maternal response to distress across all models. The specific models revealed varying results for mindfulness and attachment style. Model 1 identified that both FFMQ *acting with awareness* and *they-words* were significant predictors of maternal response to distress, accounting for 29% of the variance, however *secure* attachment did not significantly contribute to the model. The results indicated that higher scores on acting with awareness and they-words resulted in increased maternal response to distress. A similar positive relationship was also found in Model 3 when *dismissive* attachment style was entered into the equation. This model accounted for 26% of variance and found again that attachment style did not contribute to the model.

Models 2 and 4 explored preoccupied and fearful styles respectively; both demonstrated a negative association between the attachment styles and maternal

response to distress. Higher endorsement on these styles was associated with a reduction in maternal response to distress. In both models attachment style overrode the role of FFMQ acting with awareness. Model 2 was found to account for 45% of the variance whilst Model 4 accounted for 37%.

Table 4. Maternal response to infant distress predicted by a regression model comprising mindfulness, plural pronouns and attachment style. N = 30

1. Response to distress	F	df	sig.	R²	R²_{Adjusted}
	5.15	3,28	.006	.36	.29
	β	t	sig		
Acting with awareness	.35	2.28	.03		
They	.42	2.73	.01		
Secure	.17	1.11	.28		
2. Response to distress	F	df	sig	R²	R²_{Adjusted}
	9.47	3,28	.00002	.50	.45
	β	t	sig		
Acting with awareness	.23	1.63	.11		
They	.45	3.32	.003		
Preoccupied	-.45	-3.15	.004		
3. Response to distress	F	df	sig	R²	R²_{Adjusted}
	4.6	3,28	.01	.33	.26
	β	t	sig		
Acting with awareness	.38	2.45	.02		
They	.40	2.55	.02		
Dismissive	.06	.39	.70		
4. Response to distress	F	df	sig	R²	R²_{Adjusted}
	7.14	3,28	.001	.43	.37
	β	t	sig		
Acting with awareness	.31	2.11	.04		
They	.40	2.80	.009		
Fearful	-.33	-2.29	.03		

Discussion

The current study explored the role of language markers, i.e. pronoun use, mindfulness awareness and attachment styles assessed prenatally in predicting maternal response to distress and infant behavior towards caregiver at six months post partum. Overall the results for pronoun use supported our hypothesis; prenatal maternal language, previously associated with improved relationship satisfaction and greater affiliation to others predicted greater capacity to respond sensitively to their infant post-natally. The findings demonstrate maternal language that is more inclusive of others indicates an increased ability to hold the baby in mind, with a concomitant increase in the infant's response to caregiver, supporting a mutual exchange. Interestingly, of the three predictor variables only plural pronoun use 'they words' was consistently found to predict maternal response to infant distress. High levels of response to infant distress indicate that mothers are attuned enough to their infant to prevent potent disengagement and/ or exhibit a range of strategies that are directed at soothing or alleviating distress. Either scenario relies on the mother's awareness of the mental state of her infant and an appropriate understanding of responsive behavior. Previously, plural pronoun use has been associated with increased relationship satisfaction and improved relationship outcome. It is posited here that the linguistic marker is also indicative of generally being more attentive and hence responsive, to others. This capacity for inclusion resulted in the improved attuned response to the infant post-natally. The consistency of the linguistic marker (plural pronouns) in predicting maternal attunement across all models would suggest that cognitive perceptions of relationship have a strong effect across time on maternal behavior.

Maternal use of inclusive language, e.g. '*they-words*' was significantly associated with infant response to caregiver. The positive effect on infant response is reflective of a mutual exchange between mother and infant. The items contained in this subscale are primarily contingent items, i.e., endorsement of infant behavior that is directly in response to caregiver-initiated behavior. Attachment theory supposes that the development of internal working models is based upon the integration of experience based mental representations. The current finding presumably reveal the infants' understanding of maternal behavior through experience and also supports Bowlby's position that language allows a window through which to understand and borrow from the internal working model of others. This finding may indicate the formation of the infants' internal working models.

Furthermore, infant clarity of cues was significantly associated with plural pronouns, '*we-words*'. The clarity of cues items relates to infant initiated behavior, e.g., '*child vocalizes whilst looking at the test material*'. We-words have previously been associated with reduced divorce rates and higher relationship satisfaction (Buehlman, et al., 1992; Sillars, et al., 1997) indicating a probable association with effective communication strategies and relationship expectations. The positive association of we-words with infant clarity of cues would suggest an inclusive and responsive maternal relationship style that then facilitates a more mutual exchange, where the infant is able to develop more effective communication skills. It is generally held that individuals with a secure attachment style have developed more effectual strategies for having their needs met. Conversely, single pronouns: '*I, you, and me-words*' have previously been associated with reduced relationship

satisfaction, passivity and deflection of responsibility (Biesen, et al., 2016; Simmons, et al., 2005). Consistent with this, the current study found that infant behavior was negatively associated with single pronoun (I-word) use, further complimenting the outcomes in regards to plural pronoun use. The significant findings in regards to infant behavior, e.g. clarity of cues and responsiveness to caregiver provide further insight into the mechanics of cross generation transmission of attachment, indicating that word usage convey maternal secure based scripts and are influential upon infant behavior and response to caregiver.

The importance of the mindfulness subscales: acting with awareness and describing with words in predicting maternal response to distress was also supported in this study. Mindful awareness was included in this study to explore both a top-down and bottom-up approach to mother-infant interaction. Both attachment styles and linguistic markers are indicative of a working model of experience that relies heavily on archival references, whereas mindfulness taps into the importance of current experience in the mother infant relationship. Insecure attachment styles are typically associated with either an entanglement with or avoidance of attachment related processing, thereby potentially preventing the integration of current moment information. The current study explored the proportion of variance that was explained by mindful awareness in maternal response to distress. The analyses provided interesting results to further clarify contributory roles. Firstly, in the case of a secure attachment style, the mindfulness subscale acting with awareness was found to significantly contribute with plural pronouns to maternal response to distress, whilst attachment style did not play a significant role. Previous research has identified commonality between secure attachment and mindfulness (Goodall,

et al., 2012; Siegel, 2007a). It is posited that the overlap between the variables may have rendered secure attachment non-significant when added to the model. On a similar note, dismissive attachment has typically not been associated with the same degree of negative mental health outcomes experienced by other insecure attachment profiles (Reis & Grenyer, 2004). In the current study this manifests by revealing similar results to secure attachment, i.e., dismissive attachment did not play a significant role in the relationship with maternal response to distress, whilst both mindfulness and plural pronouns were significant.

Individuals with a preoccupied or fearful attachment style are more likely to employ strategies associated with defensive exclusion (Bowlby, 1980), thereby limiting the incorporation of contemporary experience into mental representations. This propensity appears to have played out here, indicated by the non-significant role that mindfulness played in the regression models relating to preoccupied and fearful attachment. The findings suggest a marked difficulty for individuals with preoccupied or fearful attachment to stay present (mindful) and incorporate new information into their experience. Essentially this lack of integration would preserve the established secure based script and affect the interpretation of infant behavior, fuelling the habitually driven maternal behavior. The negative relationship between the preoccupied and fearful attachment styles and maternal response to distress indicate that these attachment styles have a suppressing effect on maternal response to distress.

The current study is to our knowledge the first to explore the concomitant role of key predictor variables of maternal response to infant distress. Exploring maternal

infant interaction during times of infant distress is posited as a particularly important window for understanding attachment relationships. The tapping of this potential is considered a significant strength in this study. There are several further strengths to the study: a longitudinal design that allows greater predictor ability as well as both interview and direct observation data, which give meaning to the study outcomes. That said, there are several limitations. First, the relatively small sample size reduced the power of the study and limited our ability to conduct more complex statistical analysis, which may have revealed more detail regarding the interplay of predictors by being able to include more than one variable from each of the predictors in the analysis. Second, the sample was drawn from a larger health related study at the university, it is reasonable to assume that participants who volunteered to participate were generally more aware of health related behavior, which may have impacted on their relationship with their infant. It is suggested that a larger sample, coupled with a broader population sampling approach is recommended for future research. Finally, mindfulness was measured by the self-report measure, five-facet mindfulness questionnaire (Baer, et al., 2006). This is arguably the most commonly used tool for measuring mindfulness in contemporary research. However, the self-report style represents a limitation on identifying a true non-biased representation of mindful awareness. The development of an observational measurement approaches would be of great asset to future study exploring mindfulness as a concept.

Overall the study provided significant findings, which strongly supported the mutual contribution of variables in predicting maternal response to infant distress and transmission across generations. The consistency of the role of plural pronouns

when controlling for other variables indicated a primary and enduring effect of internal working models that manifests through maternal behavior. The resultant significant impact on infant responsiveness and clarity of cues provides insight into the early transmission of attachment. Whilst it is not within the scope of this current paper to provide infant attachment classifications, it raises interesting questions for future research regarding the relationship between these early signs of infant communication and response to caregiver with future attachment profiles.

Chapter Five

Overall summary and future directions

Preamble

The three studies in this thesis have contributed to research on the potential role of mindfulness and social information processing on the transmission of attachment between generations. This chapter summarizes the key findings of the studies in direct response to the specific aims of the thesis. Further, clinical and theoretical implications are provided with suggestions for further exploration.

5. 1 Strengths and limitations

The significant strengths of this thesis lie in the longitudinal design of Studies 2 and 3, as well as the video-observation of maternal infant interaction. The opportunity to follow and observe the early maternal-infant relationship provided a rich source of data regarding the early predictors of development, which demonstrated results that were overall consistent with the hypotheses.

Further, it is posited that the method of analysis for the interview data, a narrative regarding emotionally meaningful experiences, was relatively unaffected by bias. The LIWC provided profiles of linguistic markers that did not rely on the veracity of the content but instead evaluated the linguistic style.

Unfortunately, the studies relied on self-selection, and were at times both logistically challenging and time consuming for participants. These factors may have resulted in a biased sample with an existing positive and educated health perspective and almost certainly, limited the sample size, reducing the power for more sophisticated analysis. Study one drew from a student population noted to score in the moderate to severe range on the DASS. This was consistent with previous findings reporting an increased incidence of poor mental health amongst university students (Stallman, 2010), however limits our understanding of the generalizability of the proposed role of mindfulness and emotional regulation in a wider sample.

Whilst it is difficult to quantify the impact of the relatively small sample, it is reasonable to propose that it may account for smaller than expected effect sizes or null findings. Nevertheless, the value of data retrieved from video-recorded observational data of mother-infant interaction should not be diminished.

The three studies all relied on self-report measures, e.g. the FFMQ and the RQ. The FFMQ is arguably the most commonly used tool for assessing mindfulness in contemporary research however, as with all self-report measures, it has its limitations. Reporter bias, conceptual understanding and image management, i.e. fear of negative appraisal potentially affect self-report. The use of a mixed method approach in Studies 2 and 3 is intended to have ameliorate this potential effect, whilst a larger sample size for Study 1 is also suggested to have mitigated the potential problem of self-report bias.

5.2. Integration of results

Despite their limitations, the studies reported in this thesis explored the role of mindfulness in early mother-infant interaction as a potential vehicle in interrupting the cross-generation transmission of insecure attachment. Study 1 focused on establishing the underlying premise of the thesis, i.e., mindful awareness is facilitative of an alternate pathway for processing social information that can interrupt the negative outcomes more commonly associated with an insecure attachment profile. Studies 2 and 3 extended from this position to explore the shared contributions of attachment history and established relationship patterns with mindfulness in the early mother-infant interactions.

This thesis began by confirming the previously established relationship between the key research variables of mindfulness, attachment style and developmental outcomes, and depression. The primary focus of Study 1 was to investigate the sequential mediating role of mindfulness and emotional regulation in the relationship between attachment style and depression. The results supported the hypothesis of full mediation for secure, preoccupied and dismissive attachment, with partial mediation for fearful attachment. The confirmed mediating relationship supports the proposal that the ability to remain present to current context (being mindful) facilitates an alternate pathway for processing social information, enabling the integration of new information and ameliorating the incidence of depression. This pathway is more commonly associated with a secure attachment style, where emotional regulation skills are employed and full processing of information can

occur. The finding suggests a cognitive manifestation of the attachment and exploratory system activation process previously identified (Cassidy, 2008). The identification of this pathway has important research and clinical implications. Greater theoretical understanding of this process provides clear support for the inclusion of clinical intervention strategies that foster the development of mindfulness, both a dispositional trait and a skill. Mindfulness is perhaps more typically used as a therapeutic technique in reducing arousal and distress by becoming grounded in the present moment. Beyond this, Study 1 provided evidence for the role of mindfulness in facilitating change in an individual's understanding of the self and other. This is arguably fundamental to therapeutic change, enhancing the capacity to explore new experiences through greater cognitive flexibility and engage in more effective behavioural strategies. New or novel and more contextually appropriate behavioural responses will potentially increase the likelihood for more desirable outcomes, which may then be integrated into schemata and reinforced over time. The enhanced understanding of the mediating role of mindfulness and emotional regulation in ameliorating negative developmental outcomes provides strong justification for the inclusion of both variables in treatment programs. In sum, Study 1 supported the first two aims of the thesis: mindfulness and emotional regulation were found to play a mediating role in the relationship between attachment style and mental health outcomes. Further, the findings demonstrated a sequential pathway for processing social information that mitigates the negative cognitive bias associated with insecure attachment history, addressing a primary goal of therapeutic intervention.

Following from Study 1, and previous research purporting the potential role of mindfulness in cross-generation transmission of attachment (Snyder, et al., 2012), Study 2 explored the relationship between mindfulness and maternal response to infant distress. To our knowledge, this is the first study to use a longitudinal and/ or observational approach to identify mindfulness as a predictor of maternal response to infant distress. Given the attachment system is reportedly activated in times of distress as a driver to seek safety (Ainsworth, et al., 1974; Bowlby, 1973), it was considered that maternal response to infant distress was well suited for capturing the indicators of attachment development. The results supported the hypothesis, finding the mindfulness subscale, *non-reactivity to inner experience* was predictive of maternal response to infant distress. This further consolidates the reported outcomes from Study 1, that is, the ability to remain present and contain internal experiences, e.g., emotions and cognitions, facilitates appropriately sensitive responding to prevent or comfort infant cues of distress. This finding demonstrates a social information-processing pathway that allows for the interpretation of current experience, independent of previously conceptualized internal working models and habitually driven behaviours. The identification of mindfulness as a variable integral to this pathway has important theoretical and clinical implications. First, the finding provides insight into the underlying mechanics of social information processing and second, offers strong justification for its inclusion in clinical interventions. Consistent with previous research (Van IJzendoorn, 1995), attachment style was also found to be predictive of maternal response to infant distress; however, the hypothesis that mindfulness mediated this relationship was not supported. Nevertheless, the significant association between secure attachment and the mindfulness subscale, describing with words, supports the proposed shared

role between the two variables in social information processing. The ability to describe an experience verbally requires, firstly contact with the experience, followed by cognitive processing. This process is markedly different to defensive exclusion (Bowlby, 1980), where by nature, the experience is partially or fully blocked to avoid contact with potentially painful information and hence, processing is limited. This provides research evidence for the inclusion of mindfulness in clinical practice; supporting the role of mindfulness in allowing the mother to stay open and hence, responsive to her infants' signals regardless of her own attachment history; an ability that is critical to sensitive caregiving and the interruption of attachment transmission.

In relation to the impact on early infant cues and the responsiveness to the caregiver, Study 2 identified that a preoccupied attachment style significantly predicted early infant behavior, whereas similar associations were not observed for the remaining attachment styles. Preoccupied attachment is typically characterized by entanglement with an attachment figure and is reported to develop in response to inconsistent caregiving. This finding was informative as it implied that preoccupied attachment measured prenatally predicted a more active responsibility on the infant's behalf in engaging their caregiver at this young age (7-10 weeks post partum). Individuals with a preoccupied attachment style are commonly associated with behaviours that seek to maintain contact with their caregiver. This finding is arguably indicative of early signs associated with developing internal working models and a parallel attachment profile. Limitations of the study in terms of small sample size and limited power are noted. The ability to observe the influence of preoccupied attachment on the mother-infant dynamic at this early age provides an important opportunity for early intervention. Early identification and address of

negative care factors is pertinent to creating better outcomes, hence this finding is potentially instrumental in guiding further research and treatment.

In relation to the aims of Study 2, the results supported a relationship between prenatal maternal levels of mindfulness, *non-reactivity to inner experience*, and attachment style as predictive of maternal response to distress. The ability to be non-reactive to, or contain inner experience and its relationship with maternal response to infant distress supports the premise of the role of mindfulness, i.e., creating a space for alternate, more effective behavioural strategies. This finding provides intriguing theoretical support for developing therapeutic interventions that foster non-reactivity.

Prenatal attachment history was found to predict early infant response to caregiver. This is consistent with previous research identifying the propensity for the cross-generational transmission of similar attachment patterns between mother and their infant (Behrens, Haltigan, & Gribneau Bahm, 2016; Van IJzendoorn, et al., 1995). Conversely, the hypothesis was not supported for maternal mindfulness and infant response. It is suggested that the null finding may be because there is no relationship, or perhaps be a consequence of the study limitations, e.g. small sample size, and hence warrants further exploration before being discarded.

Previous research has indicated that the cross-generation transmission of attachment is a consequence of the interplay of several variables (Cassidy, et al., 2013; Van IJzendoorn, et al., 1995). The role of maternal mental representations in transmission is well grounded in attachment theory (Ainsworth, 1979a; Pederson, et al., 1998b), and the first two studies of this thesis are consistent with a role of mindfulness. To develop a better understanding of the collective contribution of

internal working models and mindful awareness, Study 3 used indicators of cognitive style, e.g., linguistic markers, mindfulness levels and attachment style measured prenatally, to explore their potential influence on maternal response to infant distress. The longitudinal study used a mixed method approach, incorporating interview, observational and self-report data. The results supported the overall hypothesis that linguistic markers (such as plural pronoun use) and mindful awareness positively predicted maternal response to infant distress. The use of pronouns was previously associated with relationship satisfaction (Sillars, et al., 1997). In Study 3, prenatal plural pronoun use was predicted to reflect greater maternal attunement through the capacity to ‘hold’ others in mind, or in awareness, thereby generating more appropriate responding. This is arguably integral to sensitive and attuned responding. The multiple regression analyses revealed differences with regards to the specific attachment profiles. The results made sense in regards to the level of entanglement and subsequent low mindfulness levels likely for both the preoccupied and fearful attachment categories. As reported in Study 3, the regression of maternal response to infant distress on plural pronoun use and mindful awareness with either a secure or dismissive attachment style identified a non-significant contribution by attachment style. Conversely, attachment style remained significant in the regression models including either preoccupied or fearful attachment, whereas the effect of mindfulness was overridden or not present. This finding is possibly attributable to the nature of attachment styles typically associated with greater entanglement with attachment narratives. Following the previous identified association between pronoun use and relationship satisfaction (Biesen, et al., 2016; Simmons, et al., 2005), the linguistic markers were included in this study to provide insight into the maternal cognitive world. Previous research

has reported that dismissive attachment is less commonly associated with negative developmental outcomes, e.g., depression, than preoccupied and fearful profiles (Reis & Grenyer, 2004), with Study 1 finding that this relationship was fully mediated by mindfulness. Similar to secure attachment, the reduced likelihood to become enmeshed with attachment-related content creates an opportunity to be aware of current context and hence, responsive to infant distress. The consistent importance of plural pronoun use in predicting maternal response to infant distress across all four attachment models highlights the importance of the established cognitive conceptualization of relationships in affecting future ones. Previous findings regarding the positive association between plural pronoun use and relationship outcomes suggest a more inclusive focus on others in the relationship (Sillars, et al., 1997). Thus the finding that plural pronoun use was associated with more attuned maternal response in Study 3 was unsurprising. The continuing impact on future relationships is evident here where higher plural pronoun use was also positively associated with infant clarity of cues, whereas higher single pronoun use was negatively associated with both infant clarity of cues and infant response to caregiver. This finding is consistent with Bowlby's (1982) supposition regarding drawing from the language of others as a strategy for developing one's own internal working models.

It seems reasonable also to conclude, a more inclusive and hence, attentive maternal relationship pattern facilitates a mutual exchange with the infant, that allows the infant to develop effective skills in communicating; whereas a greater maternal self-focus interrupts the mutual interaction, and impedes the development of infant communication skills. This result has important implications for early intervention in maternal-infant communication. For example: maternal coaching in language that

is inclusive of others may foster a more positive sense of infant belonging in the world that encourages more mutual exchange and hence, promotes healthy infant developmental outcomes. Study 3 supports the proposition posed here that cognitive processing style may influence maternal response to infant distress across attachment profiles. Specifically, mindful awareness was found to contribute to the models that included secure and dismissive attachment, but was not significant in the models including preoccupied and fearful attachment. Maternal cognitive processing style measured through linguistic markers, was found to relate to early indicators of infant response to caregiver. These findings may contribute to further studies informing clinical practice. Linguistic markers provided insight into the mothers' prenatal relationship patterns and predicted maternal and infant interaction post-natally. This is potentially valuable information regarding the early indicators of attachment difficulties and potential developmental outcomes. Attention in clinical settings to client narratives could provide useful information in regards to hallmark features of particular problematic relationship styles. Further, therapies such as Acceptance and Commitment Therapy that specifically target word usage and include strategies directed at deliteralising of thoughts and word defusion may be particularly effective in attenuating the impact of existing relationship style and language patterns.

5.3 Implications

In recent times there has been a growing momentum in research related to mindfulness in a range of different areas, and specifically for inclusion in clinical practice. This thesis sought to explore the role of mindfulness as a facilitator in social information processing. The studies affirmed previous research

demonstrating a positive association between mindfulness and attachment, whilst also increasing our current understanding regarding the role mindfulness plays in social information processing related to mother-infant interactions. The studies support mindfulness as a variable of research interest in response to the significant impact of negative early care experiences, and resultant insecure attachment, on developmental outcomes. Previous research identifying a commonality in neurological functioning between individuals identified with a secure attachment profile and those high in mindfulness have provided understanding regarding a shared pathway (Siegel, 2007a). The current research suggests the potential for developing mindful awareness to assist in overriding early negative care experiences. This is helpful to our understanding of the variables integral to the cross-generation transmission of attachment and encourages further research investigating its possible interruption as well as avenues for deviating from existing internal working models. This provides potential to capitalize on the understanding of attachment style as transactional in nature (Sameroff, 2009; Sroufe, 2005), i.e., open to change with validated change strategies.

The final study provided, to our knowledge, the first evidence of the mutual roles of the maternal cognitive world and mindful awareness. This insight facilitates a clearer understanding of the potentially competing social information processing pathways. Narratives indicating entanglement or confusion with attachment content characterize preoccupied and fearful attachment profiles. Study 3 demonstrated the prevailing nature of this in overriding mindfulness, potentially limiting the integration of new information. This signals a likely required increased length and intensity of intervention programs for individuals with the abovementioned

attachment profiles. The role of language as an indicator of cognitive relationship style provided new understanding regarding maternal attunement and maternal-infant interaction. This arguably provides early indication of infant developmental factors, e.g. internal working models and communication effectiveness. Meanwhile, the positive relationship between both prenatal mindfulness levels and plural pronoun use with maternal response to distress enhances our capacity to provide early identification and intervention strategies.

5.4 Summary and future directions

Overall, the studies provide support for the importance of mindfulness in ameliorating the impact of negative early care experiences and provide impetus to call for further research that addresses the current limitations and provide greater methodological rigor. Given the growing interest in research investigating mindfulness and the promising outcomes, the development of alternate forms of measurement for mindfulness seems pertinent. This is proposed as an important area for future research, which would provide greater meaning and validity to outcomes.

Further, the potential ability to predict maternal response to distress from pronoun use and pre natal levels of mindfulness provides both an interesting area for future research as well as useful instruction for identifying indicators for early intervention. Understanding into the complex interplay of variables affecting attachment transmission is arguably still in its infancy with a potential for considerable growth through clarification, thereby facilitating improved treatment outcomes.

In sum, the importance of understanding the variables that affect the cross-generation transmission of attachment is established. The studies within this thesis expand on current knowledge regarding the affect of attachment history on the processing of new social information. The identification of an alternate pathway where mindfulness facilitates full and open processing style for the integration of new information into existing schemas offers valuable addition to this knowledge, and indicates the importance of further investigation to reduce the negative personal, social and economic cost of poor early care experience.

References

- Abidin, R. R. (2010). The determinants of parent behavior. *Journal of Clinical Child Psychology*, 21(4), 407-412. Retrieved from doi:10.1207/s15374424jccp2104_12
- Ainsworth, M. D. (1979a). Attachment as related to Mother-Infant Interaction. 9, 1-51. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0.00002306520&partnerID=40&md5=4b80a60de0992389045b428f2eb86b3f> doi:10.1016/S0065-3454(08)60032-7
- Ainsworth, M. D. (1979b). Infant-mother attachment. *American Psychologist*, 34(10), 932-937. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0.0018526495&partnerID=40&md5=78d69e88f38867da920cc9138f686cb0>
- Ainsworth, M. D., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development*, 41(1), 49-67. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0.0014745204&partnerID=40&md5=b0d517ee48af0c09ddccc7dd79837a55>
- Ainsworth, M. D., & Bell, S. M. (1977). Infant crying and maternal responsiveness: A rejoinder to Gewirtz and Boyd. *Child Development*, 48(4), 1208-1216. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0.0017702147&partnerID=40&md5=1985ea9ddcd6a10495b13a82c2994263>
- Ainsworth, M. D., Bell, S. M., & Stayton, D. J. (1974). Infant-mother attachment and social development. In M. P. Richards (Ed.), *The Integration of a child into a social world* (pp. 99-136). London: Cambridge University Press.
- Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: a psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
- Alhusen, J. L., Hayat, M. J., & Gross, D. (2013). A longitudinal study of maternal attachment and infant developmental outcomes. *Archives of Women's Mental Health*, 1-9.
- Atkinson, L., Goldberg, S., Raval, V., Perderson, D. R., Benoit, D., Moran, G., . . . Leung, E. (2005). On the relation between maternal state of mind and sensitivity in the prediction of infant attachment security. *Developmental Psychology*, 41(1), 42-53. Retrieved from doi:10.1037/0012-1649.41.1.42
- Atkinson, L., Niccols, A., Paglia, A., Coolbear, J., Parker, K. C. H., Poulton, L., . . . Sitarenios, G. (2000). A meta-analysis of time between maternal sensitivity and attachment assessments: Implications for internal working models in infancy/toddlerhood. *Journal of Social and Personal Relationships*, 17(6), 791-810. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0.0034550826&partnerID=40&md5=2274a625a6724e13f635a594b7da9c1a>
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self report assessments methods to explore facets of mindfulness *Assessment* 13, 27-45. doi: 10.1177/1073191105283504
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, J. M. J. (2008). Construct Validity of the Five Facet Mindfulness Questionnaire in Meditating and Nonmeditating Samples. *Assessment*, 15, 329-342. doi: 10.1177/1073191107313003

- Baker, C., Huxley, P., Dennis, M., Islam, S., & Russell, I. (2015). Alleviating staff stress in care homes for people with dementia: Protocol for stepped-wedge cluster randomised trial to evaluate a web-based Mindfulness- Stress Reduction course. [Article in Press]. *BMC Psychiatry*. doi: 10.1186/s12888-015-0703-7
- Barnes, S., Brown, K. W., Krusemark, E., Campbell, W. K., & Rogge, R. D. (2007). The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy*, 33(4), 482-500. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-34748833807&partnerID=40&md5=9d5175899ccb7bee61236776ddcf7c55>
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment Styles Among Young Adults: A Test of a Four-Category Model. *Journal of Personality and Social Psychology*, 61(2), 226-244. Retrieved from
- Beck, A. T. (1963). Thinking and Depression: I. Idiosyncratic Content and Cognitive Distortions. *Arch Gen Psychiatry*, 9(4), 324-333. doi: doi:10.1001/archpsyc.1963.01720160014002.
- Behrens, K. Y., Haltigan, J. D., & Gribneau Bahm, N. I. (2016). Infant attachment, adult attachment, and maternal sensitivity: revisiting the intergenerational transmission gap,. *Attachment & Human Development*, 18(4), 337-353. doi: 10.1080/14616734.2016.1167095
- Bell, S. M., & Ainsworth, M. D. (1972). Infant crying and maternal responsiveness. *Child Development*, 43, 1171-1190. Retrieved from <http://www.jstor.org/stable/1127506> .
- Bernier, A., Matte-Gagne, C., Belanger, M. E., & Whipple, N. (2014). Taking Stock of Two Decades of Attachment Transmission Gap: Broadening the Assessment of Maternal Behavior. *Child development*, 85(5), 1852-1865. doi: 10.1111/cdev.12236
- Besser, A., & Priel, P. (2005). The Apple Does Not Fall Far From the Tree: Attachment Styles and Personality Vulnerabilities to Depression in Three Generations of Women. *Personality and Social Psychology Bulletin*, 31, 1052-1073. Retrieved from doi:10.1177/0146167204274082
- Biesen, J. N., Schooler, D. E., & Smith, D. A. (2016). What a Difference a Pronoun Makes: I/We Versus You/Me and Worried Couples' Perceptions of Their Interaction Quality. *Journal of Language and Social Psychology*, 35(2), 180-205. doi: 10.1177/0261927X15583114
- Bifulco, A., Figueiredo, B., Guedeney, N., Gorman, L. L., Hayes, S., Muzik, M., . . . Henshaw, C. A. (2004). Maternal attachment style and depression associated with childbirth: preliminary results from a European and US cross-cultural study. *The British Journal of Psychiatry*, 184(46), s31-s37. doi: 10.1192/bjp.184.46.s31
- Bigelow, A. E., MacLean, K., Proctor, J., Myatt, T., Gillis, R., & Power, M. (2010). Maternal sensitivity throughout infancy: Continuity and relation to attachment security. *Infant Behavior and Development*, 33(1), 50-60. Retrieved from doi:10.1016/j.infbeh.2009.10.009
- Biro, S., Alink, L. R., van Ijzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2014). Infants' monitoring of social interactions: The effect of emotional cues. [Article]. *Emotion*, 14(2), 263-271. doi: 10.1037/a0035589
- Biro, S., Alink, L. R. A., Huffmeijer, R., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2015). Attachment and maternal sensitivity are related to

- infants' monitoring of animated social interactions. *Brain and behavior*, 5(12). doi: 10.1002/brb3.410
- Borelli, J. L., David, D. H., Rifkin-Graboi, A., Sbarra, D. A., Mehl, M. R., & Mayes, L. C. (2013). Language use in the Adult Attachment Interview: Evidence for attachment-specific emotion regulation. *Personal relationships*, 20(1), 23-37. doi: 10.1111/j.1475-6811.2012.01394.x
- Botbol, M. (2010). Towards an integrative neuroscientific and psychodynamic approach to the transmission of attachment. *Journal of Physiology Paris*, 104(5-6), 263-271. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-78649444680&partnerID=40&md5=4ccf520c3ad95e4268312de7ee77bbf7> doi:10.1016/j.jphysparis.2010.08.005
- Bowlby, J. (1973). *Attachment and Loss: Separation* (Vol. 2). New York: Basic Books.
- Bowlby, J. (1980). *Attachment and Loss: Loss, sadness and depression* (Vol. 3). New York: Basic Books.
- Bowlby, J. (1982). *Attachment: Attachment and Loss* (2nd ed. Vol. 1). New York: Basic Books.
- Bretherton, I., & Mulholland, K. A. (2008). Internal working models in attachment relationships: elaborating a central construct in attachment theory. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research and Clinical Applications* (2nd ed., pp. 102-127). New York: Guildford Press.
- Brockington, I. (2011). Maternal Rejection of the Young Child: Present Status of the Clinical Syndrome. *Psychopathology*, 44(5), 329-336. doi: 10.1159/000325058
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007a). Addressing fundamental questions about mindfulness. *Psychological Inquiry*, 18(4), 272-281.
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007b). Mindfulness: Theoretical Foundations and evidence for it's salutary effects. *Psychological Inquiry*, 18, 211-237. Retrieved from doi:10.1080/10478400701598298
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2008). Beyond me: Mindful responses to social threat. In H. A. Wayment & J. J. Bauer (Eds.), *Transcending Self Interest: Psychological Explorations of the Quiet Ego*. Washington: American Psychological Association.
- Bryan, A. A. (2000). Enhancing Parent-Child Interaction With a Prenatal Couple Intervention. *The American Journal of Maternal/Child Nursing*, 25(3), 139-145. Retrieved from
- Buehlman, K. T., Mordechai, J., Gottman, L., & Fainsilber, K. (1992). How a Couple Views Their Past Predicts Their Future: Predicting Divorce from an Oral History Interview. *Journal of family psychology*, 5(3-4), 295-318.
- Burke, L. (2003). The impact of maternal depression on familial relationships *International Review of Psychiatry*, 15, 243-255. Retrieved from doi:10.1080/0954026031000136866
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy*, 35(3), 471-494. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-11144224830&partnerID=40&md5=b09f7847f45596914a8ac060e8de626d>
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2007). Self-expansion as a mediator of relationship improvements in a mindfulness intervention

- Vol. 33. *Journal of Marital and Family Therapy* (pp. 517-528). Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-35348921702&partnerID=40&md5=27308d94626c6dd4f4b94db15a8dfb80>
- Cassidy, J. (2008). The nature of the child's ties. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research and Clinical Applications* (2nd ed., pp. 3-22). New York: Guildford Press.
- Cassidy, J., Jones, J. D., & Shaver, P. R. (2013). Contributions of attachment theory and research: A framework for future research, translation, and policy. *Development and Psychopathology*, 25(4 PART 2), 1415-1434. doi: 10.1017/s0954579413000692
- Cassidy, J., Sherman, L. J., & Jones, J. D. (2012). What's in a word? Linguistic characteristics of Adult Attachment Interviews. *Attachment and Human Development*, 14(1), 11-32. doi: 10.1080/14616734.2012.636649
- Cohn, D., Silver, D. H., Cowan, C. P., Cowan, P. A., & Pearson, J. (1992). Working Models of Childhood Attachment and Couple Relationships. *Journal of Family Issues* 13(4), 432-449. doi: 10.1177/019251392013004003
- Crowell, J. A., & Feldman, S. S. (1988). Mothers' Internal Models of Relationships and Children's Behavioral and Developmental Status: A Study of Mother-Child Interaction. *Child Development*, 59(5), 1273-1285. Retrieved from <http://www.jstor.org/stable/1130490>
- Crowell, J. A., Fraley, C. R., & Shaver, P. R. (2008). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical application* (2nd ed., pp. 599-634). New York: Guildford.
- Cummings, E. M., & Cicchetti, D. (1990). Toward a transactional model of relations between attachment and depression. In M. T. Greenberg, D. Cicchetti & E. M. Cummings (Eds.), *Attachment in the preschool years* (pp. 339-372). Chicago: University of Chicago Press.
- De Wolff, M. S., & Van IJzendoorn, M. H. (1997). Sensitivity and attachment: a meta-analysis of the parental antecedents of infant attachment. *Child Development*, 68(4), 571-591. Retrieved from doi:10.1111/j.1467-8624.1997.tb04218.x
- Dewitte, M., Koster, E. H. W., De Houwer, J., & Buysse, A. (2007). Attentive processing of threat and adult attachment: A dot-probe study. *Behaviour Research and Therapy*, 45(6), 1307-1317. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-34247168689&partnerID=40&md5=fbe4f4c40b67d11c05473f24e5f51b95>
- Dozier, M., & Bernard, K. (2017). Attachment and Biobehavioral Catch-up: addressing the needs of infants and toddlers exposed to inadequate or problematic caregiving. [Review]. *Current Opinion in Psychology*, 15, 111-117. doi: 10.1016/j.copsyc.2017.03.003
- Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: theory and evidence. *Psychological Bulletin*, 137(1), 19-46. Retrieved from doi:10.1037/a0021367
- Farel, A. M., Freeman, V. A., Keenan, N. L., & Huber, C. J. (1991). Interaction between high-risk infants and their mothers: the NCAST as an assessment tool. *Research in nursing & health*, 14(2), 109-118.
- Feeney, J. (2000). Implications of attachment style for patterns of health and illness. *Child: Care, Health and Development*, 26(4), 277-288. Retrieved from doi:10.1046/j.1365-2214.2000.00146.x

- Fonagy, P. (2001). *Attachment Theory and Psychoanalysis*. London: Karnac.
- Fonagy, P., & Target, M. (2005). Bridging the transmission gap: An end to an important mystery of attachment research? *Attachment and Human Development*, 7(3), 333-343. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-27744441028&partnerID=40&md5=917097e48f5729922a91055ae9371f8e>
- Fraley, R. C., Garner, J. P., & Shaver, P. R. (2000). Adult attachment and the defensive regulation of attention and memory: Examining the role of preemptive and postemptive defensive processes. *Journal of Personality and Social Psychology*, 79(5), 816-826. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0034330765&partnerID=40&md5=5576f7adf457e5b590f6016bd8f2d561>
- George, C., Kaplan, N., & Main, M. (1985). *Adult Attachment Interview Protocol*. (2nd ed). Unpublished manuscript. University of California. Berkeley.
- George, C., & Solomon, J. (2008). The caregiving system: a behavioural Systems approach to parenting. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research and Clinical Applications* (2nd ed., pp. 833-854). New York: Guilford.
- Ghera, M. M., Hane, A. A., Malesa, E. E., & Fox, N. A. (2006). The role of infant soothability in the relation between infant negativity and maternal sensitivity. *Infant Behaviour and Development*, 29, 289-293. Retrieved from doi:10.1016/j.infbeh.2005.09.003
- Goodall, K., Trejnowska, A., & Darling, S. (2012). The relationship between dispositional mindfulness, attachment security and emotional regulation. *Personality and Individual Differences*, 52, 622-626. Retrieved from doi:10.1016/j.paid.2011.12.008
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54. Retrieved from doi:<http://dx.doi.org.ezproxy.uow.edu.au/10.1023/B:JOBA.0000007455.08539.94>
- Griffin, D., & Bartholomew, K. (1994). Models of the Self and Other: Fundamental Dimensions Underlying Measures of Adult Attachment. *Journal of Personality and Social Psychology*, 67(3), 430-445. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0009239845&partnerID=40&md5=9e72cc20a26476063c60ac2aff2ca49b>
- Groom, C. J., & Pennebaker, J. W. (2002). Words. *Journal of Research in Personality*, 36, 615-621.
- Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. [Article]. *Nature*, 450(7169), 557-559. doi: 10.1038/nature06288
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium *Communication Monographs*, 76(4), 408-420. doi:
- Henning, A., & Striano, T. (2011). Infant and Maternal Sensitivity to Interpersonal Timing. *Child Development*, 82(3), 916-931. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-79955619791&partnerID=40&md5=ac741fbd39dac6fbf6a9e2ab670ca03a> doi:10.1111/j.1467-8624.2010.01574.x
- Hesse, E. (2008). The Adult Attachment Interview: Protocol, methods of analysis, and empirical studies In J. Cassidy & P. Shaver (Eds.), *Handbook of*

- attachment: Theory, research and clinical applications* (2nd ed., pp. 552-598). New York: Guilford Press.
- Holmes, B. M., & Lyons-Ruth, K. (2008). The relationship questionnaire-clinical version (RQ-CV): introducing a profoundly-distrustful attachment style. *Infant Mental Health Journal*, 27(3), 310-325. Retrieved from doi:10.1002/imhj.20094
- Johnson, S. C., Dweck, C. S., Chen, F. S., Stern, H. L., Ok, S.-J., & Barth, M. (2010). At the Intersection of Social and Cognitive Development: Internal Working Models of Attachment in Infancy. *Cognitive Science*, 34, 807-825. doi: 10.1111/j.1551-6709.2010.01112.x
- Jones, K. C., Welton, S. R., Oliver, T. C., & Thoburn, J. W. (2011). Mindfulness, spousal attachment, and marital satisfaction: A mediated model. *Family Journal*, 19(4), 357-361. Retrieved from
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144-156. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-2542438512&partnerID=40&md5=c21ac79ed5e3d860d7b54fe7719585c1>
- Kessler, R. C., & Bromet, E. J. (2013). The Epidemiology of Depression Across Cultures. *Annu. Rev. Public Health* 34, 119-138. doi: 10.1146/annurev-publhealth-031912-114409
- Laurent, H. K., & Ablow, J. C. (2012). The missing link: Mothers' neural response to infant cry related to infant attachment behaviors. *Infant Behaviour and Development*, 35, 761-772. Retrieved from doi:10.1016/j.infbeh.2012.07.007
- Lee, J. S., & Koo, H. J. (2015). The relationship between adult attachment and depression in Korean mothers during the first 2 years postpartum: A moderated mediation model of self-esteem and maternal efficacy. *Personality and Individual Differences*, 79, 50-56. doi: 10.1016/j.paid.2015.01.021
- Leigh, J. (2013). Secure attachment and autonomy orientation may foster mindfulness. *Contemporary Buddhism*, 14(2), 265-283. doi: 10.1080/14639947.2013.832082
- Little, R. J. A. (1988). A Test of Missing Completely at Random for Multivariate Data with Missing Values. *Journal of the American Statistical Association*, 83(404), 1198-1202. doi: 10.2307/2290157
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. Sydney: Psychology Foundation.
- Main, M., & Cassidy, J. (1988). Categories of Response to Reunion With the Parent at Age 6: Predictable From Infant Attachment Classifications and Stable Over a 1-Month Period. *Developmental Psychology*, 24(3), 415-426. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-58149366179&partnerID=40&md5=10211c919ab72a49377f13dc102fadca>
- McDonald, H. M., Sherman, K. A., Petocz, P., Kangas, M., Grant, K.-A., & Kasparian, N. A. (2016). Mindfulness and the Experience of Psychological Distress: the Mediating Effects of Emotion Regulation and Attachment Anxiety. *Mindfulness*, 7(4), 798-808. doi: 10.1007/s12671-016-0517-9
- Medeiros, C., João Gouveia, M., Canavarro, M. C., & Moreira, H. (2016). The Indirect Effect of the Mindful Parenting of Mothers and Fathers on the Child's Perceived Well-Being Through the Child's Attachment to Parents. *Mindfulness*, 7(4), 916-927. doi: 10.1007/s12671-016-0530-z

- Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry*, 42(5), 637-648. Retrieved from doi:10.1111/1469-7610.00759
- Mesman, J., Oster, H., & Camras, L. (2012). Parental sensitivity to infant distress: what do discrete negative emotions have to do with it? *Attachment and Human Development*, 14(4), 337-348. Retrieved from doi:10.1080/14616734.2012.691649
- Mesman, J., van IJzendoorn, M., Behrens, K., Carbonell, O. A., Ca'rcamo, R., Cohen-Paraira, I., . . . Zreik, G. (2016). Is the ideal mother a sensitive mother? Beliefs about early childhood parenting in mothers across the globe. *International Journal of Behavioral Development*, 40(5), 385-397. doi: 10.1177/0165025415594030
- Mitchell, M., & Heads, G. (2015). Staying Well: A Follow Up of a 5-Week Mindfulness Based Stress Reduction Programme for a Range of Psychological Issues. [Article]. *Community Mental Health Journal*, 51(8), 897-902. doi: 10.1007/s10597-014-9825-5
- Murray, C. J. L., & Lopez, A. D. (Eds.). (1996). *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020* Cambridge, MA: : Harvard Univ. Press.
- Musser, E. D., Kaiser-Laurent, H., & Ablow, J. C. (2012). The neural correlates of maternal sensitivity: An fMRI study. *Developmental Cognitive Neuroscience*, 2(4), 428-436. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1878929312000436> doi:<http://dx.doi.org/10.1016/j.dcn.2012.04.003>
- Parent, J., McKee, L. G., Rough, J. N., & Forehand, R. (2016). The Association of Parent Mindfulness with Parenting and Youth Psychopathology Across Three Developmental Stages. *Journal of abnormal child psychology*, 44(1), 191-202. doi: 10.1007/s10802-015-9978-x
- Pederson, D. R., Gleason, K. E., Moran, G., & Bento, S. (1998a). Maternal attachment representations, maternal sensitivity and the infant mother attachment relationship. *Developmental Psychology*, 34(5), 925-933.
- Pederson, D. R., Gleason, K. E., Moran, G., & Bento, S. (1998b). Maternal attachment representations, maternal sensitivity, and the infant-mother attachment relationship. *Developmental Psychology*, 34(5), 925-933. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0032150154&partnerID=40&md5=758cfbab533fed88d2111d525516e55b>
- Pennebaker, J. W., Chung, K. C., Ireland, M., Gonzales, A., & Booth, R. J. (2007). *The development and psychometric properties of LIWC2007*. Austin, Texas: LIWC.net.
- Pepping, C. A., Davis, P. J., & O'Donovan, A. (2013). Individual differences in attachment and dispositional mindfulness: The mediating role of emotion regulation. *Personality and Individual Differences*, 54(3), 453-456.
- Pepping, C. A., Davis, P. J., & O'Donovan, A. (2015). The association between state attachment security and state mindfulness. *PLoS ONE*, 10(3). doi: 10.1371/journal.pone.0116779
- Pepping, C. A., & Duvenage, M. (2016). The origins of individual differences in dispositional mindfulness

- . *Personality and individual differences*, 93, 130-136. doi: 10.1016/j.paid.2015.05.027
- Pepping, C. A., O'Donovan, A., Zimmer-Gembeck, M. J., & Hanisch, M. (2014). Is emotion regulation the process underlying the relationship between low mindfulness and psychosocial distress? *Australian Journal of Psychology*, 66(2), 130-138. doi: 10.1111/ajpy.12050
- Peters, J. R., Eisenlohr-Mohl, T. A., & Smart, L. M. (2016). Dispositional mindfulness and rejection sensitivity: The critical role of nonjudgment. *Personality and individual differences*, 93, 125-129. doi: 10.1016/j.paid.2015.06.029
- Pickard, J., Townsend, M., Caputi, P., & Grenyer, B. F. S. (2017). Observing the influence of mindfulness and attachment styles through mother and infant interaction: A longitudinal study. *Infant Mental Health* doi: 10.1002/imhj.21645
- Pickard, J. A., Caputi, P., & Grenyer, B. F. S. (2016). Mindfulness and emotional regulation as sequential mediators in the relationship between attachment security and depression. *Personality and Individual Differences*, 99, 179-183. doi: 10.1016/j.paid.2016.04.091
- Polan, H. J., & Hofer, M. A. (2008). Psychobiological Origins of Infant Attachment and its role in development. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research and Clinical Applications* (Vol. 2nd, pp. 158-172). New York: Guilford Press.
- Reis, S., & Grenyer, B. F. S. (2004). Fearful attachment, working alliance and treatment response for individuals with major depression. *Clinical Psychology and Psychotherapy*, 11(6), 414-424. doi: 10.1002/cpp.428
- Reis, S. L., & Grenyer, B. F. S. (2002). Pathways to anaclitic and introjective depression. *Psychology and Psychotherapy: Theory, Research and Practice*, 75, 445-459.
- Roepke, A. M., & Seligman, M. E. P. (2015). Depression and prospection. *British Journal of Clinical Psychology*. doi: 10.1111/bjc.12087
- Roisman, G. I., Padrón, E., Sroufe, L. A., & Egeland, B. (2002). Earned-secure attachment status in retrospect and prospect. *Child Development*, 73(4), 1204-1219. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0036655019&partnerID=40&md5=0d9c39111badb10b26f16e09eeca2364>
- Rutherford, H. J. V., Wallace, N. S., Laurent, H. K., & Mayes, L. C. (2015). Emotion regulation in parenthood. *Developmental Review*, 36, 1-14. doi: <http://dx.doi.org.ezproxy.uow.edu.au/10.1016/j.dr.2014.12.008>
- Ryan, R. M., Brown, K. W., & Creswell, J. D. (2007). How integrative is attachment theory? Unpacking the meaning and significance of felt security. *Psychological Inquiry: An International Journal for the Advancement of Psychological Theory*, 18(3), 177-182. Retrieved from doi:10.1080/10478400701512778
- Sameroff, A. (2009). The Transactional Model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3-21). Washington, D.C. : American Psychological Association.

- Schaffer, H. R., & Emerson, P. E. (1964a). The development of social attachments in infancy. *Monographs of the Society for Research in Child Development*, 29(3), 1-77. Retrieved from <http://www.jstor.org/stable/1165727> .
- Schore, A. N. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal*, 22(1-2), 7-66. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0002194118&partnerID=40&md5=74710e064d739e938d4218a537c55393>
- Shaver, P. R., Lavy, S., Saron, C. D., & Mikulincer, M. (2007). Social foundations of the capacity for mindfulness: An attachment perspective. *Psychological Inquiry*, 18(4), 264-271. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-36349000584&partnerID=40&md5=4b68cd73509be8ba41c6155d5af2b120>
- Siegel, D. J. (2001). Toward an interpersonal neurobiology of the developing mind: Attachment relationships, "mindsight," and neural integration. *Infant Mental Health Journal*, 22(1-2), 67-94. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-0001875245&partnerID=40&md5=12b085a823caefa553b8a421eed52738>
- Siegel, D. J. (2007a). *The Mindful Brain - Reflection and Attunement in the Cultivation of Well-Being*. . New York: W.W. Norton & Company.
- Siegel, D. J. (2007b). Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of well-being. *Social Cognitive and Affective Neuroscience*, 2(4), 259-263. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-36549002330&partnerID=40&md5=0693c60cecf74df281a309d38e4da7ca>
doi:10.1093/scan/nsm034
- Sillars, A., Shellen, W., McIntosh, A., & Momegranate, M. (1997). Relational characteristics of language: Elaboration and differentiation in marital conversations. *Western Journal of Communication*, 61(4), 403-422.
- Simmons, R. A., Chambless, D. L., & Gordon, P. C. (2008). How do Hostile and Emotionally Overinvolved Relatives View Relationships?: What Relatives' Pronoun Use Tells Us. *Family Process*, 47(3), 405-419. doi: 10.1111/j.1545-5300.2008.00261.x
- Simmons, R. A., Gordon, P. C., & Chambless, D. L. (2005). Pronouns in Marital Interaction: What Do "You" and "I" Say About Marital Health? *Psychological Science*, 16(12), 932-9236. doi: 10.1111/j.1467-9280.2005.01639.x
- Snyder, R., Shapiro, S., & Treleaven, D. (2012). Attachment Theory and Mindfulness. *Journal of Child and Family Studies*, 21(5), 709-717. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-84866266599&partnerID=40&md5=cf82bb30a3f72428c88ca281d7c12f0e>
- Sroufe, L. A. (2005). Attachment and development: A prospective longitudinal study from birth to adulthood. *Attachment and Human Development*, 7(4), 349-367. Retrieved from doi:10.1080/14616730500365928
- Sroufe, L. A., Egeland, B., Carlson, E., & Collins, W. A. (2005a). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: Guildford.
- Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, 45(4), 249-257. doi: 10.1080/00050067.2010.482109

- Summer, G., & Spietz, A. (1994a). *NCAST Caregiver/ Parent-Child Teaching Manual*. Seattle: NCAST Publications.
- Summer, G., & Spietz, A. (1994b). *NCAST Caregiver/Parent-Child Feeding Manual*. Seattle: NCAST Publications.
- Tani, F., Peterson, C., & Smorti, M. (2016). The Words of Violence: Autobiographical Narratives of Abused Women. *Journal of family violence*, 1-12. doi: 10.1007/s10896-016-9824-0
- Thorberg, F. A., & Lyvers, M. (2010). Attachment in relation to affect regulation and interpersonal functioning among substance use disorder in patients. *Addiction and Research Theory*, 18(4), 464-478. Retrieved from doi:10.3109/16066350903254783
- Van IJzendoorn, M. H. (1995). Adult Attachment Representations, Parental Responsiveness, and Infant Attachment: A Meta-Analysis on the Predictive Validity of the Adult Attachment Interview. *Psychological Bulletin*, 117(3), 387-403. Retrieved from doi:10.1037/0033-2909.117.3.387
- Van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (1996). Attachment Representations in Mothers, Fathers, Adolescents, and Clinical Groups: A Meta-Analytic Search for Normative Data. *Journal of Consulting and Clinical Psychology*, 64(1), 8-21. Retrieved from
- Van IJzendoorn, M. H., Juffer, F., & Duyvesteyn, M. G. C. (1995). Breaking the intergenerational cycle of insecure attachment: a review of the effects of attachment-based interventions on maternal sensitivity and infant security. *Journal of Child Psychology and Psychiatry*, 36(2), 225-248. Retrieved from doi:10.1111/j.1469-7610.1995.tb01822.x
- Waters, H. S., & Waters, E. (2006). The attachment working models concept: Among other things, we build script-like representations of secure base experiences. *Attachment and Human Development*, 8(3), 185-197.
- Waters, T. E. A., Haydon, K. C., Steele, R. D., Roisman, G. I., & Booth-LaForce, C. (2016). A linguistic inquiry and word count analysis of the Adult Attachment Interview in two large corpora. *Canadian journal of behavioural science*, 48(1), 78-88. doi: 10.1037/cbs0000035
- Wenlei, M. A. (Producer). (2014, June 16, 2016). How does your salary stack up against the rest of Australia? Retrieved from <http://www.news.com.au/finance/work/careers/how-does-your-salary-stack-up-against-the-rest-of-australia/news-story/72b44644b531ad10bc1a8051f016ac6c>

Appendix

Appendix A

The interview was comprised of questions were selected from the Adult Attachment Interview (George, Kaplan & Main, 1985) and developed questions. They included:

1a. I'd like to ask you to choose five adjectives or words that reflect your relationship with your mother starting from as far back as you can remember in early childhood--as early as you can go, but say, age 5 to 12 is fine. I know this may take a bit of time, so go ahead and think for a minute...then I'd like to ask you why you chose them. I'll write each one down as you give them to me.

1b. I'd like to ask you to choose five adjectives or words that reflect your childhood relationship with your father, again starting from as far back as you can remember in early childhood--as early as you can go, but again say, age 5 to 12 is fine. I know this may take a bit of time, so go ahead and think again for a minute...then I'd like to ask you why you chose them. I'll write each one down as you give them to me.

2. Now I wonder if you could tell me, to which parent did you feel the closest, and why? Why isn't there this feeling with the other parent?

3. Did you ever feel rejected as a young child? Of course, looking back on it now, you may realize it wasn't really rejection, but what I'm trying to ask about here is whether you remember ever having rejected in childhood

4. Why do you think your parents behaved as they did during your childhood?
5. Did you experience the loss of a parent or other close loved one while you were a young child--for example, a sibling, or a close family member?
6. In general, How do you think your overall experiences with you parents have affected your adult personality? Are there any aspects to your early experiences that you feel were a set-back in your development?
7. Were there many changes in your relationship with your parents (or remaining parent) after childhood?
8. What is your relationship with your parents (or remaining parent) like for you now as an adult? Here I am asking about your current relationship.

Developed questions

1. Tell me about your life right now, the good and the bad, what it's like for you?
(reference)
2. What do you imagine parenting will be like for you? Prompt: What will you enjoy? What do you imagine will be challenging?
3. How do you feel about your baby at the moment?

4. What do you think your baby's birth will be like?

5. What do you think life will be like in ten months' time? Prompt: Who will be involved with the baby? What support will you have?

Appendix B

Five Facet Mindfulness Questionnaire (Baer, et al., 2006)

This instrument is based on a factor analytic study of five independently developed mindfulness questionnaires. The analysis yielded five factors that appear to represent elements of mindfulness as it is currently conceptualized. The five facets are observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5
never or very rarely true	very rarely	sometimes true	often true	very often or always true

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

- ____ 12. It's hard for me to find the words to describe what I'm thinking.
- ____ 13. I am easily distracted.
- ____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- ____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
- ____ 16. I have trouble thinking of the right words to express how I feel about things.
- ____ 17. I make judgments about whether my thoughts are good or bad.
- ____ 18. I find it difficult to stay focused on what's happening in the present.
- ____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
- ____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- ____ 21. In difficult situations, I can pause without immediately reacting.
- ____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- ____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.
- ____ 24. When I have distressing thoughts or images, I feel calm soon after.
- ____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.
- ____ 26. I notice the smells and aromas of things.
- ____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.
- ____ 28. I rush through activities without being really attentive to them.
- ____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.
- ____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
- ____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- ____ 32. My natural tendency is to put my experiences into words.

- _____ 33. When I have distressing thoughts or images, I just notice them and let them go.
- _____ 34. I do jobs or tasks automatically without being aware of what I'm doing.
- _____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
- _____ 36. I pay attention to how my emotions affect my thoughts and behavior.
- _____ 37. I can usually describe how I feel at the moment in considerable detail.
- _____ 38. I find myself doing things without paying attention.
- _____ 39. I disapprove of myself when I have irrational ideas.

Scoring Information:

Observe items: 1, 6, 11, 15, 20, 26, 31, 36

Describe items: 2, 7, 12R, 16R, 22R, 27, 32, 37

Act with Awareness items: 5R, 8R, 13R, 18R, 23R, 28R, 34R, 38R

Non-judge items: 3R, 10R, 14R, 17R, 25R, 30R, 35R, 39R

Non-react items: 4, 9, 19, 21, 24, 29, 33

Appendix C

Difficulty in Emotional Regulation Scale (Gratz & Roemer, 2004)

	1 (0-10%) Almost never	2 (11-35%) Sometimes	3 (36-65%) About half of the time	4 (66-90%) Most of the time	5 (91-100%) Almost always
1. I am clear about my feelings					
2. I pay attention to how I feel					
3. I experience my emotions as overwhelming and out of control					
4. I have no idea how I am feeling					
5. I have difficulty making sense out of how I am feeling					
6. I am attentive to my feelings					
7. I know exactly how I am feeling					
8. I care about what I am feeling					
9. I am confused about how I feel					
10. When I'm upset, I acknowledge my emotions					
11. When I'm upset, I become angry with myself for feeling that way					
12. When I'm upset, I become embarrassed for feeling that way					
13. When I'm upset, I have difficulty getting work done					
14. When I'm upset, I become out of control					
15. When I'm upset, I believe that I will remain that way for a long time					
16. When I'm upset, I believe that I'll end up feeling depressed					

	1 (0-10%) Almost never	2 (11-35%) Sometimes	3 (36-65%) About half of the time	4 (66-90%) Most of the time	5 (91-100%) Almost always
18. When I am upset, I have difficulty focusing on other things					
19. When I'm upset, I feel out of control					
20. When I'm upset, I can still get things done					
21. When I'm upset, I feel ashamed with myself for feeling that way					
22. When I'm upset, I know I can find a way to eventually feel better					
23. When I'm upset, I feel that I am weak					
24. When I'm upset, I feel like I can remain in control of my behaviours					
25. When I'm upset, I feel guilty for feeling that way					
26. When I'm upset, I have difficulty concentrating					
27. When I'm upset, I have difficulty controlling my behaviours					
28. When I'm upset, I believe that there is nothing I can do to make myself feel better					
29. When I'm upset, I become irritated with myself for feeling that way					
30. When I'm upset, I start to feel very bad about myself					
31. When I'm upset, I believe that wallowing in it is all I can do					
32. When I'm upset, I lose control over my behaviours					
33. When I'm upset, I have difficulty thinking about anything else					
34. When I'm upset, I take time to figure out what I'm really feeling					
35. When I'm upset, it takes me a long time to feel better					
36.. When I'm upset, my emotions feel overwhelming					

Appendix D.

Relationship Questionnaire – Clinical Version (RQ-CV) (Holmes & Lyons-Ruth, 2008)

Following are five general relationship styles that people often report. Place a checkmark next to the letter corresponding to the style that best describes you or is closest to the way you are.

____ A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

____ B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

____ C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

____ D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

Now please rate each of the relationship styles above to indicate how well or poorly each description corresponds to your general relationship style.

Style A

1	2	3	4	5	6	7
Disagree			Neutral/			Strongly
Strongly			Mixed			Agree

Style B

1	2	3	4	5	6	7
Disagree			Neutral/			Strongly
Strongly			Mixed			Agree

Style C

1	2	3	4	5	6	7
Disagree			Neutral/			Strongly
Strongly			Mixed			Agree

Style D

1	2	3	4	5	6	7
Disagree			Neutral/			Strongly
Strongly			Mixed			Agree

Style E

1	2	3	4	5	6	7
Disagree			Neutral/			Strongly
Strongly			Mixed			Agree

Appendix E

DASS (Lovibond & Lovibond, 1995)

Please read each statement and circle a number 0, 1, 2 or 3, which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I just couldn't seem to get going	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I had a feeling of shakiness (eg, legs going to give way)	0	1	2	3
8	I found it difficult to relax	0	1	2	3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting upset rather easily	0	1	2	3
12	I felt that I was using a lot of nervous energy	0	1	2	3
13	I felt sad and depressed	0	1	2	3
14	I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting)	0	1	2	3
15	I had a feeling of faintness	0	1	2	3
16	I felt that I had lost interest in just about everything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3

<i>Reminder of rating scale:</i>			
0 Did not apply to me at all			
1 Applied to me to some degree, or some of the time			
2 Applied to me to a considerable degree, or a good part of time			
3 Applied to me very much, or most of the time			
20	I felt scared without any good reason	0	1 2 3
21	I felt that life wasn't worthwhile	0	1 2 3
22	I found it hard to wind down	0	1 2 3
23	I had difficulty in swallowing	0	1 2 3
24	I couldn't seem to get any enjoyment out of the things I did	0	1 2 3
25	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1 2 3
26	I felt down-hearted and blue	0	1 2 3
27	I felt that I was very irritable	0	1 2 3
28	I felt I was close to panic	0	1 2 3
29	I found it hard to calm down after something upset me	0	1 2 3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1 2 3
31	I was unable to become enthusiastic about anything	0	1 2 3
32	I found it difficult to tolerate interruptions to what I was doing	0	1 2 3
33	I was in a state of nervous tension	0	1 2 3
34	I felt I was pretty worthless	0	1 2 3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1 2 3
36	I felt terrified	0	1 2 3
37	I could see nothing in the future to be hopeful about	0	1 2 3
38	I could see nothing in the future to be hopeful about	0	1 2 3
39	I found myself getting agitated	0	1 2 3
40	I was worried about situations in which I might panic and make a fool of myself	0	1 2 3
41	I experienced trembling (e.g., in the hands)	0	1 2 3
42	I found it difficult to work up the initiative to do things	0	1 2 3

Table 1. Study 2. Spearman correlations between NCAST variables and relationship styles N = 37

Variable	1	2	3	4	5	6	7	8	9	10	11.	12
1. Sensitivity to cues	-								-			
2. Response to distress	.15	-										
3. Social Emotional Growth	.55**	.15	-									
4. Cognitive growth fostering	.36*	.10	.59**	-								
5. Caregiver total	.67**	.36*	.82**	.83**	-							
6. Clarity of cues	.48**	-.12	.32	.30	.36*	-						
7. Response to caregiver	.49**	-.01	.57**	.67**	.69**	.59**	-					
8. Infant total	.56**	-.04	.52**	.57**	.63**	.82**	.93**	-				
9. Secure	.47	.43**	.05	.10	.17	.04	.07	.08	-			
10. Preoccupied	.20	-.33*	-.02	.11	.06	.16	.34*	.31	-.46**	-		
11. Dismissive	.21	-.17	.11	-.08	.05	.16	.12	.17	-.32	.26	-	
12. Fearful	.02	-.40*	-.05	-.12	-.13	.08	.16	.16	-.68**	.53**	.49**	-

Appendix F.