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TOWARD THE DEVELOPMENT OF A RIGOROUS AND QUANTITATIVE THEORY OF EMOTIONAL BONDING IN VULNERABILITY

by

Camille Joy-Ann Gennevieve Reid

A thesis submitted in fulfillment of the requirements for the degree of
Master of Arts

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School of Social Sciences
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The University of the South Pacific

April, 2015
DECLARATION

Statement by Author

I, Camille Joy-Ann Gennevieve Reid, declare that this thesis is my own work and that, to the best of my knowledge, it contains no materials previously published, or substantially overlapping with material submitted for the award of any other degree at any institution, except where due acknowledgement is made in the text.

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February 6, 2015

Statement by Supervisor

The research in this thesis was performed under my supervision and to my knowledge is the sole work of Ms. Camille Joy-Ann Gennevieve Reid.

Signature ........................................... Date .............................................
Name ..........................................................
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Robert Epstein, PhD
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February 8, 2015
DEDICATION

I wish to dedicate this work to my dad, Collin Dave Reid, and my mom, Carol Margaret Reid, who have been so supportive and encouraging throughout this entire process. Thanks for the countless sacrifices and accommodations you have made for me and for being a tower of strength. I once read that, “the future belongs to those who believe in the beauty of their dreams,” a quote from Eleanor Roosevelt. Thanks for believing in me; even over the distance, you have always inspired me.

May my life continue to honor you.
ACKNOWLEDGEMENT

Now that I reflect, it is amazing how many persons and agencies have played a significant role in making this project a reality. I can honestly say that without the input of the following persons, this would not have been at all possible.

I wish to acknowledge the tremendous support and input of my supervisor, Professor Robert Epstein, whose high standards and expectations created an environment that forced me to grow and learn so much in the space of a year. You have always made yourself available and willing to assist. I want to thank you sincerely and say that because of you, my academic work from hereon will always reflect the indelible stamp of excellence you have taught me to always strive for. Thank you Sir.

I wish to thank the Caribbean-Pacific Inter-Island Mobility Scheme Committee for awarding me with not only a scholarship, but an experience of a lifetime. It had been my desire to pursue a master’s degree for so long that when this opportunity was given to me, it really was a dream come true. The experience has been wonderful and I wish to single out Mr. Miguel Lance Dindial, whose professionalism and support meant a lot as I embarked on this journey.

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I wish to thank my family and friends for their practical input. In this regard, I wish to thank Tamica Codd and Rolando Cocom who never seemed to tire of providing peer reviews for my work, even though it that was outside the scope of their area of specialization. I also wish to thank Jasmine Benjamin who is a friend like no other. Through your constant encouragement, thoughtfulness and prayers, you have kept me balanced. To my parents, Collin and Carol Reid, who have done everything possible to support me on this journey, mere words cannot express my love and appreciation to you.

Above all, I wish to thank God, the source of all goodness. I know I am truly loved and blessed at times like these when I reflect and realize that all things have worked together so perfectly. It has always been you. Thank you.
Abstract

This research was designed to test the Vulnerability Theory of Emotional Bonding (VTEB), which posits that new emotional bonds are formed between two individuals, or existing emotional bonds between two individuals are strengthened, when circumstances arise in which one or both individuals become vulnerable in the presence of the other person. For the purpose of scientific study, vulnerability is operationalized as a need with which the other person can empathize, where both need and empathy are assumed to be measurable variables. Stated formally, VTEB can be expressed as follows: \( B = f(N_1, N_2, E_1, E_2) \), where \( B \) is the strength of the resulting bond, \( N_1 \) and \( N_2 \) are the levels of need expressed by the two individuals, respectfully, and \( E_1 \) and \( E_2 \) are the levels of empathy expressed by the two individuals, respectfully. The theory was tested in two online experiments. Experiment 1 employed 1,000 participants from the United States of America and Experiment 2 employed 114 participants from the Republic of Fiji. In each experiment, participants were randomly assigned to one of four groups in which they viewed a video recording of a confederate who displayed varying levels of need and empathy. Pretest scores from Experiment 1, but not Experiment 2, showed that participants across all four conditions showed no difference in state of vulnerability or emotional bond in a pretest, while posttest scores showed that as the confederate’s expressions of need and empathy increased, so too did the strength of the emotional bond the participants developed with the confederate. Results from Experiment 1 showed the role of Need to be inconsistent but Empathy to be a good and reliable predictor of Emotional Bonding, whereas the findings from Experiment 2 were difficult to interpret because of possible confounding variables. These findings, as well as the theory itself, are discussed in relation to related theories and research. Overall, the study demonstrates the viability of developing and testing a rigorous, quantitative theory of emotional bonding.
### ABBREVIATIONS

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<th>Description</th>
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<tr>
<td>KMO</td>
<td>Kaiser-Meyer Olkin</td>
</tr>
<tr>
<td>MTURK</td>
<td>Mechanical Turk</td>
</tr>
<tr>
<td>OT</td>
<td>Oxytoxin</td>
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<td>VTEB</td>
<td>Vulnerability Theory of Emotional Bonding</td>
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Chapter 1 Introduction

Overview

This research paper examines the Vulnerability Theory of Emotional Bonding (VTEB), and this chapter is dedicated to describing the context in which the study is situated. First, the significance of this research is discussed, specifically addressing how the subject matter relates to existing social issues. Previous research findings relevant to this phenomenon are also discussed, as well as the implications of this research in light of inadequate scholarly and scientific material offering insight into this particular aspect of emotional bonding.

This chapter also sets the parameters of the study by outlining the specific aim and hypotheses which frame the scope of the research. The ontological, epistemological and methodological underpinnings of this research are subsequently discussed, and this entails the researcher’s epistemological and personal reflexivity. The chapter then closes with a summation.

Significance of the Study

Once there is life there is vulnerability. It is an inseparable part of our existence. While it is true that the extent of vulnerability experienced may vary greatly from person to person or from one group to another, vulnerability remains a natural feature of all life.

Despite extensive research carried out in this area, it appears mankind has not made much progress in addressing the issue of vulnerability. This may be due in part
to research conducted in this area focusing mainly on the plight associated with the vulnerability of special groups. While it is important to focus on these special groups, there is also a need to understand how vulnerability impacts human beings collectively since it is a universal concept. This study tackles this issue in part by acknowledging vulnerability as a human universal and examining its possible role as an essential factor in instigating emotional bonding in humans.

**The portrayal of vulnerability.** There has been an overwhelming tendency by welfare and development agencies, in research and academia in general, to portray only the adverse consequences of vulnerability and the failure to highlight the equally positive aspects of vulnerability has led to its overall negative perception. The term has come to connote a weak state of being that is most undesirable (Council for International Organizations of Medical Sciences, 2002; Luna, 2009; A. Werner & Malterud, 2005). In the area of social interactions, this overreaching unfavorable characterization of vulnerability is a grave misconception that has damaging implications for how one sees self and engages in relationships with others (Livingston, 2004). This is because individuals may deem their vulnerability as an ‘unflattering’ quality they need to overcome or conceal. However, achieving an invulnerable persona is an impractical goal and the use of self protective mechanisms to conceal one’s vulnerability can create an emotional distance with loved ones (Brené Brown, 2012).

This study therefore seeks to advance the constructive capacity of vulnerability as a vital component in the development of interpersonal relationships, since it is “our common vulnerability that bonds us and binds us to other people”
It is hoped that this view will lead to a more balanced understanding of vulnerability given its importance and existence as a natural aspect of all life.

**Understanding the importance of vulnerability in relationships.** This study is also significant as it responds to a growing demand for resources and information useful for sustaining healthy relationships. This demand has been ignited by fast changing realities that have challenged how relationships develop and are maintained. Symptoms of these challenges are evidenced by the significant rise in divorce rates (Weiner & Craighead, 2010), as well as the vast number of individuals and couples seeking counseling or psychotherapy and self-help resources for issues related to relationships (McLeod, 2013; Nemec, Cichocki, & Norcross, 2008).

In general, a human being’s need for stable and close relationships with others is almost as necessary as the need for food (Baumeister & Leary, 1995), so much so the quality of a person’s interpersonal relationships has significant implications on their physical and psychological health. Research has long shown that persons in relationships tend to have better overall health, longer life and are more likely to report a greater sense of well-being (Berscheid & Peplau, 1983; Lamanna & Riedmann, 2011; Woolfe, Dryden, & Strawbridge, 2003). It has also been discovered that even couples who remain in unhappy marriages tend to have better emotional health than those who divorce and eventually remarry (Waite et al., 2002; Waite, Luo, & Lewin, 2009). Yet, while relationships are a vital aspect of our lives, this does not mean they are easy to maintain. It is therefore necessary to pursue a greater understanding of how to achieve satisfying and long-lasting relationships.
Vulnerable emotions as an indicator of relationship success. In this regard, some researchers have emphasized the importance of delving deeper into the realm of emotions since people usually rely on their emotions to know whether they are fulfilled (Durana, 1996; McLaren, 2010; Stefanucci, Gagnon, & Lessard, 2011). This is because emotions are a physiological experience or state of awareness from which we derive information about our surroundings as opposed to feelings which are merely the conscious awareness of the emotion itself; prone to subjective interpretations (McLaren, 2010).

Emotions have been shown to directly influence reasoning (De Sousa, 1990; McLaren, 2010), motivation (Tomkins, 1980) and interpretations of events and behavior (S. Epstein, 1994; Lang, 1984; Leventhal, 1984; Stefanucci et al., 2011). Far from being irrational, as originally thought, emotions are the most uninhibited indicators of primal physiological and psychological needs (Stefanucci et al., 2011). Emotions are also able to effectively coordinate practical reactions in situations where an individual is faced with competing motivations (Tooby & Cosmides, 2008). For example, the motivation to satisfy hunger may be suppressed when immediate danger is present. Even more intriguing is that emotion can sometimes convey the feeling that something is amiss prior to finding actual confirmation of this. For instance, the feeling of being watched, which alerts individuals that their need for safety maybe threatened.

All this implies that emotion is the key component that navigates how an individual will interpret and think about their relationship, as well as how motivated that individual maybe to ensure its success. Additionally, it emphasizes the
importance of understanding which needs must be satisfied in order to experience fulfillment in relationships. This knowledge will prove particularly useful in the process of repairing failing relationships.

The objective of this research. The ultimate goal is to be able to help individuals feel comfortable expressing their vulnerability in ways that would be conducive to the development and maintenance of healthy relationships. Being able to assist individuals in embracing their vulnerability, would lead to significant improvements in relationship adjustment, cohesion and self-esteem (Durana, 1996). The challenge however, is transforming theoretical principles into practical behaviors or events. This study undertakes this challenge as it investigates and attempts to implement theoretical conclusions that emotional bonding takes place in the presence of vulnerability.

The knowledge produced from this study could enable individuals to gain control and find satisfaction in their relationships. The benefits of this would be far reaching, inclusive of health benefits, increases in work productivity, motivation and a positive sense of self-worth. The results yielded from this study would be of great interest in the areas of counseling, industrial and organizational psychology and the behavioral sciences in general.

Background of the Study

VTEB is a recent theory that has been gaining interest. Its premise lies in a widely observed phenomenon that has received relatively little attention in academic
research. This phenomenon has to do with how individuals in a state of vulnerability appear more likely to develop an emotional bond with others.

**The basis for an association between vulnerability and emotional bonding.** One of the best illustrations of this is seen among soldiers who fight together in a war. A war zone invokes a state of vulnerability as soldiers are constantly placed in life endangering situations. Soldiers fighting together in a war usually develop such strong emotional bonds that even their concern for self on the battlefield is minimized (Wong, Kolditz, Millen, & Potter, 2006). In a highly acclaimed study carried out by Stouffer and colleagues, it was found that the primary motivation for soldiers in combat was based on the strong emotional ties formed with other soldiers (Stouffer et al., 1949). This was reinforced by an accredited historian who noted that soldiers were more motivated to fight because they did not want to let their comrades down and seemed less interested in fighting for the actual cause of the war (Marshall, 1947).

Interestingly, the development of strong emotional bonds on the battle field is not just limited to bonds with other soldiers. Nearly all embedded media personnel covering the war would also develop very strong emotional bonds with soldiers charged with their protection (Wong et al., 2006). One media reporter in reflecting on the experience was quoted as saying, “I knew they [emotional bonds] would develop, I just didn’t know how strong they would be” (Wong et al., 2006, p. 14). This is especially important since it indicates that the bond shared on the battlefield cannot be attributed solely to military training, but rather to shared vulnerability on the battlefield.
Soldiers charged with the handling of military dogs also become very attached to the animals despite being trained to see them as expendable. A Staff Sergeant described this connection by saying, "These dogs are like our children. I'm closer to my dog than I am to anyone other than my wife" (Susman, 2008, February 25). Many soldiers became so close to their military dogs some requested to be buried with them if they were killed together (Susman, 2008, February 25). These sentiments indicate that there may be a stronger emotional bond between soldiers and their military dogs in battlefield settings than exists between pet owners and their pets in an ordinary household and what appears to account for this is the security soldiers and their military dogs provide for each other throughout a highly vulnerable period.

The battlefield situation is not the only condition which elicits a vulnerable state and seems to produce the formation of deep emotional bonds. There are bizarre cases where persons who have been kidnapped develop very strong emotional bonds with their captors. This phenomenon has been labeled “Stockholm syndrome”, after the location of a 1973 bank robbery that took place in Stockholm, Sweden where two bank robbers held three women and one man hostage for six days. In a strange twist of events the hostages supported their kidnappers and developed a fear of the law enforcement personnel who came to their rescue. After the hostages had been released, they vehemently defended their captors in the media. One female who had been taken hostage opened a legal defense fund on behalf of her captors, while another female hostage later became engaged to one of the robbers (Strentz, 1980). Even though this incident popularized the phenomenon of vulnerability and emotional bonding, similar cases had been recorded years before and continue to be observed in many hostage situations.
Admittedly, war zones and hostage situations are extreme cases. Nonetheless, these scenarios reveal invaluable information about how emotional bonds may form. Firstly, a common feature observed in these cases is that the individuals involved were in an emotionally and physically vulnerable state. This seems to suggest that there may be something about being in a state of vulnerability that primes individuals to bond emotionally.

Secondly, the process of forming deep emotional bonds while in a state of vulnerability is spurred on by what Clinical Psychologist Joseph Carver calls acts of ‘small kindness’ or a sincere display of what would be perceived to be a ‘soft side’ (Carver, 2007). Carver believes that this may account for the differences in cases where individuals in at risk situations actually form an emotional bond or not.

Using the battlefield illustration, soldiers seem to share a mutual concern for each other and were confident that their comrades felt the same. In the case of the 1973 Stockholm, Sweden bank robbery this can be inferred from the actions of the hostages who, while barricaded in a 3.3 x 14.3m vault, acted to protect the robbers and one of the hostages was quoted as saying, “This is our world now … sleeping in this vault to survive. Whoever threatens this world is our enemy” (Namnyak et al., 2008, p. 2).

Thirdly, it appears that the development of emotional bonds in a state of vulnerability occurs at a subconscious level. This is significant because if the process of bonding emotionally in a state of vulnerability does not emanate from conscious motive then one can assume it is almost an instinctual compulsion (De Fabrique,
Romano, Vecchi, & Van Hasselt, 2007). Therefore, this tendency should exist in all human beings, regardless of external social or cultural influences.

The fact that these concepts have been widely used by various media across the world gives credence to this. The movie industry for instance, is quite capable of persuading their audience to bond emotionally with a particular target despite that characters villainy. For instance, it is not uncommon for fans to identify with the actions of Walter White, a struggling high school chemistry teacher turned methamphetamine drug dealer in the American crime drama television series, Breaking Bad, which has been rated the best television series of all time by Guinness World Record (Janela, 2013, September 4). There are also many fans that will defend the actions of the psychopathic killer, Dexter Morgan, in the American TV drama series Dexter.

These observations where vulnerability seems consistently paired with emotional bonding may suggest a connection between these two variables. It is this premise that has laid the foundation for research into this area and to date, the research accumulated supports this notion. However, a more rigorous approach to understanding this phenomenon needs to be undertaken and it is hoped that the findings from this study can demonstrate whether a causal relationship exists between these two variables.

Within the next chapter, these and similar findings will be discussed in greater depth. It is hoped that by putting together what knowledge exists about emotional bonds, practical techniques can be produced which will enable individuals, couples, family members and even work colleagues to develop closer ties, especially in
instances where there maybe deep seated enmity. This study therefore pries open ‘vulnerability’ given its consistent association with emotional bonding and its influence on the dynamics of interpersonal relationships.

**The conception of VTEB.** When a theory is being tested, it is important to distinguish it from the review of other theories and scholarly literature presented in the literature review (Creswell, 2013). This subsection is therefore dedicated to outlining VTEB.

Proposed by Robert Epstein and colleagues in 2013, VTEB emerged out of observations which consistently pointed to an association between vulnerability and emotional bonding (R. Epstein, Pandit, & Thakar, 2013). VTEB posits that emotional bonds are forged in the presence of vulnerability.

The theory attempts to construct an explanation of the mechanisms involved in the process of emotional bonding, in order to understand the role it plays in human relations. In doing so, VTEB recognized that vulnerability comprises of two elements.

**The concept of need.** One of the elements which emerged after analyzing the connection between vulnerability and emotional bonding was that of “need.” Need is recognized as an integral aspect of vulnerability since, when an individual is in a vulnerable state, a need is at the core of this, such as a need for food, safety or belonging. Need can therefore be understood as a physical or psychological state of being which requires allayment.

Therefore, how vulnerable a person is may depend on the intensity of a need. For instance, hunger is a need for food, which if unfulfilled causes pain and
discomfort but starvation is a more intense need for food and nutrition since it can result in death if not fulfilled with some immediacy. Furthermore, ‘negative’ emotional states, such as loneliness, sadness or even anger, can be seen as signs of a deficiency or a need requiring allayment and can therefore be used as indicators of a need.

**The concept of empathy.** The second concept that emerged was that of “empathy.” Used in this context, empathy is studied not only from the point of view of the person experiencing it, but also from the point of view of the person perceiving it, since it can only be of consequence if it is interpreted as a sincere act or expression of that emotion. The way empathy is operationalized in this sense is very similar to Clinical Psychologist Joseph Carver’s use of acts of “small kindness” or the display of a “soft side.”

It is believed that empathy provides validation to a person who has a need and this is what may facilitate the bonding process. According to VTEB ‘need’ and ‘empathy’ are interlocking components which strengthen emotional bonds between individuals (R. Epstein et al., 2013). Low vulnerability refers to an absence of a state of need and empathy and is not associated with bonding. Moderate vulnerability refers to being in a state of either need or empathy, and is said to be predictive of a weak bond with a target in the counter component of vulnerability. High vulnerability refers to being in a state of need and empathy and is associated with strong emotional bonding with a target individual who is also in a state of high vulnerability. According to VTEB, when individuals have experiences that make them feel mutually vulnerable in each other’s presence, if they respond with empathy towards each other’s needs –
that is, when each person is needy and each person is supportive – a strong emotional bond is forged. The strength of an emotional bond can also be determined by understanding the intensity of the need-empathy dynamics between individuals. The main tenets of VTEB are simply outlined as follows:

1. If an individual expresses need and this is met with no empathy from another individual, then no bond will be formed.

2. If an individual expresses need and this is met with empathy from another individual, then a bond is established, albeit a weak bond.

3. If two individuals are in need simultaneously, and each shows empathy toward the other, a strong emotional bond is established.

The theory further asserts that the magnitude of the resulting emotional bond is functionally related to the need and empathy variables in a way that can be measured and represented quantitatively using the equation:

\[ B = f(E_1, E_2, N_1, N_2) \]

where \( B \) is the strength of the emotional bond formed, \( E_1 \) and \( E_2 \) are measures of empathy expressed by two people in a dyad, respectively, and \( N_1 \) and \( N_2 \) are measures of need expressed by two people in a dyad, respectively.

Based on these assertions, specific predictions can be made about the occurrence of emotional bonding. The three most basic predictions are as follows:

1. Of all possible combinations of need-empathy, the strongest emotional bond will be formed in dyads where high need and high empathy are mutual.
2. A weaker level of bonding will be formed when one person exhibits need and the other exhibits empathy toward that person.

3. Little or no bond will be formed when neither person exhibits need or empathy, or when one person shows need and the other person does not show empathy toward that person.

These predictions have yet to be tested under rigorous conditions. If confirmed, they will provide some support for VTEB and, more importantly, provide greater insight regarding how emotional bonds are formed.

Aim and Hypotheses

The aim of this research is to test the validity of VTEB, which asserts a causal relationship between vulnerability and emotional bonding, in which vulnerability leads to the formation of emotional bonds. According to this theory, vulnerability is measured by two key components: need and empathy. It is believed that an emotional bond is formed when an individual empathizes with an individual who is in need; the bond will be felt by both individuals in different degrees, depending on the circumstances. When two people who are in need simultaneously empathize with each other, the bond that forms is stronger. This research therefore poses the following hypotheses:

*Hypothesis 1:* The expression of moderate vulnerability in dyads – that is, when one person expresses a need and another person
expresses empathy towards that person – leads to a weak emotional bond.

*Hypothesis 2:* The strongest emotional bonds will be observed in dyads where there is mutual high vulnerability – that is, when both individuals reciprocate need and empathy.

Using a 2-by-2 between-subjects experimental design with random assignment, the levels of need and empathy expressed by a confederate (shown in a video) will be manipulated across four conditions, as follows:

![Figure 1](image-url) The Characteristics of the Four Experimental Conditions.

The strength of the emotion bond that participants viewing each of the videos form toward the confederate will be estimated in each of the four conditions based on
the self-reports of the participants. VTEB will be supported if the results of the experiment are consistent with the theory’s predictions.

The Ontological, Epistemological & Methodological Foundation of This Study

Research within the field of psychology has long adhered to an objectivist ontology – the position that there is a single reality that is independent of our ability to acknowledge or understand it but which can be known through an accumulation of objective information (Breen & Darlaston-Jones, 2010). This has lent credence to a positivist epistemology - the notion that the best way to understand this reality was via the scientific method.

While the ontological foundation of psychology remains deeply rooted in objectivism, ongoing challenges have threatened the hegemony of a positivist epistemology. A growing number of researchers, labeled post-positivists, have rejected the stance that the scientific model used within the natural sciences can be imposed upon the social sciences without any modifications (Muijs, 2010). Instead, they support the use of alternatives to the scientific method. These researchers acknowledge the limitations of the scientific method and recognize that these limitations may lead to an imperfect depiction of reality.

Indeed, several post-positivists have advocated the inclusion of other epistemologies, methodologies and theoretical frameworks that capture contextual significance and the overall complexity of psychological phenomena. For them, it is the context or the phenomenon to be studied that determines the suitability of a
research tool. They are aware that while all instruments are flawed and triangulation of various methods may be the best means of achieving a clearer picture of reality.

This research more closely adheres to a post-positivist philosophy. However, it must be emphasized that a post-positivist approach is not opposed to the use of the scientific method (Ryan, 2006). In fact, this research employs an experimental design in its investigations. The post-positivist stance is mostly evidenced in the reflexive tone used throughout the research, particularly when research findings are being discussed and applied.

**Reflexivity.** True to the post-positivist nature of this study, a section dedicated to the reflexivity is in order. While it is unusual for a reflexivity to be present in a study that relies on the scientific method, the post-positivist perspective believes that by reflecting on the processes involved, alternative methods can be recommended to bring clarity, enhance findings and advance the way research is conducted within the discipline (Ryan, 2006).

**Epistemological reflexivity.** The epistemological reflexivity addresses the ways in which the research questions, the design of the study and the method of data analysis determines what can be known about the phenomena being studied (Willig, 2013). This researcher is confident that applying a high level of scrutiny to this research process ensures that mechanisms can be put in place to address potential shortcomings, findings are understood in context and projections made are highly credible.
The pre-scientific basis of this study. The pre-scientific processes leading to the formulation of hypotheses are just as important as adherence to the requisites of the scientific method (Westen, Novotny, & Thompson-Brenner, 2004). This is because a hypothesis based on a faulty assumption can still lead to scientifically generated but flawed results. To address this, extensive research has been conducted to ensure that the hypotheses being tested in this study are empirically sound.

Observations of the consistent pairing of vulnerability and emotional bonding led to the notion of a possible link between the two variables. While one could argue that an event regularly followed by another does not prove causality (Hume, 1967) it is reasonable to acknowledge the consistency with which this pairing takes place and engage in further research to determine if there is an explanation for why this occurs.

Current research in this area has gone beyond mere casual observation. For instance, neuroscience has produced findings that may explain the connection between vulnerability and emotional bonding. It has found that the hormone Oxytocin (OT) is naturally released by the body in response to stress and trauma. OT promotes pro-social behavior, such as the desire to form emotional bonds, and is useful in buffering the effects of stress (Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003; Nishioka, Anselmo-Franci, Li, Callahan, & Morris, 1998). These findings address concerns regarding a possible faulty pre-scientific process, since the hypotheses in this research has support from a field known for its rigid adherence to the scientific process. Altogether, the literature will demonstrate unanimity substantiating the notion of a plausible relationship between vulnerability and emotional bonding, even when the approach, perspectives and disciplines differ.
Assumptions, limitations and delimitations of the data collection method. This study utilizes a quantitative approach to data collection which is useful for collecting information in breadth, but can fail to provide an in-depth understanding of that data (Muijs, 2010). So while the quantitative approach better lends itself to the analysis of the overwhelming data that will be collected from a large sample size (Silverman, 2011), the interpretation of the data is usually dependent on the researcher’s own knowledge base, which, no matter how extensive, will always be limited. This limitation however is somewhat inconsequential since the main objective of this research is not concerned with providing an explanation of why vulnerability may lead to emotional bonding. The primary objective is to establish whether there is indeed a relationship between these variables. Once this has been established, future research can be undertaken to explain how and why this phenomenon occurs.

For any study that intends to offer generalizable findings it is imperative that the sample be representative of the general population. However, the explicit requirements for what constitutes a truly representative sample remain unclear. Most of the leading psychology journals approve of studies which make generalizations from samples consisting only of college students; who are most often psychology majors (Grohol, 2010). A meta-analysis of some lead journals found that as many as sixty-eight percent of the research participants came from the United States, and as many as ninety-six percent from western industrialized nations (Henrich, Heine, & Norenzayan, 2010).

This study opts to utilize a more diverse sample of participants from both western and non-western regions. To ensure non-western participants are included,
emphasis will be placed on recruiting participants from Fiji in one portion of the study. This will provide representation from at least one non-western culture for cross-comparisons with western cultures.

To facilitate the participation of individuals across cultures, the experiment will be conducted on-line. This mode of research has recently shown its superiority in accessing large, more diverse and/or difficult to access populations (Rhodes, Bowie, & Hergenrather, 2003; Topp & Pawloski, 2002; Touvier et al., 2010; Ward, Clark, Zabriskie, & Morris, 2012). Additionally, conducting experiments online is a growing trend since it has been proven that virtual laboratories retain the validity and reliability of physical laboratories (Birnbaum, 2000; Gosling, Vazire, Srivastava, & John, 2004; Krantz & Dalal, 2000).

Online research has also been shown to be more accurate in registering and preserving data when compared to pen-and-pencil tests or face-to-face surveys (Topp & Pawloski, 2002). Furthermore, participants’ anonymity is assured, and an online laboratory also alleviates the costs, time and resources needed to cater to large sample sizes (Ward et al., 2012). Due to limited resources, such as the availability of a physical laboratory, along with the necessary equipment to recruit and facilitate international participants across various time zones, use of an online medium is seen as the most efficient and reliable way to conduct an experiment of this nature.

Nonetheless, it is acknowledged that this inadvertently excludes persons who are not computer literate or those who are without internet access. The hope therefore, is that the sample will be a better representation of the general population than presently exists in literature on this topic.
There are also limitations that accompany the use of a close-ended questionnaire, which is the sole tool used to gather information from participants for this research. The main assumption of close-ended questionnaires is that all possible options have been provided when this may not actually be the case (Reja, Manfreda, Hlebec, & Vehovar, 2003). In addition to this, close-ended questionnaires do not allow participants to provide responses that could assist the researcher in better understanding their responses (Reja et al., 2003). However, close-ended questionnaires have the advantage of producing responses that easily avail themselves to comparisons, and this is essential in comparative research such as this.

The nature of this research design also implies that participant self-reporting is the primary means of data collection. The use of this tool rests on the assumption that participants are conscious of and are competent in interpreting their own behavior, personality or emotions (Winkielman & Berridge, 2004). Indeed, studies have shown that people often do not know what influences their behavior (Nisbett & Ross, 1980; Wilson, Laser, & Stone, 1982). There is also evidence to suggest that there are cultural differences in how persons report their emotional state, even when they experienced the same level of physiological arousal (Soto, Levenson, & Ebling, 2005).

While these concerns are pertinent, this tool is most appropriate for understanding participants’ perception which also provides highly valuable information. The implicit objective of this research captures participants’ conscious desire to bond, since this is a strong indicator of whether emotional bonding has
occurred. Participants’ are not expected to interpret or show an understanding of why they developed a desire to establish a bond.

The random assign of participants also assures that all known or unknown variables are evenly distributed among group conditions. This therefore offsets the effects of confounding variables, such as individual or cultural differences, and creates greater internal validity (Suresh, 2011). All measurement methods have in-built flaws, however, the results produced are verifiable through cross-comparisons with findings from similar research using different methods. Other safeguards have also been incorporated to enhance the validity of results such as the use of deception (within ethical boundaries) to prevent participant bias.

These epistemological strengths and weaknesses help to situate the context of the data gathered and will therefore be given due consideration during the analysis and interpretation of results. It is hoped that the unique components of this research will not only serve to validate existing findings on this phenomenon but also provide additional insights.

**Personal reflexivity.** The personal reflexivity involves reflecting upon the ways a researcher’s own values, interests, beliefs and identity shape the research (Willig, 2013). This researcher therefore wishes to acknowledge that the inspiration for this study originated from personal interests in keeping with academic and career goals. It is further acknowledged that the interpretation and analysis of data is limited to the researcher’s own knowledge and access to human and technological resources.
The position of a post-positivist social researcher in relation to participants assumes a learning role, where the objective is to conduct research among other people, as opposed to on them (Ryan, 2006). Given the cross-cultural nature of this study, this researcher must be considered as an outsider for the most part, interpreting data produced from foreign cultures (Rabe, 2004). This may result in inadequacies when interpreting the data produced from a foreign culture.

While it may not be possible to change this feature, attempts will be made to ensure that the quality and analysis of data is not compromised. It is hoped that through mechanisms implemented to gain clarity from willing participants after they have completed the experiment, more accurate interpretations of the data can be attained. Additionally, a variation of perspectives will be sought through informal discussions with several colleagues and individuals in order to glean a rich analysis of the overall data.

As much as is possible, this researcher strives to present all findings in an objective and transparent manner. The researcher is also optimistic that the data produced will contribute to a constructive understanding of vulnerability and how it impacts emotional bonding.

**Summation**

This chapter has highlighted the significance of research in the area of vulnerability and emotional bonding, establishing its importance in the success of interpersonal relationships and corresponding areas such as health and well-being. The presentation of relevant scholarly work provided an understanding of the origins
of and justifications for the research topic. This chapter also outlined VTEB and defined the research parameters by stating the aims, objectives, hypotheses and research questions. The ontological, epistemological & methodological underpinnings of the study were critical reviewed and provide the foundation for the analysis and interpretation of data in later chapters.

The upcoming chapter presents a wide range of existing literature related to the research area. The objective of Chapter two is to engage in the process of piecing together this knowledge to present a clear depiction of what has been discovered about vulnerability and its role in interpersonal relationships.
Chapter 2 Literature Review

Overview

Chapter 2 is a review of the literature, which gives a greater understanding of the literary context in which this research is situated. The chapter begins by discussing the challenges of defining key concepts relevant to this research, and provides operational definitions to ensure there is clarity of the concepts being discussed and measured. An elaboration of VTEB is presented, followed by a critical review of the most widely accepted theories of emotional bonding. In the section, This Present Study, the information provided shows how the contribution of past research has informed and directed this research. This section also provides an indication of how this research intends to respond to gaps in the literature and in so doing contribute to new knowledge. A summation of the chapter is then presented. The overall purpose of this chapter is not to be exhaustive, but thorough and to provide readers with a clear understanding of how research has progressed and continues to progress in the area of emotional bonding.

Defining ‘Vulnerability’ and ‘Emotional Bonding’

The meaning and connotation of ‘vulnerability’. The concept of vulnerability has been difficult to operationalize in academia, especially for the purposes of research (Hoffmaster, 2006; Luna, 2009). Generally, the term ‘vulnerability’ is synonymous with being ‘powerless’ and ‘at risk of harm’ and may be defined as having a decreased capacity to protect oneself from harm (Council for International Organizations of Medical Sciences, 2002; Currie, Mason, Southgate, &
Squire, 2007; Hoffmaster, 2006; Luna, 2009; Rogers, Mackenzie, & Dodds, 2012). However, ‘vulnerability’ can be used to describe a wide range of conditions and when used in certain contexts, carries different connotative meanings.

For instance, it may be used in reference to endangered species of plants and animals (Ghosh, 2008; Mace & Lande, 1991), or all human beings (Brene Brown, 2008; Firestone & Catlett, 2009; Rogers et al., 2012) or in reference to specific individuals or demographic populations that are most likely to fall prey to cruelty or misfortune (Levine et al., 2004; Luna, 2009). Used in the latter context, the insinuation is that such persons or populations need to be protected from pending or immediate dangers they are facing. However, in the context where vulnerability is used in reference to all human beings, the danger insinuated is much less life-threatening, referring more so to the possibility of being hurt emotionally. In light of the many usages of the word ‘vulnerability’ it becomes necessary to specify its intended use within this study.

Within the context of this research, the definition used is in accordance with VTEB, which describes vulnerability in interpersonal terms as “one’s openness to the risk of being emotionally hurt or rejected when interacting with others” (R. Epstein, personal communication, May 5, 2014). Yet, rather than deem vulnerability as an undesirable state, VTEB asserts that the ability to remain vulnerable is the characteristic of a well-adjusted individual who accepts the risk of being hurt emotionally as a part of social life. VTEB further asserts that the ability to remain vulnerable is what essentially leads to successful relationships.
Finding and defining ‘emotional bonding’. The literature pertaining to emotional bonding appears to have almost as many terms and phrases connoting emotional bonding as there are theories addressing the concept. The process of collating and comparing the literature on emotional bonding can seem disjointed if it is not clear that it is the same concept that is being discussed, using the parlance of the theoretical perspectives in focus. While it is important to retain the terms and phrases associated with each theory an attempt will be made to simplify the jargons for the sake of consistency and comparability of various theories.

For instance, the term most closely associated with emotional bonding is ‘attachment’. Often times, the two terms are used interchangeably when in fact they are distinct concepts (Perry, 2001). Bonding is the process of forming an emotional attachment, whereas attachment is an enduring emotional relationship with a specific person (Perry, 2001). VTEB holds a similar view of emotional bonding but believes it is more than just the process of initiating an emotional attachment. VTEB defines emotional bonding as the process whereby emotional attachments are initiated or strengthened.

The Process of Emotional Bonding in Vulnerability According to VTEB.

The formation of emotional bonds in a state of vulnerability has been documented in the form of philosophical and phenomenological research (Carver, 2007; De Fabrique et al., 2007; Namnyak et al., 2008; Strentz, 1980; Wong et al., 2006). Such papers have offered invaluable information, yet many of the descriptions and explanations will remain unsubstantiated unless rigorously tested. The challenge
in corroborating these theories scientifically has been due to difficulties operationalizing ‘vulnerability’, as well as the absence of a testable model accounting for the occurrence of emotional bonding in a state of vulnerability.

In recent times, VTEB has proposed a theoretical model along with a testable description of vulnerability, meaning that for the first time, the concept of bonding in a state of vulnerability can be tested experimentally. This also presents the opportunity to develop a predictive model of this phenomenon, which would be groundbreaking work in Psychology.

**Definitions.** As mentioned earlier, VTEB defines vulnerability as “one’s openness to the risk of being emotionally hurt or rejected when interacting with others.” VTEB asserts that there are two components at work in vulnerability, ‘need’ and ‘empathy’, and while they both work towards establishing a connection with others, they do so in very different ways. For individuals in a state of need, their need to form a connection with others stems from an innate desire to receive affirmation and to belong, and while being in a state of empathy also leads the individual to form a connection out of an innate desire, the objective is to provide support and nurturance to others, especially those who appear to be in a state of need. Each of these components of vulnerability will now be discussed in further detail.

**Defining “need.”** For the purposes of this research, need is defined as a physical or psychological state requiring allayment; when in a state of need, individuals feel that they are at risk and are therefore vulnerable. For instance, an individual with a psychological need, such as a need for acceptance or to belong, is at risk of isolation or rejection as he or she attempts to gain acceptance from others and
form meaningful friendships. It is also understood that the state of need experienced by an individual can vary from time to time, so an individual who is in the presence of friends may be receiving fulfillment of his or her need to belong and at that moment may be in a lower state of need, as opposed to someone who has moved into a new environment where he or she has yet to make friends at which point, his or her state of need may be higher during that time. It is believed that being in a high state of need increases the desire to initiate an emotional bond. This description of need therefore reveals that the measure of an individual’s need must take into consideration the type of need being experienced, that is, whether it is physical or psychological, as well as the intensity of the need being experienced in a given moment.

**Defining “empathy.”** Empathy on the other hand is defined as the ability to imagine or feel another person’s emotional experience (McDonald & Messinger, 2011). Empathy is also believed to render an individual vulnerable because a person in a state of empathy becomes susceptible to experiencing discomfort as they identify with a person in a state of discomfort or need. In fact, research as shown that people automatically and unconsciously experience the same level of discomfort as the person they empathize with (Cwir, Carr, Walton, & Spencer, 2011; McDonald & Messinger, 2011). Within this description it is suggested that a person’s state of empathy can vary depending on whether they are currently imagining or experiencing the emotional state of a person in need. It is believed that being in a high state of empathy towards a person in need, increases the desire to initiate an emotional bond.

According to VTEB, the emotional bonding process first begins with a need. This is because there can be no empathy if there is no perceived need. The individual
in a state of need must not only be aware of that need, but the need must also be expressed in order to elicit empathy. It is believed that the greater the state of need, the more receptive a person will be towards receiving empathy. When one individual expresses a need and another individual responds empathetically towards that need, an emotional bond forms as the individual in need accepts the empathy expressed towards him or her. VTEB further purports that when two individuals are able to express their needs and also receive empathy from each other for those needs, a strong emotional bond is forged. This is illustrated in Figure 2.

1) No Bond  = No Empathy
2) Weak Bond = Empathy
3) Strong Bond = Empathy

Figure 2. The Tenants of Vulnerability Theory of Emotional Bonding.

Traditional Theoretical Perspectives on the Development of Emotional Bonds

VTEB is one of the most recent theories of emotional bonding, first appearing in the literature in 2010 (R. Epstein, 2010; R. Epstein et al., 2013) and differs from other theories of emotional bonding because it looks specifically at the role of vulnerability as a catalyst for bonding. However, scholarly interest in understanding how people form bonds appeared as early as the 1920s pioneered by the Psychoanalytic Perspective. Other perspectives soon took an interest in explaining the formation of emotional bonds which then led to several competing theories of
emotional bonding being put forward. However, it was Attachment Theory with its eclectic approach that became the most accepted theory of attachment, and which continues to dominate the literature since its inception in the 1950s. The following subsections highlight a few of the most influential traditional theories and chronicle their contribution to a present-day understanding of how emotional bonds develop.

**The Psychoanalytic Perspective.** Prior to the introduction of scholarly work regarding the attachment process, the thinking which dominated the time was that young children were not able to reason and make sense of their experiences and were therefore unimpressionable and immune to experiences before the age of eight (Lamb, Thompson, Gardner, & Charnov, 2013). However, psychoanalysts were successful in refuting such thinking over time as they presented convincing arguments to the contrary.

Emanating from the work of Sigmund Freud, psychoanalysts were the first to formally propose a theory that provided insight into the enduring impact of early childhood experiences and the attachment process. Assertions were based on their work as psychiatrists and developmental psychologists, so their authority on such matters was given much merit (Lamb et al., 2013). However, while all psychoanalytic theorists agree that the drive to bond stems from the inner workings of an infant’s psyche, there are differing views within the psychoanalytic camp regarding the purpose and motive of bonding.

**Sigmund Freud’s Drive Theory.** The pioneering work of Sigmund Freud on the formation of bonds inspired other perspectives of attachment. Freud focused on childhood experiences as he was convinced that the best way to truly understand the
nature of attachment and other complex behaviors was to examine the stage of life when it first materialized (Michael W Eysenck, 2004). This continues to be a widely held approach to the study of attachment and human behavior in general.

Freud’s complete work on bonding may at times seem contradictory, but perhaps this is because his discoveries often led to findings which challenged his earlier assumptions of attachment. In 1920, Freud postulated what later became labeled as the Secondary Drive Theory, which sought to explain the premise of infant attachment to their mother. According to Freud, the attachment process is nothing more than the infant instinctually seeking nourishment and gratifying an erogenous oral desire, which is fulfilled by sucking its mother’s breast. The infant gradually becomes attached to its mother as he or she comes to the realization that the mother is the provider of its contentment. The primary motive of attachment is to be fed, nourished and orally gratified. The mother herself is secondary; emerging as the child learns to associate her as the provider of its oral desires and needs. Protests to its mother’s absence were understood as the infant being fearful that its needs would go unmet, resulting in a dangerous state of need with no way of fulfilling it. Freud therefore proposed that the primary ambition of the infant’s psyche was to obtain oral gratification and nourishment, which was achieved by sucking its mother’s breast, and attachment to the mother developed only as the infant realizes he or she must interact with the mother to fulfill this need (S. Freud, 1920).

However, by 1938 Freud ascribed greater significance to the infant’s attachment to its mother than that of merely being a source of nourishment. He describes the mother-infant relationship as “unique, without parallel,” remarking that
it was “established unalterably for a whole life-time as the first and strongest love-object and as the prototype of all other love-relations – for both sexes” (S. Freud, 1938, p. 56). While maintaining his initial stance that attachment developed out of the child’s desire to gratify his or her oral needs and pleasures, Freud elaborated how the mother herself becomes significant to the child. He writes that “A child’s first erotic object is the mother’s breast that nourishes it; … This first object later completed into the person of the child’s mother, who not only nourishes it, but also looks after it and arouses in it a number of other physical sensations, pleasurable and unpleasurable. By her care of the child’s body she becomes its first seducer” (S. Freud, 1938, p. 188).

Later in this work Freud seems to have departed from his original premise altogether, at least temporarily, by reporting that an infant’s attachment to its mother appeared independent of her ability to provide oral gratification. Freud revealed that “the phylogenetic foundation has so much the upper hand … that it makes no difference whether a child really sucked at the breast or has been brought up on the bottle and never enjoyed the tenderness of a mother’s care. In both cases the child’s development takes the same path; it may be that in the second case its later longing grows all the greater” (S. Freud, 1938, pp. 188-189). By this declaration, Freud gave credence to an instinctual basis for bonding. Yet, he appeared somewhat reluctant to completely abandon his original premise as he later insisted that bonding in infancy is need driven, emerging out of a physiological need for food and sexual stimulation; and not primarily out of a need for social connection (S. Freud, 1964).

Sigmund Freud’s insights inspired other psychoanalysts to give thought to the attachment process, and while some sought to endorse Freud’s original premise of the
attachment process and account for the inconsistencies in his writing, others explored the trail of Freud’s own deviation from his original premise by exploring an instinctual basis for attachment. The former developed a theory known as Ego Psychology, advancing Freud’s original conceptualization of attachment as a secondary drive, while the latter developed Object Relations Theory focusing on the ‘phylogenetic foundation’ of attachment which Freud introduced, arguing that attachment to the mother and the desire for social relations are instinctual and therefore a primary ambition of the psyche which manifests during infancy.

Yet, even within Ego Psychology and Object Relations Theory there is a lack of homogeneity. A few of these voices will be discussed with special attention placed on their contribution towards present-day knowledge of the attachment process. In other words, this discourse is not intended to be representative of the respective theories in their entirety.

**Ego psychology.** As reflected throughout her work, Anna Freud preserved Sigmund Freud’s original premise of Drive Theory, arguing that the desire to bond stemmed from a need to feed. Based on extrapolations from her work published in 1946, 1952 and 1965 Anna Freud described four stages an infant undergoes as it develops its first attachment to a person, usually its mother.

In the first stage, there is no evidence of attachment and the infant may be perceived as narcissistic – self-centered and self-sufficient - until he experiences a need or discomfort, such as hunger, which he is unable to meet himself. When a need arises, the infant expresses distress. However, once the infant’s needs have been met, it is unconcerned and returns to an autonomous state until it finds itself again in need.
So throughout this stage, the infant establishes connections outside of himself or herself when in need, only to withdraw again after the need have been gratified (A. Freud, 1946). This suggests that the infant is only concerned with self, especially as he does not seem selective of who attends to him. For Anna Freud, this was sufficient justification to draw the conclusion that there is no attachment to the mother or any person at this stage.

In the second stage, it appears the infant, though still self-absorbed becomes a little less so as it grows attached to the milk which he comes to see as the source of gratification. The infant’s attachment is still based on self-gratification and he or she has not yet come to acknowledge a person existing outside of him or herself (A. Freud, 1946).

The final two stages describe how the infant then forms its first attachment to a person, the mother. In the beginning of this personal affection leading to an attachment, the infant becomes aware that the mother is the source of the pleasure and need fulfillment and that the mother is not an extension of self. Still, the child does not love his mother, but instead loves that she gratifies his or her needs (A. Freud, 1946). However, the child eventually comes to love the mother herself outside of her ability to gratify his or her needs and regardless of whether she is a source of pleasure or displeasure. This becomes evident when the mother is absent and the child appears to miss her even when all its needs are being met during her absence (A. Freud, 1952).

While Anna Freud remained convinced that attachment to one’s primary caregiver was need driven, her reports of clinical observations suggested otherwise.
One such case involved six Jewish children who were deprived at an early age of the opportunity to form any long-term attachment to an adult-figure after their mothers were killed while they were in a concentration camp (A. Freud & Dann, 1951). The young children, who could only be between the ages of three and four when they arrived in England, had developed a strong bond with each other and were inseparable. Adults interacting with them would find it very difficult to treat them as individuals and they were very resistant to the interference of an adult if they had a disagreement. It appeared that in the absence of a caregiver the children had developed a deep bond among themselves, and this is important to note since it is highly unlikely that their initial bond stemmed from the benefits they provided for each other (A. Freud & Dann, 1951). Based on similar observations in other cases, Anna Freud noted that children continued to display a deep attachment to a mother even if she was “continually cross and sometimes cruel to them” (A. Freud & Burlingham, 1942).

A criticism of Anna Freud’s theory of the attachment process is that it does not provide a description of the features that characterizes each stage so there is no way of knowing which stage an infant is operating in. This was because Anna Freud believed that behavior was cumulative as opposed to clear-cut.

Contrary to this view, René Spitz, a fellow ego-psychologist, believed that there are identifiable signs that indicate when an infant enters a new stage. In this regard Spitz was the first to propose a clear and systematic theory of attachment based on observation that was supported by photographs and experiments over twenty-nine years beginning in 1945 (Palombo, Koch, & Bendicsen, 2009). Based on his research
Spitz proposed his own insights of the bonding process, which in some regards were similar to Anna Freud’s.

According to René Arpad Spitz and Cobliner (1965) there are four stages marked by three important transitional phases the infant passes through before he or she gains a true sense of self and individuality. However, it is only during the third stage of development that the infant begins displaying attachment behavior. The first stage is the “Objectless Stage” which encompasses the first three months of the infant’s life. In this stage, the infant is not capable of forming an attachment as it is unable to differentiate between its mother and itself. In fact, at this stage, the infant is unable to differentiate between itself and its surroundings.

The end of this stage is signaled by the infant’s ‘smiling response’. This is the first transition, ushering in the second stage which Spitz referred to as the “Precursor of the Object” since the infant does not fully develop a sense that others are completely separate. This stage begins at approximately three months of age and ends at eight months. Spitz believed that the infant’s smiling response was the first indication that the infant had begun to make distinctions between its environment and itself. More importantly, the smiling response is an indication that the infant is developing the propensity to relate to others. It is through the ability to relate to others that the infant will eventually be able to form attachments. However, the smiling response is initially indiscriminate as the infant is likely to smile with anyone be it family members, family friends or strangers. Spitz believed that the bonding process had not yet begun since “we can hardly speak of love, for there is no love until the
loved one can be distinguished from all others, and there is no libidinal object as long as it remains interchangeable” (René Arpad Spitz & Cobliner, 1965, p. 156).

The second transition marks the beginning of the third stage known as the “Libidinal Object.” It becomes apparent that an infant has entered this stage when he or she begins to display anxiety in the presence of strangers. This behavior emerges when an infant is approximately eight months old and lasts until around fifteen months. This anxious behavior shows that the infant is not only able to discriminate between faces but prefers the face of his primary care-giver – the first real indicator that attachment has occurred.

In the fourth and final stage Spitz goes on to describe how the child develops a sense of individuality. This fourth stage, known as semantic communication, occurs when the infant is approximately fifteen-months-old and continues throughout life. Evidence of this stage of development is apparent when a child understands and expresses the concept of “No.” This is a clear indication that the child understands the difference between someone else’s will and its own. Unfortunately, Spitz did not focus on the nature of bonding once the child reached this level of individuality.

Like Sigmund Freud and Anna Freud, Spitz’ account of clinical observations differed from his theoretical stance. In one of his published works, he describes his observation of children raised from birth in a foundling home. Though adequately cared for, in terms of their physical needs, the children lacked one-on-one psychological support and nurturance. Consequently, they displayed a range of disturbing health and psychological challenges. Notably, the children would become depressed, withdrawn, sickly and exhibited developmental regressions and delays and
the children within these homes had a high mortality rate (Mitchell, 1995; Rene A Spitz, 1945).

While Anna Freud and René Spitz were both focused on describing the process of ego development, very little is said of how other bond relationships develop after the initial bond is established between the infant and its primary caregiver. Furthermore, they have failed to adequately address reports from their clinical findings that advance the notion that the desire to form an attachment is: (a) instinctual – occurring regardless of whether the target of the bond can meet the basic needs of the infant and (b) essential – deprivation of bonds may have detrimental health consequences and can even prove to be fatal.

Object Relations Theory. While this theory is a psychoanalytic theory, it challenges Freud’s idea that attachment to others is a secondary drive, and argued instead that the desire to bond emanates from a primary drive to form meaningful connections with others (Clair & Wigren, 2004). Melanie Klein is considered to be one of the earliest authorities in Object Relations Theory (Carducci, 2009), while others have credited her with being its founder (Kaslow & Magnavita, 2002). Her contribution to the understanding of how attachments are formed is discussed, followed by a look at the work of Heinz Kohut who, when compared to others, is a recent proponent of Object Relations Theory.

Melanie Klein described the actions of three-week-old infants who interrupt their sucking to stare intently at their mother’s face and five-week-old infants reaction of smiling upon hearing its mother’s voice as evidence that emotional bonding emanated from a primary drive. Klein placed great emphasis on the importance of the
first year of a child’s life, particularly the first four to six months (Klein, 1952). She posits that newborns have a fragmented perception of others and process information in simple terms of “good” or “bad” based on its experience with that part of the person, which is seen in isolation. For example, the infants’ experience with the breast is “good,” but the infant’s experience with the hand that takes it away is “bad” (Carducci, 2009). By the end of the first year, the infant is able to process the caregiver as a whole entity separate from himself or herself.

In terms of attachment, Klein argues that once a child is able to perceive others as a whole being separate from self, he or she also begins to form a perception of the caregiver as “good” or “bad.” Klein goes further to state that the extent to which a child sees their caregiver as “good” or “bad” is based on the caregiver’s ability to model behavior that is supportive of the child, and which can help him or her navigate new or difficult situations. In other words, evidence of a healthy attachment to one’s caregiver to a display of confidence and autonomy, as this is attributed to having a mental image of a caregiver who is a source of comfort and support.

Heinz Kohut’s work complements that of Melanie Klein, as he contributed the concept of “empathic mirroring” to explain how the child develops a mental construct of their caregiver which acts as an internal source of support or denigration. Empathic mirroring is “the process by which parents provide attention and praise when the child tries to establish a sense of self by taking a risk or expressing an interest in a particular activity” (Carducci, 2009, p. 99).
Kohut postulates that when the caregiver’s level of empathic mirroring towards the child is low, this child engages in self-seeking and often times reckless behavior. Conversely, if the caregiver provides too much attention their child develops an inflated sense of self-worth and tends to overestimate his or her ability, which actually contributes to the child’s failure. The development of a healthy personality, where the child comes to exhibit autonomous behavior and is self-assured, is based on the supportive nature of their caregiver (Kohut, 1977).

Kohut’s theories were based on findings in his clinical practice where most of his patients presented as having a shallow sense of self, and this was accompanied with depression, general discontent with life and a need for constant reassurance and these symptoms appeared to be associated with childhood experiences with a caregiver (Carducci, 2009). While the concepts of Object Relations Theory have been difficult to operationalize and test scientifically, there have been advances in contemporary research which have provided an innovative way of studying the mental constructs described in Object Relations Theory. Combining the postulations of Object Relations Theory with the area of social cognition has produced mounting evidence which supports, not only the arguments of Object Relations Theory, but many other psychoanalytic principles (Calabrese, 1998; Calabrese, Farber, & Westen, 2005). For instance, Westen and others have found that a person’s conceptualization of self and significant others were the result of the nature of the care-giving received in childhood, which in turn impacts how people form attachments with others in adulthood and make evaluations about their capabilities (Westen, 1998; Westen & Gabbard, 1999).
The main weakness found in Object Relations Theory is their emphasis on the influence of the primary care-givers. This ignores the role of other socializing agents, especially in light of research which indicates that “parents do not socialize their children” (Harris, 2011) and that peers have a greater influence on a child than parents.

**The Behaviorist Theory of Attachment.** Usually behaviorists and psychoanalysts hold contending views of behavior as behaviorists dismiss the psychoanalytical premise of unconscious forces influencing behavior and argue instead that all behavior is learnt. However, in their explanations regarding the development of attachment, behaviorists endorsed the general principle put forward by Ego Psychologists that feeding was the basis of the infant’s attachment to its mother. Using behaviorist terminology, they sought to explain how bonding behavior is actually learnt. These accounts generally apply principles from Classical Conditioning, Operant Conditioning or Cognitive Social Learning.

**Classical Conditioning.** The work of Ivan Pavlov demonstrated that behavior could be learned based on the constant pairing of two events (Pavlov & Thompson, 1902). Thus, when Freud proposed Secondary Drive Theory, behaviorists used the principles of Classical Conditioning to demonstrate how the process of attachment was based on learning. They explained that the food given to the infant, for example breast milk, is the unconditioned stimulus and the pleasurable feeling the infant experiences when he is nourished by it is the unconditioned response. Assuming the mother is the primary caregiver, the infant initially views her as a neutral stimulus, but after repeated pairings of the mother with breast milk, the mother herself becomes
meaningful, a conditioned stimulus. The infant experiences pleasure upon seeing her, a conditioned response, in anticipation of the breast milk, the true source of its pleasure. This pleasurable response the infant expresses towards the mother is labeled as emotional bonding (Cardwell & Flanagan, 2003).

The case which became well-known as the “Little Albert Experiment” demonstrated that a fear response could be learnt. Albert, who was approximately nine months old when the study commenced, initially showed no fear towards a set of objects and creatures placed before him, including a white rat. However, he would display a startle and fear response to the sudden and loud sound of a steel bar being hit by a hammer. He was then exposed to repeated pairings of the white rat and the sharp sound, and eventually began to exhibit fear and avoidant behavior upon seeing the white rat, even when the sharp sound did not accompany the rat’s presence (Watson & Rayner, 1920).

Theories that interpreted the earliest infant behaviors as evidence of biological pre-wiring were refuted with counterarguments that newborns were capable of learning by association. One such study showed that newborn infants responded to the presentation of a citrus odor - which was initially a novel and neutral stimulus - by turning their head toward the citrus odor in anticipation of being stroked a day after being exposed to ten 30-second pairings of the citrus odor with stroking. The infants were only a day old when they were introduced to these pairings and exhibited the conditioned response by turning their heads toward the citrus odor, even when they were asleep (Sullivan et al., 1991). Several reflexive behaviors, such as sucking
(Lipsitt & Kaye, 1964) and eye-blinking (Ivkovich, Collins, Eckerman, Krasnegor, & Stanton, 1999), have also been shown to be responsive to classical conditioning.

**Operant Conditioning.** This theory of learning also provides a valuable explanation of how attachments are formed. Developed by B. F. Skinner (1938) the fundamental principle of Operant Conditioning is that the expression of a behavior increases when it is reinforced and decreases when it is punished. While theorists from other perspectives interpreted behaviors such as crying and smiling in the infant as attachment behavior, Skinner believed that such behaviors were meaningless until they are ascribed value through reinforcement or punishment (Nelson, 2005). Experiments have been conducted which confirm that when principles of Operant Conditioning are applied, they predictably increase, decrease or even render extinct such behaviors as crying (Etzel & Gewirtz, 1967; Hart, Allen, Buell, Harris, & Wolf, 1964) and smiling (Brackbill, 1958; Etzel & Gewirtz, 1967). Other attachment behaviors proven susceptible to the principle of operant conditioning are sucking (Lipsitt, Kaye, & Bosack, 1966), vocalizations (Rheingold, Gewirtz, & Ross, 1959), head-turning (Siqueland, 1968) and making eye contact (Etzel & Gewirtz, 1967).

At a time when the importance of feeding was seen as the basis for attachment, the Operant Conditioning model made such a remarkable contribution to the understanding of attachment behaviors it was able to demonstrate that there were a wide range of reinforcers, such as toys, smiles and praises, that could modify a range of behaviors in the infant (Gewirtz & Peláez-Nogueras, 1992). In addition to this, research using the principles of Operant Conditioning was able to explain the caregiver’s attachment towards the infant. Gewirtz and Boyd (1977) reported that as
the caregiver acts in a way that reinforces the desired attachment behavior in the infant, the infant’s expressions of attachment behavior is rewarding to the caregiver, thereby increasing the likelihood that the caregiver will express attachment behavior towards the infant, and this results in a mutual attachment.

The shared perspective between Behaviorists and Psychoanalysts on attachment and the impressive empirical support gathered by Behaviorist models led researchers, Dollard and Miller to propose a theory that served to integrate Freud’s Secondary Drive Theory with Classical Conditioning and Operant Conditioning (Cardwell & Flanagan, 2003; Horowitz, 2014; Lamb et al., 2013). According to Dollard and Miller (1950), the need for nourishment is in fact the infant’s primary drive. The pleasure the infant experiences when its need for nourishment is gratified is rewarding, which shows that nourishment acts as a primary reinforcer increasing the likelihood that the infant will engage in nourishment fulfilling behaviors. As there is a constant pairing of receiving nourishment and seeing the caregiver, the infant comes to view the caregiver favorably, even when the caregiver is not presenting the infant with nourishment. Thus, the caregiver becomes a secondary reinforcer and the pleasure expressed towards the caregiver is seen as attachment.

**Cognitive Social Learning Theory.** As behaviorists demonstrated how their learning theories could account for attachment behavior in the infant and even the caregiver, there seemed to be a move to provide a comprehensive theory of behavior even if breeched the premise of traditional behaviorism. Such was the case of Cognitive Social Learning Theory which took into consideration the unobservable, inner processes involved in learning. Social Learning Theory was introduced by
Albert Bandura in the 1960s. Bandura incorporated principles from Operant Conditioning but also challenged it when he declared that direct reinforcement was not as important as vicarious or second-hand reinforcement (Bandura & Walters, 1963; M.W. Eysenck, 2002). Essentially, Bandura was proposing a cognitive component of learning and declaring that learning was not dependent on reinforcement (Dworetzky, 1994).

A newborn has no sense of self but as it inadvertently develops new skills, he or she is motivated to continue learning. Cognitive Social Learning Theory posits that this learning is mostly vicarious, where the child observes the actions of others and based on the outcome, imitates the behavior they perceived garnered a favorable consequence (Bandura & Walters, 1963). Without debating which cognitive-social learning strategy is more important, Hay and Vespo (1988) explain that the child’s caregiver intentionally teaches the child attachment behavior via three learning strategies:

- Direct instruction – where the child is told exactly what behaviors to engage in. For example, telling a child to “give daddy a hug.”

- Modelling – where the caregiver acts as a role model to the child, and the child imitates the affectionate behavior the caregiver displays towards them. This is observable when a child engages in symbolic play with a doll, where the child takes on the role of the caregiver and the doll is cared for as though it were an infant.
• Social facilitation – the caregiver is watchful of how the child behaves, especially with its peers and provides assistance when necessary. For instance, encouraging a child to “play nicely.”

Behaviorists have provided convincing evidence, supported by scientific research, that learning plays an important part in the formation of attachments. Despite this, their failure to consider the importance of inherent tendencies may have been their shortcoming. For instance, cross-cultural research has shown that facial expressions are universal for basic emotions, such as anger, disgust, fear, happiness, sadness and surprise (Ekman & Friesen, 1971) and that there is no difference in the facial expressions of the congenitally blind and the non-congenitally blind (Matsumoto & Willingham, 2009).

Traditional Behaviorist Theories explain the goal of behavior in terms of receiving pleasure, but ignore the fact that people intentionally seek out fearful experiences and engage in risky behaviors that have an undesirable outcome. Using the principle of learning reinforcement, an abused child or adult should be expected to develop a fear of their abuser and act to avoid them. Instead, there are cases of abused children seeking to be near their abusive parents (Bergin & Bergin, 2011) and victims of domestic violence developing a strong emotional bond towards their abuser (Dutton & Painter, 1993). So while behaviorism has contributed invaluable information regarding the development of attachment, it is necessary to look to other perspectives which can account for the apparent innateness of bonding.

The Ethological Perspective. Ethology is the scientific study of animal behavior and presents explanations of behavior in evolutionary terms (Hergenhahn &
Henley, 2013; McKenzie, 2009). Affiliates of Ethological Perspective believe that findings in nonhuman species of animals are relevant to better understanding human behavior. This perspective therefore argues that all animals, inclusive of human beings, have an inherent ability to form attachments for the purpose of ensuring their survival, particularly during the first stage of life when young ones are most dependent (Darwin, 1872; Ekman & Friesen, 1971). Behaviors such as clinging (Steinberg, Bornstein, Vandell, & Rook, 2010) and crying (Lashley & Watson, 1913) in nonhuman primate newborns demonstrate this concept as these actions make it more likely that the young one will be protected and cared for (Breger, 2009).

Konrad Lorenz (1965) successfully reinforced this principle as he was able to show how attachment was instinctual in young geese, through a process known as filial imprinting. He found that goslings would immediately follow and quickly attach to the first large moving object they saw after they hatched. One group of goslings attached to Lorenz (Lorenz, 1965) and in another experiment, chicks followed and attached to a box that was set on a toy train (Petri & Govern, 2012). Lorenz discovered that there was a critical period for filial imprinting which began immediately after being hatched, and once imprinting had taken place the young birds would not form an attachment to another mother figure, even from their own species, but would maintain their attachment to the object they initially bonded with. Additionally, when the geese reached maturity, they would seek out a model similar to the object they initially bonded with for mating (Lorenz, 1965). This has also been found in other species, such as mammals (Kendrick, Hinton, Atkins, Haupt, & Skinner, 1998; Penn & Potts, 1998), fish (Breden, Novinger, & Schubert, 1995) and spiders (Hebets, 2003).
Proponents of ethology argue that such attachment behaviors are evident throughout the entire lifespan of all social creatures, and human beings are no exception (Eibl-Eibesfeldt, 1989; Joseph, 2009). For instance, crying in human infants is an innate ability, which is seen as an effective means of receiving food, comfort and protection from an adult (Barr, Hopkins, & Green, 2000; Steinberg et al., 2010). In adulthood, crying elicits empathy and can initiate bonding (Cornelius & Labott, 2001). Smiling is also believed to be a sign of eliciting social interaction as by the time an infant is two-three months old, he or she can produce a social smile in response to seeing a human face (Emde, Gaensbauer, & Harmon, 1976). Smiling is evident throughout the human lifespan and across-cultures it conveys the same meaning as a signal for friendliness (Ekman, 1971; Ekman & Friesen, 1971; E. E. Werner, 1988). There is even some evidence for sexual imprinting in humans (Bereczkei, Gyuris, & Weisfeld, 2004).

Therefore, the formation of bonds is not solely directed towards gaining basic physical needs for survival. In the case of goslings, these birds are able to feed themselves immediately after birth and yet they seem to prefer staying in social groups long after they have matured (Lorenz, 1965). Thus, it appears that social needs, such as a need for comfort and support, are a primary driving force for attachment. This is even more evident in the Harry Harlow experiment where young rhesus monkeys, separated from their mothers at birth, where given the option of two inanimate mother-figures to see which one they would prefer. One mother was wrapped in soft terry cloth while the other mother provided food from a bottle but was made of wire. Results showed that the infants spent significantly more time with the mother wrapped in soft terrycloth, indicating that bonds are not formed solely on the
basis of food dependence, but primarily on the basis of receiving love and support (Harlow, 1958). Newborn humans, while they are completely dependent on others for their care also exhibit social needs as they increasingly develop their skills to achieve closeness to others such as smiling, holding out their arms to be lifted and following (Barr et al., 2000; Benson & Haith, 2010; Steinberg et al., 2010).

These findings reveal very useful information about the bonding process in humans and hold interesting implications. One such implication is that humans are pre-programmed to create emotional bonds and therefore, people may have less conscious control over the desire to bond than they may realize. Secondly, it appears that the first attachment relationship one forms is considerably significant and has enduring effects, even influencing future mate selection and interaction.

Yet, the ethological perspective has faced harsh criticisms regarding its evolutionary premise, because for many of the behaviors identified as being evolved, there is very little if any evidence of a baseline from which the presently observable behavior changed from. For example, there is insufficient evidence that there was ever a time when human beings did not produce such behaviors as crying and smiling. Additionally, the functional or adaptationist approach assumes that existing behavior must serve a purposive role or have an adaptive benefit. However, this is yet to be validated, and if the hypotheses of such studies assume from the start that behavior has adaptive advantages and aim only to discover what those advantages may be, they may very well overlook the possibility that many behaviors are actually maladaptive (Hinde, 1995), as is the case with trauma bonding (Van der Kolk, 1989).
Such criticisms do not reduce the significant contribution the Ethological Perspective has made towards the overall understanding of how emotional bonding occurs. Indeed, other theorists have applied ethological principles within their own perspectives and most of what is known today about the attachment process comes mainly from the ethological perspective (Jarvis, 2004).

**Attachment Theory.** Developed by John Bowlby and Mary Ainsworth, Attachment Theory remains the most dominant theory in the area of attachment (Ganem & Iowa State University, 2008). This theory is often classed as an ethological perspective since it draws heavily from ethology (Saracho & Spodek, 2003; van der Horst & Kagan, 2011). However, Attachment Theory, which is not actually a traditional perspective in its own right, is more accurately classified as an integration of two traditional perspectives, the ethological and psychoanalytical perspectives (Brandell & Ringel, 2013; Bretherton, 1992; Holmes, 2006). Bowlby believed that the principles of Psychoanalysis and Ethology complemented each other and openly voiced his support for “the unification of psychoanalytic concepts with those in ethology and to pursue the rich vein of research which this union suggests” (Bowlby, 1953, p. 32).

According to Attachment Theory, “attachment” is “an affectional tie that one person or animal forms between himself and another specific one - a tie that binds them together in space and endures over time” (M. D. S. Ainsworth & Bell, 1970, p. 50). Attachment is believed to be the result of our evolutionary progression from a past where attachment was necessary to avoid predation (Bowlby, 1969). Evidence of
this is believed to be observable in the mother-infant relationship. For the mother, all her sensory channels become tuned into the needs of her infant even when danger is at hand, and on the part of the infant, he or she displays behavior that elicits the fulfillment of his or her needs from the primary caregiver.

Attachment Theory describes how the response of the primary care-giver to the needs of the infant leads to the development of one of four attachment styles which acts as the blueprint for all bonding relationships, whether friendships or romantic relationships, throughout that child’s life (M. S. Ainsworth, 1989; Feeney & Noller, 1990; Fraley & Shaver, 2000; Hazan & Shaver, 1987; Hendrick & Hendrick, 1994; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). When a care-giver is consistently warm and responsive to the needs of an infant - to the extent that the caregiver-infant relationship is mutually satisfying - the infant develops a secure attachment, whereas insecure attachments are the result of the caregiver not being attuned to the needs of the infant (M. D. Ainsworth, 1963).

Three attachment styles were proposed, one which described the mannerisms of securely attached children while two described insecurely attached children (M. D. Ainsworth, 1963). It is believed that securely attached children tend to be much more optimistic in their outlook and generally feel worthy of having their needs met due to their experience with a caregiver who was warm and consistent (Jacobsen & Hofmann, 1997). Insecure avoidant attached children, due to their experience with a caregiver who was generally insensitive and harsh when they expressed a need (Behrens, Hesse, & Main, 2007), tend to become very self-reliant, even when they are in distress (Stevenson-Hinde & Verschueren, 2002). Insecure ambivalently attached
children, due to their experience with an inconsistent caregiver, tend to be unsure of how responsive others will be to their needs and so send out mixed signals, appear needy and clingy and tend to be inconsolable (Cassidy & Berlin, 1994).

The claim that attachment styles are stable and predictive of adult attachment styles in close relationships was tested in a longitudinal study conducted over a twenty-year period. This study found that seventy-two percent of the infants classified as having a secure versus insecure attachment style, maintained their attachment style in adulthood while negative life events accounted for a significant number of those who changed their attachment style while transitioning from infancy to adulthood (Waters et al., 2000).

Findings from other studies have also supported the theory that attachment styles influence how we engage in close adult relationships. These studies tend to produce similar findings which indicate that: (a) secure attachment styles were more likely to be associated with successful relationships, characterized by happiness, friendliness, trust, an ability to love and support their partner regardless of their faults and a tendency to have longer lasting relationships (b) insecure avoidant styles where characterized by their fear of intimacy and a discomfort with closeness and (c) insecure ambivalent styles were characterized by extreme sexual attraction, jealousy and obsession (Feeney & Noller, 1990; Hazan & Shaver, 1987; Mikulincer & Erev, 1991; Simpson, 1990; Voller, Notaro, & Larsen, 1998).

However, Attachment Theory attributes the child’s attachment style to its experience with one primary care-giver, and as seen from Anna Freud’s clinical observation of six Jewish children (A. Freud & Dann, 1951), strong attachments can
be formed among peers. Recent research even suggests that peers have more influence than parents in shaping the personality and character of a child (Harris, 2011). This raises the possibility that strong attachments may be possible with other figures besides the primary care-giver and is an area that needs to be further explored.

**This Present Research**

This research examines the VTEB theoretical model which proposes that “need and empathy are interlocking components which strengthen emotional bonds between individuals” (R. Epstein et al., 2013). Experiment 1, which uses only participants from the United States of America, was designed to test the validity of the proposed model, while Experiment 2, which uses participants from the Republic of Fiji, is intended to provide a cross-cultural understanding of the applicability of the model in a non-western society.

Traditional theoretical perspectives on emotional bonding tend to focus on the earliest stage of life where bonding behavior first appears in order to understand the nature of bonding. It is believed that these perspectives may provide crucial background information on the formation of emotional bonds in a state of vulnerability. We now examine how emotional bonding in a state of vulnerability may be construed in the context of each theoretical perspective.

Secondary Drive Theorists, which include Ego Psychologists, propose that essentially, the primary ambition of the psyche is to fulfill physical needs and bonding occurs because others are associated with meeting this need (A. Freud, 1952; S. Freud, 1920; René Arpad Spitz, 1959). In this context, vulnerability is described
narrowly in terms of the need for nourishment and empathy is described in terms of how well others are able to meet those needs. This portrayal of emotional bonding may be useful in understanding a wide range of relationship types to the extent that a cohesive society is established on the basis on forming various social networks, such as marriages, friendships and professional relationships, where the ultimate goal of each individual is to enhance their ability to meet their own physical need.

Traditional Behaviorist Theories do not appear amenable to explaining how emotional bonds are initially developed in adulthood in the absence of observable associations or reinforcers. However, when combined with Cognitive-Social Learning Theory, a likely explanation of emotional bonding is that past events have prepared the individual to form bonds. For instance, it is conceivable that individuals would initiate a bond with someone who displays particular characteristics or mannerisms, as experience has taught them that such characters are associated with rewarding experiences. Vulnerability comes into play when the individual risks being punished or rejected by others from whom they seek a rewarding relationship (Cordova & Scott, 2001).

Attachment Theory seems to suggest that how vulnerable one is willing or capable of being in their interpersonal relationships may revolve heavily around their childhood bonding experience with their primary caregivers. Attachment theory portrays vulnerability in childhood as rising out of a child’s inability to meet its own needs and a total dependence on a caregiver to discern and respond appropriately to fulfill a physical or psychological need. In adulthood on the other hand, vulnerability is depicted in an interpersonal context and is characterized by having a physical or
psychological need that can only be gratified through others. How comfortable an adult feels in expressing their vulnerability in order to have those needs met may be based on how their primary caregiver responded to their needs in childhood since this is where individuals are taught how they should expect others to react to their expression of need.

Within the context the Ethological theory, it appears that the expression of vulnerability – the communication of a physical or social need – is aimed at eliciting empathy and support from others. From the standpoint of this perspective, perhaps those who are best able to communicate their needs have better life outcomes and quality of life as they are most likely to receive an empathic response leading to meaningful interpersonal relationships and the fulfillment of their needs.

However, within some of these perspectives there tends to be disparities as to the aim of bonding. In a broad sense, two motives of bonding have been proposed and theories of emotional bonding can be roughly placed in one of these factions.

On the one hand are theories which advocate that bonding stems from the urge to receive gratification of physical and/or psychological needs and since other help us meet these needs we develop attachments to them. This characterizes Secondary Drive Theory, Ego Psychology, Classical Conditioning, Operant Conditioning and Cognitive-Social Learning. On the other hand there are theories which advocate that people have an innate tendency to bond with others, regardless of the benefits it brings. This characterizes Object Relations Theory, Ethological Theories and Attachment Theories.
Secondary Drive Theory and Ego Psychology have explicitly stated that it is the need for nourishment that is at the core of bonding, while the learning theories have demonstrated that fulfillment of physical and psychological needs can lead to emotional bonding. The commonality of the theories in this faction is their shared view that bonding is based on self-interest.

For Object Relations Theory, Evolutionary Theory and Attachment Theory, there is agreement that the primary motive of bonding is to be with others. Yet, Object Relations Theories, tend to emphasize that bonding functions to help individuals understand and distinguish themselves from others, while Ethological theories and Attachment theories place emphasis on how bonding functions to provide comfort and validation from others. The commonality of theories in this faction however lies in their agreement that the innateness of bonding is not secondary to its benefits.

The VTEB model has integrated the contributions from these fractions such that “need” comprises of both physical and psychological needs and “empathy” characterizes psychological features such as nurturing and supportive. The Harry Harlow experiment with young Rhesus monkeys (Harlow, 1958) and René Spitz’s study of hospitalized children (Rene A Spitz, 1945) is similar to this study as they measured variables similar to need and empathy, specifically, physical needs and receiving comfort and support. Their findings gave greater credence to theories which argued that bonding with others was a primary drive. Yet, what their study actually showed was that receiving comfort and support was more important than gratifying physical needs in the bonding process. VTEB ventures further by defining need in terms of physical and psychological characteristics and empathy in terms of receiving
nurturance and support. It is believed that the combination of need and empathy, as defined within the context of this study, contributes to the development of strong emotional bonds. Moreover, this research intends to investigate the effect of mutual vulnerability on emotional bonding; the expected outcome when two individuals who express their need to each other and are able to receive empathy in the form of support and validation. It is anticipated that mutual vulnerability will lead to the formation of strong emotional bonds, and if this outcome is supported by findings, it has the potential to bridge the rigid factions which argue in favor of only need or empathy being important to the bonding process.

**Summation**

This Chapter discussed the difficulties associated with generating an operational definition for “vulnerability” and distinguishing “emotional bonding” from like terms. Definitions of these terms, as used in the context of this study, were presented. Following this, there was an official introduction of VTEB and its premise, inclusive of an illustration of its predictive theoretical model of emotional bonding. Next, traditional perspectives of emotional bonding were reviewed chronologically. This entailed highlights of their contributions to present-day knowledge on emotional bonding, as well as identifying their areas of weakness. The Chapter then closed by describing this present research. This included discourse on ways in which the traditional theoretical perspectives may have contributed to the theoretical basis of this study, as well as how the outcome of this research may in turn contribute new knowledge to existing perspectives.
Chapter 3 Experiment 1

Overview

This chapter opens with the ethical considerations undertaken in this research since this would have played a crucial role in the execution and outcome of the study. In order to thoroughly investigate the research objective concerning the role of vulnerability as an initiator of the formation of emotional bonds two experiments were conducted. The first experiment investigates the premise that vulnerability increases the likelihood of emotional bonding. Experiment 2, which is detailed in Chapter 4, takes a cross-cultural approach to investigating how this phenomenon may exist or be different in a non-western society in comparison to a western country.

Ethical Considerations

This research was approved by the University of the South Pacific Ethics Committee. Throughout the study, there was full adherence to the American Psychological Association Code of Ethics.

Prior to engaging in the study, participants were briefed and asked to indicate that they understood the conditions of the study as well as their right to withdraw at any time without fear of penalty or prejudice. While participants were informed of the study in very general terms, the objective of the study was withheld to avoid participant bias. A cover story was used to make participants believe that the confederate was a participant who voluntarily agreed to be interviewed for the study. However, there was no reason to believe that this partial disclosure and mild deception would offend or harm any reasonable participant nor
would it alter the decision of a participant that was already willing to participate in the research (Athanassoulis & Wilson, 2009). Research has even indicated that research participants may actually enjoy their involvement in deception studies where the deception is used within reason (Christensen, 1988). In full adherence to ethical guidelines regarding deception studies, participants were debriefed immediately after the experiment was concluded and had the option of having their data excluded from the study at that point.

Participants were also compensated the amount of US$0.75 or FJ$1.50. This amount is considered too nominal to be considered undue inducement (Russell, Moralejo, & Burgess, 2000). This money was intended to compensate participants, at least partially, for their time and in some cases, the use of their own resources (internet, electricity costs and bus fees) to take part in the study.

**Method**

Using a 2 x 2 (Need x Empathy) between-subjects design, this experiment tests the following hypotheses:

*Hypothesis 1:* The expression of moderate vulnerability in dyads – that is, when one person expresses a need and another person expresses empathy towards that need – leads to a weak emotional bond.

*Hypothesis 2:* The strongest emotional bonds will be observed in dyads where there is mutual high vulnerability – that is, when both individuals reciprocate need and empathy.
Participants

All participants in Experiment 1 (N = 1,000) were from the United States of America. Of this number, there were 456 males, 543 females and 1 participant who identified as other. The mean age of the sample was 34.07 (SD = 11.35).

There were 904 participants who identified as straight, 63 who identified as bi-sexual, 22 who identified as gay/lesbian, 6 identified as other and 5 as unsure. The majority of the sample, 77%, identified as White/Caucasian, while 8% identified as Black/African American, 5% as Hispanic/Latino, 5% as Asian Oriental, and 3% as multiracial. Other ethnicities present represented less than 2% of the sample and these included Asian Indian, Native American and Pacific Islander and those unspecified.

Recruitment. Participants from the United States were recruited via Amazon Mechanical Turk (MTURK), a crowdsourcing service that is commonly used in research in the Behavioral and Social Sciences (Berinsky, Huber, & Lenz, 2012; Paolacci & Chandler, 2014; Peer, Vosgerau, & Acquisti, 2014). The invitation posted on MTURK requesting participation can be viewed in Appendix A. Participants who completed the online experiment were compensated US$0.75. The MTURK service controlled the disbursement of funds and this ensured that participants remained anonymous.

Eligibility. In Experiment 1, the criteria for eligibility required that all participants be from the United States of America and eighteen-years-of-age or older. Participants were required to have high-speed internet access to stream the video in real time, and a functioning audio device to hear the video. Based on self-reports on a Likert Scale ranging from 1 to 10, only those participants who reported having an English proficiency of 8, and vision and hearing of 5 were included in the final analyses. Once this done, only the data from the first
250 participants in each condition were included in the study since unequal sample sizes can decrease the power to detect statistically significant differences between groups (Efird, 2010).

**Materials and Measures**

*Videos.* Four videos were supplied by Professor Robert Epstein. Each video recording was intended to simulate a distinct level of vulnerability and characterized the experimental condition participants were randomly assigned to.

*Picture.* A neutral picture of the confederate (as rated by three observers) was used for display in the pretest condition (see Appendix B for the picture used).

*Electronic Equipment.* Customized computer programming was developed and implemented to facilitate the online administration of the experiment. These customizations included the random assignment of participants in adherence to the criteria of a true experiment as well as the automatic showing of one of the four videos.

As the experiment was conducted online and involved watching a video, this meant participants needed high-speed internet access to stream the video in real time and a functioning audio device to hear the video.

*Demographic questions.* The survey was comprised of a thirteen-item respondent demographic section. Items were general enough to protect the identity of participants and required information such as a participant’s: age, gender, sexual orientation, race, education, etc. The names of participants name were not requested.

*Need and Empathy Scales.* Two types of need and empathy scales were used; one ascertained participants’ state of need and empathy, and the other ascertained participants’ impression of the state of the confederate’s levels of need and empathy. These scales were
alike in every way except that the instructions measuring participants’ state of need and empathy read, “Please answer the following questions about how you are currently feeling” and each item would begin with “I feel …”; while the instructions measuring participants’ impression of the confederate’s state of need and empathy read, “Please look at this photo and answer the questions below” and each item would begin with “He seems …. ” There were seven items measuring need (tired, anxious, sad, hungry, thirsty, lonely and needy) and seven items measuring empathy (caring, kind, soft-hearted, sympathetic, loving and affectionate). The level of need and empathy were measured along a five-point Likert Scale ranging from 1 = strongly disagree to 5 = strongly agree.

**Emotional Bond Scale.** Participants’ emotional bond to the confederate was evaluated using a four-item measure of emotional bond. These items asked participants’ the following questions: “How close do you feel to this person,” “How much do you like this person,” “How attracted are you to this person” and “How much do you love this person.” The intensity of the emotional bond was measured along a five-point Likert Scale, which ranged from 1 = Not at all to 5 = Quite a lot. A copy of the entire survey can be seen in Appendix C.

**Procedure and Manipulation**

Participants were briefed and asked to indicate their awareness of, and agreement to the terms presented in the informed consent form before taking part in the experiment (see Appendix D for briefing and informed consent information provided to participants). The true objective of the experiment was not disclosed to prevent participant bias (see subsection Ethical Considerations).
**Pretest.** Participants were required to report their current state of need and empathy. Then, they were shown a picture of the confederate with a neutral facial expression and asked to indicate the level of emotionally bond they felt towards the confederate, as well as their impression of the confederate’s state of need and empathy.

**Manipulation.** Participants were randomly assigned to one of the four experimental conditions. Conditions comprised of a video of the confederate being interviewed where he displayed one of four levels of vulnerability. The experimental conditions were intended to simulate varying levels of vulnerability and when ranked from the lowest to highest levels would be as follows: Condition 1 (low need - low empathy) where the confederate displayed a low level of vulnerability, Condition 2 (high need - low empathy) and Condition 3 (high empathy - low need) where he displayed a moderate level of vulnerability and Condition 4 (high need - high empathy) where he displayed a high level of vulnerability.

Need was expressed by the confederate relating a story of his experience of losing someone to cancer. The level of need is manipulated by his account of how close that person was to him and variations in his expression of sadness. For instance, in the high need scenario, he expressed sadness at the loss of a close family member to cancer, while in the low need scenario he expressed very little sadness about someone he knew who may have died from cancer.

Empathy was exhibited by variations in how willing the confederate was to help those who lost loved ones to cancer. For instance, in the high empathy scenario he related an account of efforts he made to comfort those in grief, while in the low empathy scenario he did not express interest in assisting those in grief. When the confederate expresses empathy it is towards a cancer victim and not towards the participants. However, it is anticipated that
participants will generalize and assume that because the confederate appears to be an empathetic person, he would also empathize with the participant in a live interaction.

Posttest. After exposure to one of four experimental conditions, participants’ emotional bond to the stranger was then re-assessed and participants were asked to give their impression of the confederate’s state of need and empathy, as well as report their own need-empathy state.

Results

Nonparametric tests, specifically Spearman’s rank-order correlation, Mann-Whitney U test, and the Kruskal-Wallis H test, were used given that the scales for need, empathy and emotional bond were ordinal in nature. Additional tests employed in the analysis of the data were multiple regressions, factor analyses and item analyses.

Pretest and manipulation checks

Evaluation of the pretest scores using a Kruskal-Wallis H test indicated that there were no statistically significant differences across conditions in participants’ self-report of state of need, \( \chi^2 (3) = 4.19, p = .24 \ ns \), state of empathy \( \chi^2 (3) = 3.68, p = .30 \ ns \), impression of the confederate’s state of need, \( \chi^2 (3) = 1.40, p = .71 \ ns \), impression of the confederate’s state of empathy \( \chi^2 (3) = 2.85, p = .42 \ ns \), and the emotional bond experienced towards the confederate, \( \chi^2 (3) = .63, p = .89 \ ns \). Table 1 shows the similarity of pretest mean scores for state and impression of need, empathy and emotional bonding across conditions.

Manipulation checks were conducted to confirm whether participants perceived the confederate’s state of need and empathy as was intended by the researcher. Findings revealed

64
that the confederate’s state of need in the high need conditions\textsuperscript{1}, Conditions 2 and 4 (mean rank = 679.13), was perceived to be significantly higher than in the low need conditions, Conditions 1 and 3 (mean rank = 321.87), \(U = 214,316.5, z = 19.57, p < .001\), while participants in the high empathy conditions\textsuperscript{2}, Conditions 3 and 4 (mean rank = 631.98), perceived the confederate to be in a significantly higher state of empathy than participants in the low empathy conditions, Conditions 1 and 2 (mean rank = 369.02), \(U = 190,738, z = 14.42, p < .001\). Table 2 shows posttest mean scores for impression of need and empathy across conditions.

**Summary of pretests and manipulation checks.** The results of the pretests showed that across all conditions, participants were in similar states of need and empathy, they had similar impressions of the confederate’s state of need and empathy and reported similar levels of emotional bond. Manipulation checks of posttest results confirmed that participants perceived the confederate to be in a high state of need in Conditions 2 and 4, and a high state of empathy in Conditions 3 and 4 as intended.

\textsuperscript{1} A Mann-Whitney U test was used to compare the combined mean scores of the two high need conditions, to the combined mean scores of the two low need conditions.

\textsuperscript{2} A Mann-Whitney U test was used to compare the combined mean scores of the two high empathy conditions to the combined mean scores of the two low empathy conditions.
Table 1

Participants' Pretest Mean Scores for Need, Empathy and Emotional Bond Across Conditions in Experiment 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Need Mean (SD)</th>
<th>Empathy Mean (SD)</th>
<th>Impression Need Mean (SD)</th>
<th>Impression Empathy Mean (SD)</th>
<th>Emotional Bond Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.46 (0.35)</td>
<td>20.89 (0.45)</td>
<td>16.38 (0.32)</td>
<td>19.51 (0.38)</td>
<td>7.22 (0.14)</td>
</tr>
<tr>
<td>2</td>
<td>14.42 (0.32)</td>
<td>20.40 (0.46)</td>
<td>16.42 (0.33)</td>
<td>19.94 (0.37)</td>
<td>7.36 (0.15)</td>
</tr>
<tr>
<td>3</td>
<td>14.01 (0.35)</td>
<td>21.62 (0.48)</td>
<td>16.76 (0.33)</td>
<td>20.42 (0.34)</td>
<td>7.45 (0.16)</td>
</tr>
<tr>
<td>4</td>
<td>13.74 (0.33)</td>
<td>20.73 (0.46)</td>
<td>16.36 (0.30)</td>
<td>20.46 (0.38)</td>
<td>7.40 (0.15)</td>
</tr>
</tbody>
</table>
Initial examination of hypotheses

The main effect in the experiment should be an increase in the strength of the emotional bond from Condition 1 (low need - low empathy) to Conditions 2 and 3 (high need - low empathy, high empathy - low need) to Condition 4 (high need - high empathy). The outcome is shown in Figure 3 where the emotional bond reported by each condition posttest was examined.
Figure 3. Posttest Mean Emotional Bond Scores Across Conditions in Experiment 1. Error bars represent standard error.
Comparison of mean scores showed that as the vulnerability expressed by the confederate increased, so did emotional bonding. A Kruskal-Wallis test was then conducted, which indicated that there were significant differences in emotional bond experiences between conditions, $\chi^2(3, N = 1000) = 137.41, p < .001$. The proportion of variability in the ranked emotional bond scores accounted for by vulnerability expressed was 14%, indicating a weak relationship between emotional bond and vulnerability expressed. Pair-wise comparisons were then analyzed using Dunn’s rank sums for multiple comparisons procedure (Dunn, 1964). It was found that there was a statistically significant difference between Condition 1 (low need – low empathy), mean rank = 333.73, and Condition 2 (high need), mean rank = 488.93, $p < .001$; Condition 1 and Condition 3 (high empathy), mean rank = 583.77, $p < .001$; Condition 1 and Condition 4 (high need – high empathy), mean rank = 593.56, $p < .001$ and Condition 2 and Condition 3, $p = .001$, but there was no significant difference between Condition 3 and Condition 4, $p = 1$.

Hypothesis 1 predicted that a state of need in one individual and a state of empathy in another individual will result in a weak emotional bond. It was therefore anticipated that in Condition 2, where the confederate expresses a high state of need, participants in a high state of empathy will report experiencing a weak emotional bond. In Condition 3, where the confederate expresses a high state of empathy, it is expected that participants in a high state of need will also report experiencing a weak emotional bond with the confederate.

As expected, there was a significant positive correlation between participants’ level of empathy and the emotional bond in Condition 2 (high need), $r_s = .56, p < .001$. Next, a regression analysis was performed to determine whether participants’ state of empathy and impression of the confederate’s state of need were predictors of emotional bonding and
findings confirmed this, $F(2, 247) = 65.89, p < .001$, adj. $R^2 = .34$ (see Table 3, for regression coefficients and standard errors).

Table 3

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
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<td>State of Empathy</td>
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<td>.02</td>
<td>.51***</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.13</td>
<td>.04</td>
<td>.18**</td>
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</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

In Condition 3 (high empathy) the correlation between participants’ state of need and the emotional bond reported was not statistically significant, $r_s = .08, p = .19$ ns, but there was a significant positive correlation between the participant’s state of empathy and emotional bond, $r_s = .57, p < .001$. A regression analysis was then conducted to examine the relative importance of participants’ state of need and impression of the confederate’s state of empathy in emotional bonding. Results revealed that only participants’ impression of the confederate’s state of empathy was a significant contributor in predicting emotional bonding, $F(2, 247) = 61.07, p < .001$, adj. $R^2 = .33$ and Table 4, displays the regression coefficients and standard errors. Thus, Hypothesis 1 could only be partially substantiated.
Table 4

*State of Need and Impression of Empathy as Predictors of Emotional Bond in Condition 3 (high empathy) in Experiment 1*

<table>
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<tr>
<th>Variables</th>
<th>$B$</th>
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<th>$\beta$</th>
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<td>.03</td>
<td>.00</td>
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</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

The second hypothesis anticipated that when two persons in a high state of need exhibit a high state of empathy towards each other a strong emotional bond will occur. It is therefore expected that participants in Condition 4 who are in a high state of need and a high state empathy and who also perceived the confederate as being in a high state of need and a high state of empathy, will report a strong emotional bond with the confederate. As shown in Table 5, only participants’ state of empathy and impression of the confederate’s state of empathy contributed significantly in predicting emotional bond, $F(4, 245) = 55.78, p < .001$, adj. $R^2 = .47$. Hypothesis 2 was therefore only partially supported.
Table 5

*State of Need and Empathy and Impression of Need and Empathy as Predictors of Emotional Bond in Condition 4 (high empathy high need) in Experiment 1*

<table>
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<th>Variables</th>
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Note. *$p < .05$, **$p < .01$, ***$p < .001$.*

**Summary of hypotheses testing.** Findings revealed that while state and impression of empathy contributed to emotional bonding at a statistically significant level, a state of need did not and impression of need was not a consistent predictor of emotional bonding. Overall, hypotheses were partially supported as the expected need-empathy interaction resulting in an emotional bond occurred with participants who were in a state of empathy when there was a perceived need. However, the reverse was not supported as participants in a state of need, when there was perceived empathy, did not predict emotional bonding. Moreover, state of empathy and impression of empathy were jointly and separately more reliable predictors of emotional bond.
Investigating internal consistency

To better understand the outcome of the results, further analyses were performed. An exploratory analysis was conducted to examine whether the items presumed to measure “need,” “empathy” and “emotional bond” were classifiable in accordance with their intended components. Then, an item analysis was done to identify and select the items that made the greatest contributions to emotional bonding. The objectives of these assessments were to verify the validity of the measuring tool and to achieve the best model for predicting emotional bonding.

Exploratory analysis. The initial exploratory analysis examined the factorability of 64 items intending to measure participants’ state and impression of need and empathy and emotional bond. The results showed that two items, “hungry” and “thirsty,” consistently loaded as separate components from all others (see Appendix E). As they were not consistent with other items measuring need they were removed.

For the remaining 56 items, the overall Kaiser-Meyer Olkin (KMO) measure showed that all variables had at least one correlation coefficient greater than 0.4. Individual KMO measures were all greater than .7 and the overall KMO measure was 0.929, falling within the “middling” to “marvelous” classification according to Kaiser (1974). Bartlett’s Test of Sphericity was statistically significant, $p < .001$, confirming that there was adequacy of sampling.

Although the first ten components had eigenvalues greater than one which explained 27.5%, 11.5%, 8.2%, 6.3%, 4.8%, 3.9%, 2.9%, 2.4%, 2.1% and 1.9% of the total variance, respectively, the seven-component solution generated by the interpretability criterion was preferred, given that the subsequent components had an insufficient number of primary
variables or proved difficult to interpret. The seven-component solution explained 65% of the total variance.

While there were three cross-loadings, the exploratory analysis validated that the retained 56 items could generally be categorized as independent measures along the intended stratifications of “need,” “empathy” and “emotional bonding.” There were strong loadings of all pretest and posttest state of empathy items on component 1, all posttest impression of empathy items on component 2, all pretest and posttest state of need items on component 3, all pretest impression of empathy items on component 4, all posttest impression of need on component 5, most pretest and posttest emotional bond items on component 6 and all pretest impression need items on component 7 (see Table 6).
Table 6

Factor loadings and communalities with Varimax Rotation for 56 items measuring "Need", "Empathy" and "Emotional Bond"

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
<th>Component 5</th>
<th>Component 6</th>
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Table 6 Cont’d

*Factor loadings and communalities with Varimax Rotation for 56 items measuring "Need", "Empathy" and "Emotional Bond"*

<table>
<thead>
<tr>
<th>Item</th>
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Table 6  Cont’d

Factor loadings and communalities with Varimax Rotation for 56 items measuring "Need", "Empathy" and "Emotional Bond"

<table>
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<tr>
<th>Item</th>
<th>Component</th>
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<th>6</th>
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<td>Post Attracted</td>
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<td>.639</td>
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<tr>
<td>Pre Impression Sad</td>
<td>.711</td>
<td></td>
<td></td>
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<tr>
<td>Needy</td>
<td>.711</td>
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<tr>
<td>Tired</td>
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<tr>
<td>Pre Impression</td>
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<td>.281</td>
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</table>

Note. Factor loadings < .4 are suppressed. Pre = Pretest Item; Post = Posttest Item.
Item analysis. Each item on the scales measuring posttest “need” and “empathy,” inclusive of posttest impressions of need and empathy, were analyzed in order to select the ones which made the greatest contribution to emotional bond. The criterion for selection was that the item must have a positive relationship that is statistically significant with each of the four items on the Emotional Bond Scale. The item analysis used only the posttest responses since the pretest need and empathy items were intended to generate a neutral or baseline effect and were not associated with the introduction of the independent variable, vulnerability.

The results of a correlation analysis supported the retention of the original posttest empathy and posttest impression empathy items (see Appendix F). Thus, the measure of empathy remained unchanged and suitable for final analysis.

Correlation analysis of the state of need and impression of need scales revealed that many of the need items did not correlate with items of emotional bond at statistically significant level (see Appendix G). When these items were removed, the state of need scale comprised of three items (sad, needy and lonely), while the Post Impression Need Scale yielded two items (sad and lonely). The Need Scales were therefore modified accordingly.

Hypotheses re-examined

Following adjustments to the measure of state of need and impression of need, the hypotheses were re-examined using these modified measures of need. Hypothesis 1 predicted that participants in Condition 2 (high need) who were in a high state of empathy and who perceived the confederate as being in a high state of need would report a weak emotional bond. The results, which incorporated the modified impression of need scale, produced
confirmatory findings, $F(2, 247) = 67.37, p < .001$, adj. $R^2 = .35$ (see Table 7) which was very similar to the initial results from Condition 2 ($F(2, 247) = 65.89, p < .001$, adj. $R^2 = .34$).

Further investigations were conducted in order to discover if there were other pairings of state and impression of need and empathy which could predict emotional bonding in Condition 2. It was believed that this sort of investigation could reveal additional information about the nature of emotional bonding regarding need and empathy. It was discovered that state of empathy and impression of empathy were significant contributors to emotional bonding and this can be seen in Table 8, $(F(2, 247) = 81.36, p < .001$, adj. $R^2 = .39$).

Additionally, state of need and impression empathy were also good predictors of emotional bonding and this is shown in Table 9, $(F(2, 247) = 80.99, p < .001$, adj. $R^2 = .39$).

Table 7

*State of Empathy and Impression of Need as Predictors of Emotional Bond in Condition 2 (high need) in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.46</td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.22</td>
<td>.03</td>
<td>.49***</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.43</td>
<td>.12</td>
<td>.20***</td>
</tr>
</tbody>
</table>

Note: *$p < .05$, **$p < .01$, ***$p < .001$. 

79
Table 8

*Trial Combination of State of Empathy and Impression of Empathy as Predictors of Emotional Bond in Condition 2 (high need) in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
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<th>β</th>
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</thead>
<tbody>
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<td>Impression Empathy</td>
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<td>.35***</td>
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<tr>
<td>State of Empathy</td>
<td>.16</td>
<td>.03</td>
<td>.35***</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.

Table 9

*Trial Combination of State of Need and Impression of Empathy as Predictors of Emotional Bond in Condition 2 (high need) in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
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<th>β</th>
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<tbody>
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<tr>
<td>Impression of Empathy</td>
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<td>.03</td>
<td>.52***</td>
</tr>
<tr>
<td>State of Need</td>
<td>.34</td>
<td>.06</td>
<td>.28***</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.

For Condition 3 (high empathy) it was anticipated that participants who were in a high state of need would report experiencing a moderate emotional bond towards the confederate.

A correlation analysis revealed a positive statistically significant relationship between participants’ state of need and emotional bond, $r_s = .15$, $p = .02$ but regression analysis testing whether state of need and impression of empathy were good predictors of emotional bond
found that only impression of empathy contributed significantly in predicting emotional bond, $F(2, 247) = 61.68, p < .001$, adj. $R^2 = .33$ (see Table 10). Hypothesis 1 therefore remained only partially supported as the expected results were confirmed in Condition 2 (high need) but not fully so in Condition 3 (high empathy).

Trial combinations of state and impression of need and empathy were also conducted in Condition 3 (high empathy) to better understand the nature of emotional bonding on the basis of need and empathy. It was revealed that participants’ state of empathy and impression of the confederate’s state of empathy were better predictors of emotional bond, $F(2, 247) = 87.94, p < .001$, adj. $R^2 = .41$ (see Table 11, for regression coefficients and standard errors). State of need and impression of empathy in Condition 3 were also good predictors of emotional bonding, $F(2, 247) = 67.5, p < .001$, adj. $R^2 = .35$, and the results were very similar to that in Condition 2 (high need). See Table 12, for regression coefficients and standard errors.

Table 10

<table>
<thead>
<tr>
<th>Variables</th>
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<tr>
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<td>State of Need</td>
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<td>Impression of Empathy</td>
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<td>.57***</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$. 
Table 11

*Trial Combination of State of Empathy and Impression of Empathy as Predictors of Emotional Bond in Condition 3 (high empathy) in Experiment 1*

<table>
<thead>
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<th>Variables</th>
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</thead>
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<tr>
<td>Impression of Empathy</td>
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<td>.04</td>
<td>.36***</td>
</tr>
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</table>

Note. *p < .05, **p < .01, ***p < .001.

Table 12

*Trial Combination of State of Empathy and Impression of Need as Predictors of Emotional Bond in Condition 3 (high empathy) in Experiment 1*

<table>
<thead>
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<th>Variables</th>
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<td>.02</td>
<td>.56***</td>
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</table>

Note. *p < .05, **p < .01, ***p < .001.

In keeping with hypothesis 2, it was anticipated that in Condition 4 (high need – high empathy), participants in a high state of need and empathy who perceived the confederate as also being in a high state of need and empathy would report experiencing a strong emotional bond with the confederate. Initial testing revealed that only two of these variables, state of empathy and impression of empathy, contributed significantly in predicting emotional bonding. When this hypothesis was re-tested using the modified scales for state of need and
impression of need, it was found that three variables, state of need and empathy and impression of empathy predicted emotional bonding at a statistically significant level, \( F(4, 245) = 60.96, p < .001, \) adj. \( R^2 = .49 \) (see Table 13 for regression coefficients and standard errors). In keeping with the prediction that mutual vulnerability would result in the strongest emotional bonding, the strength of the emotional bond reported in Condition 4 was indeed the strongest of the four conditions.

Table 13

**Predicting Emotional Bond in Experiment 1**

<table>
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<th>( \beta )</th>
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<td>.04</td>
<td>.29***</td>
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<td>.07</td>
<td>.19***</td>
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<tr>
<td>Impression of Need</td>
<td>-.04</td>
<td>.12</td>
<td>-.02</td>
</tr>
</tbody>
</table>

*Note. *\( p < .05, **p < .01, ***p < .001. \)*

Given the original form of VTEB stated earlier:

\[ B = f(N_1, N_2, E_1, E_2) \]

the results so far cannot be used to generate a true and valid form of this equation. However, if we consider the study participant to be Person 1 in the dyad \( (N_1 \) and \( E_1) \), and if we use the
study participant’s impressions of Person 2’s level of need (N₂) and empathy (E₂), the VTEB model can so far be quantified as follows:

\[ B = 0.25N₁ - 0.04N₂ + 0.19E₁ + 0.18E₂ - 0.03 \]

**Summary of re-tested hypotheses.** After modifications to the measures for state of need and impression of need, hypothesis 1 was still only partially supported as results from Condition 2 were as anticipated, onlookers’ state of empathy and impression of need resulted in an emotional bond, but results from Condition 3 did not support the notion that an onlooker’s state of need and impression of empathy led to the development of an emotional bond. However, the re-analysis of Hypothesis 2 using the modified scales produced results which were more aligned with expectations.

**De-constructing “emotional bond”**

The Emotional Bond Scale contained four items: “like,” “close,” “attracted” and “love.” These four items were intended to be progressive measures of emotional bond, with attraction and love being the highest forms of bonding. The Emotional Bond Scale can then be divided into two components, one focusing on the “casual” aspect of emotional bonding using the “like” and “close” items, and the other looking at the romantic aspect of emotional bonding using the “attracted” and “love” items. The hypotheses will again be examined³ in order to compare the impact of vulnerability on casual and romantic bonding as separate entities.

---

³ The modified state of need and the modified impression of need scales were used.
Effects of vulnerability on casual bonding and romantic bonding. In keeping with Hypothesis 1, it was anticipated that in Condition 2 (high need) there would be a positive correlation between: (a) state of empathy and casual bonding and (b) state of empathy and romantic bonding, and this was confirmed. There was a positive and statistically significant relationship between state of empathy and casual bond, \( r_s = .53, p < .001 \), and state of empathy and romantic bond, \( r_s = .48, p < .001 \).

A multiple regression analysis was then conducted to determine whether state of empathy and impression of need predicted casual bonding and romantic bonding respectively. For casual bonding, both variables were significant predictors, \( F(2, 247) = 61.06, p < .001 \), \( \text{adj. } R^2 = .33 \) (see Table 14), while only state of empathy was a significant contributor in the prediction of romantic bonding, \( F(2, 247) = 38.85, p < .001 \), \( \text{adj. } R^2 = .23 \) (see Table 15).

Table 14

<table>
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<th>( \beta )</th>
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</thead>
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<tr>
<td>Impression of Need</td>
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<td>.25***</td>
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<tr>
<td>State of Empathy</td>
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<td>0.02</td>
<td>.43***</td>
</tr>
</tbody>
</table>

Note. *\( p < .05 \), **\( p < .01 \), ***\( p < .001 \).
Table 15

*State of Empathy and Impression of Need as Predictors of Romantic Bonding in Condition 2 (high need) in Experiment 1*

<table>
<thead>
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<th>Variables</th>
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<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Impression of Need</td>
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<td>0.07</td>
<td>0.09</td>
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<tr>
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<td>0.11</td>
<td>0.01</td>
<td>0.45***</td>
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</table>

Note. *p < .05, **p < .01, ***p < .001.

Trial combinations of state and impression of need and empathy were analyzed for their ability to predict romantic bonding. It was found that impression of empathy and state of empathy were predictive of romantic bonding, \( F(2, 247) = 41.08, p < .001 \), adj. \( R^2 = .24 \) (see Table 16 for details). State of need and impression of empathy were also predictive of romantic bonding, \( F(2, 247) = 35.24, p < .001 \), adj. \( R^2 = .22 \) (see Table 17 for regression coefficients and standard errors).

Table 16

*Trial Combination of Impression of Empathy and State of Empathy as Predictors of Romantic Bonding in Condition 2 (high need) in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
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<th>SE_β</th>
<th>β</th>
</tr>
</thead>
<tbody>
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<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>0.05</td>
<td>0.02</td>
<td>0.017*</td>
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<tr>
<td>State of Empathy</td>
<td>0.09</td>
<td>0.02</td>
<td>0.39***</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.*
Table 17

*Trial Combination of State of Need and Impression of Empathy as Predictors of Romantic Bonding in Condition 2 (high need) in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
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</thead>
<tbody>
<tr>
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<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>0.10</td>
<td>0.02</td>
<td>0.36***</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>0.16</td>
<td>0.04</td>
<td>0.25***</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.*

In Condition 3 (high empathy), it was anticipated that there would be a positive relationship between: (a) state of need and casual bonding and (b) state of need and romantic bonding. Results showed that there was no statistically significant relationship between state of need and casual bonding, $r_s = .12, p = .07$ ns, but there was a marginally significant relationship between state of need and romantic bonding, $r_s = .15, p = .02$.

The result of a regression analysis is shown in Table 18, which revealed that only impression of empathy was a significant predictor of casual bonding, $F(2, 247) = 98.67, p < .001$, adj. $R^2 = .44$, while Table 19 shows that both state of need and impression of empathy were significant predictors of romantic bonding, $F(2, 247) = 19.09, p < .001$, adj. $R^2 = .13$. Hypothesis 1 was therefore only partially supported as participants’ state of empathy and impression of empathy, respectively, were good predictors of both casual and romantic bonding. Participants’ state of need appeared to be a good predictor of romantic bonding, but not casual bonding, while impression of need was not a statistically significant predictor of either casual or romantic bonding.
Table 18

State of Need and Impression of Empathy as Predictors of Casual Bonding in Condition 3 (high empathy) in Experiment 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-.09</td>
<td>.52</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.23</td>
<td>.02</td>
<td>.67***</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.

Table 19

State of Need and Impression of Empathy as Predictors of Romantic Bonding in Condition 3 (high empathy) in Experiment 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-.03</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.04</td>
<td>.04</td>
<td>.06</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.13</td>
<td>.02</td>
<td>.36***</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.
In keeping with Hypothesis 2, it was anticipated that participants’ state of need, state of empathy, impression of need and impression of empathy would be good predictors of casual bonding and romantic bonding, respectively. It was found that state of empathy, state of need and impression of empathy were good predictors of casual bonding, $F(4, 245) = 69.20, p < .001$, adj. $R^2 = .52$ (see Table 20). For romantic bonding, only state of empathy and state of need were significant predictors, $F(4, 245) = 27.09, p < .001$, adj. $R^2 = .3$ (see Table 21).

Table 20

*Predicting Casual Bonding in Condition 4 in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$β$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.24</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.11</td>
<td>.04</td>
<td>.16**</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.14</td>
<td>.02</td>
<td>.40***</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.00</td>
<td>.06</td>
<td>.00</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.09</td>
<td>.01</td>
<td>.34***</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$. 

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Table 21

*Predicting Romantic Bonding in Condition 4 in Experiment 1*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-.27</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.14</td>
<td>.04</td>
<td>.18**</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.04</td>
<td>.03</td>
<td>.11</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>-.04</td>
<td>.08</td>
<td>-.03</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.11</td>
<td>.02</td>
<td>.41***</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.*

**Demographic response to changes in vulnerability**

In addition to testing the stated hypotheses, it was considered beneficial to examine the response of various demographic groups to changes in vulnerability. It was hoped that this too would yield valuable information regarding the nature of emotional bonding.

The emotional bond reported by all males and females in the sample was compared and it was found that emotional bond scores for females (mean rank = 540.23) were significantly higher than the emotional bond scores for males (mean rank = 466.21), $U = 105,457$, $z = -4.05$, $p < .001$. Further investigation was undertaken to determine whether females would have higher emotional bonding scores than males in each of the four conditions, and it was found that for Condition 1 (low need – low empathy) and Condition 2 (high need) there were no statistically significant differences in the emotional bond reported.
by males and females, but in Condition 3 (high empathy) and Condition 4 (high need – high empathy) females experienced a significantly stronger emotional bond than males (see Table 22).

To get a sense of participants’ overall state of vulnerability pretest and posttest, their state of need and state of empathy scores were combined and analyzed for significant differences. These tests were conducted in the context of providing a background for interpreting the data. A Kruskal-Wallis test revealed that there were no statistically significant differences between participants’ pretest state of overall vulnerability, $\chi^2(3) = 3.74, p = .29$ ns. However, participants’ posttest scores of overall state of vulnerability displayed statistically significant differences between conditions, $\chi^2(3) = 3.7429.52, p < .001$. The pair-wise analysis revealed differences in posttest scores between Condition 1 (mean rank = 427.76) and Condition 2 (mean rank = 497.41), $p = .04$; Condition 1 and Condition 3 (mean rank = 509.59), $p = .01$; Condition 1 and Condition 4 (mean rank = 567.24), $p < .04$; but not between Conditions 2 and 3 nor Conditions 3 and 4.

Similarly, participants’ pretest and posttest ratings of the confederate’s state of overall vulnerability were analyzed, in order to assist with the interpretation of the data. For pretest impression of vulnerability scores, there were no statistically significant differences between conditions, $\chi^2(3) = 3.33, p = .33$ ns. For posttest scores however, there were statistically significant differences between conditions, $\chi^2(3) = 389.7, p < .001$. Pair-wise comparisons showed that the differences were between Conditions 1 (mean rank = 197.76) and Condition 3 (mean rank = 545.24), $p < .001$; Condition 1 and Condition 2 (mean rank = 591.32), $p < .001$; Condition 1 and Condition 4 (mean rank = 667.68); $p < .001$; Condition 3 and
Condition 4, \( p < .001 \) and Condition 2 and Condition 4, \( p = .02 \); but not between Condition 3 and 2, \( p = .45 \) ns.

While initial results indicated that there were significant differences in emotional bond scores based on marital status, \( \chi^2(3) = 8.28, p = .04 \), the subsequent pair-wise comparisons did not reveal any significant differences in cross comparisons among participants who were divorced (mean rank = 561.45), married (mean rank = 515.01), widowed (mean rank = 510.95) and single (mean rank = 475.15).

Similarly, for level of education, initial results indicated there were significant differences in the emotional bond scores based on level of education, \( \chi^2(6) = 15.31, p = .02 \), but post hoc analyses indicated that there were no significant differences in the emotional bonding scores for participants educated at the primary level (mean rank = 390.88), high school level (mean rank = 486.06), associate degree level (mean rank = 543.49), bachelor’s level (mean rank = 473.18), post graduate level (mean rank = 584.83) or doctoral level (mean rank = 437.61).

There were no statistically significant differences in emotional bond based on ethnicity, \( \chi^2(8) = 9.86, p = .28 \) ns nor sexual orientation, \( \chi^2(3) = 5.62, p = .13 \) ns.
Table 22

Comparison of Emotional Bond Scores of Males and Females in Each Condition in Experiment 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Males Mean Rank (n)</th>
<th>Females Mean Rank (n)</th>
<th>U</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>125.99 (130)</td>
<td>124.97 (120)</td>
<td>7736.0</td>
<td>-.11</td>
</tr>
<tr>
<td>2</td>
<td>118.05 (139)</td>
<td>134.82 (111)</td>
<td>6679.5</td>
<td>-1.83</td>
</tr>
<tr>
<td>3</td>
<td>109.42 (132)</td>
<td>142.58 (117)</td>
<td>5665.0</td>
<td>-3.64***</td>
</tr>
<tr>
<td>4</td>
<td>112.61 (142)</td>
<td>142.44 (108)</td>
<td>5838.0</td>
<td>-3.26**</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001. The numbers in parentheses are the number of males or females in the respective condition.
Chapter 4 Experiment 2

Overview

Experiment 1, which is discussed in the previous chapter, investigated how the dynamics between states and impressions of need and empathy impacted emotional bond. All participants in Experiment 1 were from the United States of America and so Experiment 2 takes a cross-cultural approach, exploring the hypotheses in the context of the Republic of Fiji and thereby facilitating the comparison of vulnerability and emotional bonding in a non-western versus a western society.

Method

Participants

A total of 114 participants from the Republic of Fiji took part in Experiment 2, of which 70 were males and 44 were females. The mean age of the sample was 21.67 (SD = 5.16). There were 103 participants who identified as straight, 2 who identified as bi-sexual, 3 who identified as gay/lesbian, 12 identified as other and 4 as unsure. The majority of the sample, 73.7%, identified as Pacific Islander, while 7% identified as Asian Indian, 2.6% as Multiracial, while 10.5% identified as ‘other’ and .9% identified as Asian Other and Hispanic.

Recruitment. Participants in Fiji were recruited via word of mouth, flyers and handout cards (see Appendix G for wording of flyers and handout cards). All participants were compensated the amount of FJ$1.50 (US$1 = FJ$1.84) upon completion of the experiment.
Eligibility. The criteria for eligibility specified that participants be eighteen-years-of-age or older and from Fiji.

Procedure and Materials

Besides the recruitment process and the provision of a computer laboratory for participants, all procedures and materials in Experiment 1 and Experiment 2 remained the same as the experiment was completed online. The modified state of need and impression of need scales that were used in Experiment 1 were used throughout Experiment 2 where necessary.

Pretest and manipulation checks

Evaluation of the pretest scores using a Kruskal-Wallis H test indicated that there were no statistically significant differences across conditions in participants’ self-report of state of need, \( \chi^2 (3) = 6.95, p = .07 \) \( ns \), state of empathy \( \chi^2 (3) = 7.68, p = .05 \) \( ns \), impression of the confederate’s state of need, \( \chi^2 (3) = 2.08, p = .56 \) \( ns \), impression of the confederate’s state of empathy \( \chi^2 (3) = 3.54, p = .32 \) \( ns \) and the emotional bond experienced towards the confederate, \( \chi^2 (3) = 3.71, p = .29 \) \( ns \). Table 23 shows the similarity of pretest mean scores for state and impression of need, empathy and emotional bonding across conditions.

Manipulation checks were conducted to confirm whether participants perceived the confederate’s state of need and empathy as was intended by the researcher. Findings revealed that the confederate’s state of need in the high need conditions\(^4\), Conditions 2 and 4 (mean rank = 76.57), was perceived to be significantly higher than in the low need conditions,

\(^4\) A Mann-Whitney U test was used to compare the combined mean scores of the two high need conditions, to the combined mean scores of the two low need conditions.
Conditions 1 and 3 (mean rank = 39.09), $U = 2,692$, $z = 6.06$, $p < .001$, while participants in the high empathy conditions\(^5\), Conditions 3 and 4 (mean rank = 73.43), perceived the confederate to be in a significantly higher state of empathy than participants in the low empathy conditions, Conditions 1 and 2 (mean rank = 44.60), $U = 2,419$, $z = 4.72$, $p < .001$.

Table 24 shows posttest mean scores for impression of need and empathy across conditions.

**Summary of pretests and manipulation checks.** The results of the pretests showed that across all conditions, participants were in similar states of need and empathy, they had similar impressions of the confederate’s state of need and empathy and reported similar levels of emotional bond. Manipulation checks of posttest results confirmed that participants perceived the confederate to be in a high state of need in Conditions 2 and 4, and a high state of empathy in Conditions 3 and 4 as intended.

\(^5\) A Mann-Whitney U test was used to compare the combined mean scores of the two high empathy conditions to the combined mean scores of the two low empathy conditions.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Need Mean (SD)</th>
<th>Empathy Mean (SD)</th>
<th>Impression Need Mean (SD)</th>
<th>Impression Empathy Mean (SD)</th>
<th>Emotional Bond Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.27 (4.69)</td>
<td>23.88 (6.24)</td>
<td>23.94 (5.38)</td>
<td>21.52 (6.69)</td>
<td>7.06 (3.82)</td>
</tr>
<tr>
<td>2</td>
<td>15.43 (4.56)</td>
<td>23.87 (6.31)</td>
<td>22.40 (5.16)</td>
<td>24.17 (5.65)</td>
<td>8.10 (3.44)</td>
</tr>
<tr>
<td>3</td>
<td>18.72 (5.05)</td>
<td>26.64 (6.76)</td>
<td>24.44 (5.45)</td>
<td>24.56 (5.80)</td>
<td>7.76 (3.00)</td>
</tr>
<tr>
<td>4</td>
<td>17.85 (5.44)</td>
<td>27.23 (5.74)</td>
<td>23.62 (5.91)</td>
<td>24.62 (5.26)</td>
<td>7.46 (2.79)</td>
</tr>
</tbody>
</table>
Table 24

*Posttest Impression Need and Empathy Mean Scores Across Conditions in Experiment 2*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Posttest Impression Need</th>
<th>Posttest Impression Empathy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>1</td>
<td>15.73 (6.24)</td>
<td>17.64 (7.52)</td>
</tr>
<tr>
<td>2</td>
<td>25.73 (5.67)</td>
<td>31.80 (4.97)</td>
</tr>
<tr>
<td>3</td>
<td>19.32 (5.44)</td>
<td>32.16 (5.79)</td>
</tr>
<tr>
<td>4</td>
<td>24.73 (5.44)</td>
<td>31.69 (5.13)</td>
</tr>
</tbody>
</table>
Hypotheses examined

The main effect in the experiment should be an increase in the strength of the emotional bond from Condition 1 (low need - low empathy) to Conditions 2 and 3 (high need - low empathy, high empathy - low need) to Condition 4 (high need - high empathy). The outcome is shown in Figure 4 where the emotional bond reported by each condition posttest was examined.

Figure 4. Posttest Mean Emotional Bond Scores Across Conditions in Experiment 2. Error bars represent standard error.
The mean score of the emotional bond reported by participants in each condition was examined. Comparison of mean scores showed that as vulnerability increased, reports of emotional bonding increased across Conditions but fell slightly after Condition 3. Next, the significance of the difference in emotional bond score between conditions was examined and this revealed statistically significant differences in the mean emotional bond scores between Condition 1 (mean rank = 38.12) and Condition 2 (mean rank = 64.87), \( p = .01 \); Condition 1 and Condition 3 (mean rank = 68.32), \( p = .003 \); and Condition 1 and Condition 4 (mean rank = 63.19), \( p = .02 \) but not among any combination of Conditions 2, 3 and 4.

To better understand this outcome, further investigations were conducted to account for the finding that there were no differences in the emotional bond scores between Conditions 2, 3 and 4. To do this, a Kruskal-Wallis H test was used to determine if there were any differences in the state of need, state of empathy, impression of need and impression of empathy scores recorded between the four conditions. To this end, findings revealed that there was a significant difference in state of empathy \( (\chi^2 (3) = 15.43, p < .01) \), impression of need \( (\chi^2 (3) = 65.07, p < .001) \) and impression of empathy \( (\chi^2 (3) = 58.76, p < .001) \), but no differences were found between conditions for state of need, \( (\chi^2 (3) = 6.18, p = .1 \text{ ns}) \).

Follow-up tests were then conducted to evaluate pair-wise differences among the four groups for state of empathy, impression of need and impression of empathy. For state of empathy, the post hoc test revealed statistically significant differences between Conditions 1 (mean rank = 40.32) and Condition 2 (mean rank = 64.45), \( p < .02 \); and Condition 1 and Condition 3 (mean rank = 72.28), \( p = .001 \); but not between Conditions 1 and 4 (mean rank = 57.08) or any other combination.
For impression of need, there were significant differences between Condition 1 (mean rank = 26.33) and Condition 4 (mean rank = 72.33), $p < .001$; Condition 1 and Condition 2 (mean rank = 87.90) $p < .001$; Condition 3 (mean rank = 46.74) and Condition 4, $p < .05$; and Condition 3 and Condition 2, $p < .001$. There was no difference between the impression of need reported between Condition 1 and Condition 3 and Condition 4 and Condition 2.

For impression of empathy, there were statistically significant differences between Condition 1 (mean rank = 21.06) and Condition 2 (mean rank = 70.50), $p < .001$; and Condition 1 and Condition 3 (mean rank = 74.66), $p < .001$; and Condition 1 and Condition 4 (mean rank = 72.25), $p < .001$. There were no significant differences in impression of empathy between Conditions 2, 3 and 4.

In keeping with hypothesis 1, it was expected that a state of need in one individual and a state of empathy in another individual, will result in an emotional bond. Accordingly, it was anticipated that in Condition 2 (high need) participants in a state of empathy would form an emotional bond with the confederate, while in Condition 3 (high empathy), participants who were in a state of need would form an emotional bond with the confederate.

For Condition 2 (high need), correlation analysis confirmed a significant and positive relationship between participants level of empathy and emotional bond, $r_s = .51, p = .004$. Next, a regression analysis was performed to determine whether participants’ state of empathy and impression of the confederate’s state of need were predictors of emotional bonding. Findings indicated that only state of empathy contributed significantly in predicting emotional bond (see Table 25 for regression coefficients and standard errors), $F(2, 27) = 11.55, p < .001$, adj. $R^2 = .42$. 

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For Condition 3 (high empathy), correlation analysis showed that there was no significant relationship between participants' level of need and emotional bond, $r_s = .17, p = .43 \ ns$. A regression analysis was then conducted to examine the relative importance of participants' state of need and impression of the confederate's state of empathy on emotional bonding. Results revealed that neither variables were good predictors of emotional bonding (see Table 26 for regression coefficients and standard errors), $F(2, 22) = 2.03, p = .16$, adj. $R^2 = .08 \ ns$. Thus, Hypothesis 1 could not be substantiated.

Hypothesis 2 proposed that when two persons in a high state of need exhibit a high state of empathy towards each other a strong emotional bond will occur. It is therefore expected that participants in Condition 4 who are in a high state of need and a high state empathy and who also perceived the confederate as being in a high state of need and a high state of empathy, will report a strong emotional bond with the confederate. As shown in Table 27, neither of these variables contributed significantly in predicting emotional bonding, $F(4, 21) = 3.03, p = .04$, adj. $R^2 = .25 \ ns$. 
Table 25

*State of Empathy and Impression of Need as Predictors of Emotional Bond in Condition 2 (high need) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>- .27</td>
<td>5.54</td>
<td></td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.48</td>
<td>.10</td>
<td>.69***</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>-.09</td>
<td>.58</td>
<td>-.02</td>
</tr>
</tbody>
</table>

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 26

*State of Need and Impression of Empathy as Predictors of Emotional Bond in Condition 3 (high empathy) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>10.74</td>
<td>4.72</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.60</td>
<td>.30</td>
<td>.42</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>-.07</td>
<td>.15</td>
<td>-.09</td>
</tr>
</tbody>
</table>

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. 
Table 27

*Predicting Emotional Bond in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td></td>
</tr>
<tr>
<td>State of Empathy</td>
<td>-0.03</td>
<td>0.13</td>
<td>-0.06</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>0.36</td>
<td>0.19</td>
<td>0.43</td>
</tr>
<tr>
<td>State of Need</td>
<td>0.36</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>0.32</td>
<td>0.60</td>
<td>-0.12</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.

**Summary of hypotheses testing.** Conditions 2 and 3 facilitated the testing of hypothesis 1, which anticipates that in a dyad where one person expresses a state of need and another person expresses a state of empathy, emotional bonding will occur. In Condition 2 (high need), participants’ state of empathy, but not their impression of the confederate’s state of need, was predictive of emotional bonding. In Condition 3 (high empathy), neither participants’ state of need nor their impression of the confederate’s state of empathy were good predictors of emotional bonding. Therefore, hypothesis 1 could not be substantiated as, while state of empathy played a role in the emotional bonding process in Condition 2, there was no evidence that indicated a need-empathy interplay leads to emotional bonding.
Hypothesis 2 was not supported by findings as participants in Condition 4 did not report experiencing an emotional bond based on their state of empathy and impression that the confederate was in a state of need and empathy.

**Effects of vulnerability on casual bonding and romantic bonding**

To better make sense of the results emotional bonding was de-constructed into two components, casual bonding and romantic bonding. As was done in Experiment 1, hypotheses 1 and 2 will be re-examined accordingly.

In keeping with Hypothesis 1, it was anticipated that in Condition 2 (high need) there would be a positive correlation between: (a) state of empathy and casual bonding and (b) state of empathy and romantic bonding and this was confirmed. There was a positive and statistically significant relationship between state of empathy and casual bond, \( r_s = .42, p = .02 \), and state of empathy and romantic bond, \( r_s = .48, p = .01 \).

Regression analysis was then conducted to determine whether state of empathy and impression of need predicted casual bonding and romantic bonding, respectively, in Condition 2 (high need). For casual bonding, only state of empathy was a significant predictor of emotional bonding, \( F(2, 27) = 12.63, p < .001, \text{adj. } R^2 = .45 \) (see Table 28). Likewise for romantic bonding, only state of empathy was a significant contributor in the prediction of bonding, \( F(2, 27) = 5.92, p = .01, \text{adj. } R^2 = .25 \) (see Table 29).
Table 28

*State of Empathy and Impression of Need as Predictors of Casual Bonding in Condition 2 (high need) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-.594</td>
<td>2.582</td>
<td></td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.161</td>
<td>.270</td>
<td>.086</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.220</td>
<td>.048</td>
<td>.666***</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.  

Table 29

*State of Empathy and Impression of Need as Predictors of Romantic Bonding in Condition 2 (high need) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.33</td>
<td>4.05</td>
<td></td>
</tr>
<tr>
<td>Impression of Need</td>
<td>-.25</td>
<td>.42</td>
<td>-.10</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.26</td>
<td>.08</td>
<td>.57**</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$.  

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In Condition 3 (high empathy), it was anticipated that there would be a positive relationship between: (a) state of need and casual bonding and (b) state of need and romantic bonding. Results showed that there was no statistically significant relationship between state of need and casual bonding, \( r_s = .18, p = .4 \ ns \), nor for state of need and romantic bonding, \( r_s = .39, p = .05 \ ns \).

Regression analysis was then conducted to determine whether participants’ state of need and impression of the confederate’s state of empathy were predictive of casual bonding and romantic bonding respectively, in Condition 3 (high empathy). Results indicated that these variables were not significant contributors in predicting casual bond, \( F(2, 22) = 1.03, p = .37, \text{ adj. } R^2 = .003 \ ns \), (see Table 30), nor romantic bond, \( F(2, 22) = 2.61, p = .1, \text{ adj. } R^2 = .12 \ ns \) (see Table 31).

In keeping with Hypothesis 2, it was anticipated that participants’ state of need and empathy and their impression of the confederate’s state of need and empathy would be good predictors of casual bonding and romantic bonding, respectively, in Condition 4. However, this was not supported by findings, casual bonding \( F(4, 21) = 3.28, p = .03, \text{ adj. } R^2 = .27 \ ns \) (see Table 32), while romantic bonding \( F(4, 21) = 2.33, p = .09, \text{ adj. } R^2 = .18 \ ns \) (see Table 33).
Table 30

*State of Need and Impression of Empathy as Predictors of Casual Bonding in Condition 3 (high empathy) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.76</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>0.20</td>
<td>0.17</td>
<td>0.26</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>0.03</td>
<td>0.08</td>
<td>0.064</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.

Table 31

*State of Need and Impression of Empathy as Predictors of Romantic Bonding in Condition 3 (high empathy) in Experiment 2*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>2.76</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>0.40</td>
<td>0.18</td>
<td>0.47 *</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>-0.09</td>
<td>0.09</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.
Table 32

Predicting Casual Bonding in Condition 4 in Experiment 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.26</td>
<td>2.53</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.11</td>
<td>.15</td>
<td>.18</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.11</td>
<td>.30</td>
<td>.09</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>.04</td>
<td>.06</td>
<td>.13</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.19</td>
<td>.09</td>
<td>.44</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$. 

Table 33

Predicting Romantic Bonding in Condition 4 in Experiment 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.31</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>State of Need</td>
<td>.25</td>
<td>.17</td>
<td>.36</td>
</tr>
<tr>
<td>Impression of Need</td>
<td>.21</td>
<td>.35</td>
<td>.14</td>
</tr>
<tr>
<td>State of Empathy</td>
<td>-.07</td>
<td>.07</td>
<td>.27</td>
</tr>
<tr>
<td>Impression of Empathy</td>
<td>.17</td>
<td>.11</td>
<td>.37</td>
</tr>
</tbody>
</table>

Note. *$p < .05$, **$p < .01$, ***$p < .001$. 

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Demographic response to changes in vulnerability

Vulnerability, as expressed by the confederate, was manipulated across conditions. In Condition 1 (low need – low empathy) the confederate expressed low vulnerability, in Conditions 2 (high need) and 3 (high empathy) he expressed moderate vulnerability and in Condition 4 (high need – high empathy) he expressed high vulnerability. This subsection examines how various demographic groups responded to these variations of vulnerability.

The emotional bond score of all male and female participants in this experiment was compared and it was found that there were no significant differences in the emotional bond scores between males (mean rank = 53.39) and females (mean rank = 64.05), $U = 1,252, z = -1.68, p = .09$. Subsequently, an examination of potential gender differences in emotional bonding per condition was conducted and this also showed that there were no gender differences in emotional bond per condition (see Table 34).

Further investigations show no significant differences in emotional bonding by marital status, $\chi^2(3) = 2.69, p = .44 \text{ ns}$; sexual orientation, $\chi^2(3) = 1.60, p = .66 \text{ ns}$; ethnicity, $\chi^2(4) = 2.01, p = .73 \text{ ns}$; nor level of education, $\chi^2(4) = 8.09, p = .09 \text{ ns}$. 

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Table 34

*Comparison of Emotional Bond Scores of Males and Females in Each Condition*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Males</th>
<th>Females</th>
<th>U</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Rank ((n))</td>
<td>Mean Rank ((n))</td>
<td>(U)</td>
<td>(Z)</td>
</tr>
<tr>
<td>1</td>
<td>16.93 (21)</td>
<td>17.12 (12)</td>
<td>124.5</td>
<td>-.06</td>
</tr>
<tr>
<td>2</td>
<td>14.00 (17)</td>
<td>17.46 (13)</td>
<td>85.0</td>
<td>-1.02</td>
</tr>
<tr>
<td>3</td>
<td>12.50 (13)</td>
<td>13.54 (12)</td>
<td>71.5</td>
<td>-.36</td>
</tr>
<tr>
<td>4</td>
<td>12.21 (19)</td>
<td>17.00 (7)</td>
<td>42.0</td>
<td>-1.42</td>
</tr>
</tbody>
</table>

Note. \(*p < .05, **p < .01, ***p < .001.\) The numbers in parentheses are the number of males or females in the respective condition.
Chapter 5 Discussion and Conclusion

Overview

Chapter 5 is dedicated to the interpretation and analysis of the results produced from Experiments 1 and 2. The discourse on Experiment 1 entails a recap of results proceeding from the experimental trials conducted with participants from the United States of America. Findings are explained in accordance with whether they support or reject the stated hypotheses and align with existing literature. The discourse on Experiment 2, with participants from the Republic of Fiji, follows a similar outline but includes a comparative tone in which findings from Experiment 1 are compared with the findings in Experiment 2. Then, the validity of the methods and procedures used in this research are critically evaluated and recommendations for future research are proposed. Finally, the overall implications of the results are discussed in the context of real-world applications and further recommendations for future studies are also discussed.

Experiment 1

This research aimed to bring greater understanding of the effect of vulnerability on emotional bonding and to this end, findings proved to be insightful and promising. The assertion of VTEB, which assumes that vulnerability leads to the formation of an emotional bond, was rigorously investigated using the scientific method and overall findings appear to substantiate some aspects of this theory.
Recap of Experiment 1

In accordance with VTEB, vulnerability was conceptualized as comprising of ‘need’ and ‘empathy’, and Hypothesis 1 anticipated that when one person expresses a need and another person expresses empathy towards that need an emotional bond develops. Hypothesis 2 anticipated that the strongest emotional bonds would be observed in dyads where vulnerability was mutually expressed – that is, when both individuals reciprocate need and are empathetic towards each other’s need. Condition 1 (low need – low empathy) was designed to provide baseline data in the testing of the effect of vulnerability. Conditions 2 (high need) and 3 (high empathy) were designed to test Hypothesis 1 where it was anticipated that participants who expressed a high state of empathy in Condition 2 would develop an emotional bond with the confederate who was perceived to be exhibiting high need while participants who expressed a high state of need in Condition 3 would develop an emotional bond with the confederate who was perceived to be exhibiting high empathy. Condition 4 was designed to test Hypothesis 2 and it was anticipated that participants in this condition who were in a state of high vulnerability – that is, being in a state of high empathy and high need – would develop a strong emotional bond with the confederate when he was perceived to also be in a state of high vulnerability – that is, he is perceived as being in a state of high need and high empathy.

Support was found for Hypothesis 1 in Condition 2 (high need) where it was revealed that being in a state of empathy while perceiving a target person to be in a state of need was predictive of emotional bonding. Trial combinations of state and impression of need and empathy revealed that being in a state of empathy and
perceiving the confederate to be empathetic produced a stronger emotional bond than did the state of empathy – impression of need combination.

The results from Condition 3 (high empathy) showed that only impression of empathy was a good predictor of emotional bonding – one’s state of need was not a significant contributor in predicting whether emotional bonding would occur. This was consistent with findings produced even before the scales for state of need and impression of need were modified. Further investigations revealed that a state of empathy and the impression that confederate was empathic were significant predictors of emotional bonding in Condition 3, further highlighting the significance of the influence of empathy in the bonding process.

For Hypothesis 2, initial findings from Condition 4 suggested that only a state of empathy and impression of empathy were significant contributors in predicting emotional bonding. However, after modification of the state of need and impression of need scales, state of need also contributed significantly in the prediction of emotional bonding. This seems to suggest that while state of need may not be a strong elicitor of emotional bonding as is empathy, its contribution should not be overlooked.

When emotional bonding was de-constructed it was found that casual bonding and romantic bonding had different need and empathy requisites. As anticipated, for Condition 2 (high need) it was found that when an individual in a state of empathy perceived another person to be in a state of need this was predictive of casual bonding. However, for romantic bonding to occur being in a state of empathy was the only significant contributor, perhaps indicating that persons who are empathetic are
open to forming romantic bonds with others regardless of the state of need that person may be exhibiting.

In Condition 3 it was discovered that when a person is perceived to be empathetic, a casual bond may occur regardless of the perceiver’s state of need. However, for romantic bonding, one’s state of need and impression that the person being observed is empathetic played an important role in the initiation of the bonding process.

In Condition 4, the only factors that predicted romantic bonding were state of need and state of empathy. While state of need, state of empathy and impression of empathy were the significant contributors to casual bonding.

Overall findings illustrate a complex relationship between how one’s emotional state and perception of another’s emotional state result in emotional bonding, and even a specific type of emotional bond. While this pattern is much more complex than originally presumed it is hoped that further research will bring greater clarity in understanding how vulnerability instigates emotional bonding.

**Interpretation and Discussion of Findings in Experiment 1**

While the most widely accepted theories of bonding propose that it is an innate tendency that is expressed through learnt behavior, absent from such theories is an elaboration of the mechanisms at work that cause people to form such powerful emotional bonds with each other when they feel most vulnerable. VTEB, a recently emerging theory, attempts to fill this vacant knowledge by developing a theory that systematically describes the processes involved in this phenomenon, such that a
predictive model of emotional bonding can be developed. This research investigated the theoretical model put forward by VTEB and the results yielded interesting insights into the bonding process. This subsection seeks to integrate these findings with existing literature, knowing that this amalgamation can chart the way for future studies and lead to even greater insights. Thus, recommendations for future studies are also implied.

The Relative Importance of Need and Empathy in Emotional Bonding.

Initially, it was anticipated that the emotional bond formed would be the same regardless of whether a person in a state of need interacted with a person they perceived as empathetic or a person in a state of empathy interacted with a person they perceived as needy. It was discovered, however, that depending on the pairings of state or impression, of need or empathy, this would change the strength of the emotional bond as well as the type of emotional bond formed.

Notably, persons in a state of empathy were more prone to forming both casual and romantic bonds as seen in Condition 2, and the perception that a person was empathetic also appeared to play a significant role in the initiation of casual and romantic bonds, as seen in Condition 3. However, results from this study suggest that a state of need and impression of need were only significant contributors for specific types of bonding relationships, and although significant, were not as strong in predicting emotional bonding as were state and impression of empathy. While it would be premature to make any conclusive statements regarding the importance of need before embarking upon further investigation one can consider the possibility that need and empathy are not equal contributors to the bonding process. Without taking
participants’ emotional state into consideration, it is noteworthy that a significantly higher emotional bond was reported by participants in Condition 3 (high empathy) than Condition 2 (high need), even though it was anticipated that both conditions would produce the same level of emotional bond. Furthermore, there was no significant difference in the overall emotional bond reported by participants in Condition 3 (high empathy) and participants in Condition 4 (high empathy - high need), suggesting that the addition of need to empathy in Condition 4 did not produce any drastic changes in the emotional bonding experience.

These findings appear similar to studies that have examined the contribution of need and empathy to the bonding process and concluded that empathy, not need, is associated with emotional bonding (A. Freud & Burlingham, 1942; Harlow, 1958; Rene A Spitz, 1945). The difference in the context of this study however, is that need has been defined, not in physical, but in social terms.

In attempting to understand why empathy would be a greater contributor to emotional bonding it may be important to consider that while an empathetic person may initiate an emotional bond with someone they perceive to be in a state of need, perhaps the empathetic individual, or people in general, may be more interested in deducing whether their own vulnerable state will be protected (Cordova & Scott, 2001). So even if the target is perceived to be in an obvious state of need, the perceiver may be more interested in deducing whether the target is empathetic. An emotional bond is initiated when the perceiver comes to the conclusion that the empathetic target would respond in a way that will not bring them harm. Research has found that in close relationships, individuals were only willing to sacrifice for their
partner if there were certain safeguards, such as a high level of trust (Van Lange et al., 1997). In the same manner, individuals may see it necessary to assess the risk of harm with a stranger, even if he or she is in need, and perceiving a person as empathetic may signal that it is safe to connect with him or her.

Given that individuals are more vulnerable in romantic relationships than casual friendships (Moss & Schwebel, 1993), one can anticipate that as the risk of being vulnerable in a relationship increases, the perception that a person is empathetic would be of greater concern than the impression that a person is needy. This is obvious in Condition 2 where the perception that the target was in a state of need was important when the relationship was casual, but the target’s state of neediness did not factor in for romantic bonding. In fact, while an impression of confederate’s state of need was not a significant contributor to romantic bonding, the impression that he was empathetic played a significant role in romantic bonding in Condition 2 which was the high need condition. To give even greater credence to the argument that people are more interested in the protection of their vulnerability, trial combinations revealed that the participants’ own state of need and the perception that the confederate is empathetic are consistently important to romantic bonding – occurring both in Conditions 2 and 3. Just to be clear, this by no means insinuates that individuals are not mindful of the needs of their romantic interest but perhaps when such close relationships are being initiated where greater vulnerability is involved, individuals may be more focused on assessing whether they would be harmed, and the perception that the person of interest is empathetic is therefore assuring.
Another possibility however, is that the survey tool measuring ‘need’ requires reconstruction and validity assessments. After modification of the Need Scales, state of need was determined by social deprivation, more specifically, by items that gauged the extent to which participants experienced emotions associated with social deprivation (Andrews, Robinson, Shaver, & Wrightsman, 1991). It was initially assumed that these were good indicators of an individual’s level of social neediness. While this logic may seem sound, research has shown that social deprivation, specifically stemming from rejection, leads to antisocial responding (Newcomb, Bukowski, & Pattee, 1993; Twenge, Baumeister, Tice, & Stucke, 2001; Twenge & Campbell, 2003). There is even evidence that shows social exclusion dulls sensitivity to physical pain and reduces one’s capacity to empathize with others (DeWall & Baumeister, 2006). It has also been argued that incidents of school-shootings by students who have experienced on-going rejection are examples of this (Leary, Kowalski, Smith, & Phillips, 2003). What is also of importance is that the self-reported emotional states of socially excluded participants do not differ significantly from the emotional states reported by socially accepted and control participants (Pickett, Gardner, & Knowles, 2004).

It is for this reason that measuring only an individual’s level of social deprivation, such as how lonely or how sad that individual is, does not distinguish them from persons who have a high social need – keeping in mind that social need deprivation may actually result in a reduced desire to interact with others (Pickett et al., 2004) whereas having a high social need should increase the desire to bond with others. Therefore an accurate assessment of an individual’s level of social need must involve deducing the extent to which that person is in a state where they desire to
initiate and maintain social interactions with others. It is their openness or desire to form connections that makes them vulnerable and not just an awareness of the extent of their social deprivation. It is even justifiable for the purposes of this study, to disqualify persons who present as having a chronically impaired capacity that affects their desire to form relationships with others, example, persons who are antisocial or who may exhibit antisocial symptoms as a result of another disorder or medication taken.

The recommendation for future studies therefore is that the need scales should be designed to assess “state of social need” – an openness to initiating social bonds, and VTEB should consider amending its definition of this component of vulnerability accordingly. Additionally, participants should be screened for chronic social impairments. The aim is to ensure that there are no confounds when assessing an individual’s current level of social need.

Yet another observation was that the original state of need and impression of need scales assessed similar need items but when the items on these scales were reviewed it was revealed that the impression of need items best associated with emotional bonding (sad and lonely) were slightly different from the state of need items that best associated with emotional bonding (sad, needy and lonely). This raises the question of whether the cluster of social needs which may compel an individual to form an emotional bond are different from the cluster of social needs which, when perceived in a target by a vulnerable observer, invokes an emotional bond response. It is likely that what is most important when assessing a target’s social need, is surmising whether the target is available or likely to be open to initiating a
relationship (Bazzini & Shaffer, 1999), and should therefore not be limited to measuring only an impression of the target’s level of social deprivation.

Acknowledging intimacy as an aspect of social need. The interaction between participants and the target may have been too impersonal and this may have weakened a potentially strong emotional bonding experience. We therefore look at the role of intimacy in the emotional bonding experience, but rather than present it as an independent component of vulnerability, it is being proposed that intimacy is a component of social need.

In the video where the confederate exhibited high need, he disclosed the painful experience of losing his mother to cancer and his grief was marked by crying. The most common example of intimacy is sharing unpleasant or pleasant private thoughts, feelings and experiences (Prager, 1997). Nonverbal expressions of intimacy include crying, seeking consolation or comfort from others, hugging, hand-holding (Cordova & Scott, 2001) and mutual eye-gazing (Argyle & Dean, 1965; Argyle & Ingham, 1972; Kendon, Sebeok, & Umiker-Sebeok, 1981). It therefore appears that intimacy is inextricably linked to social need as one’s expression of their need for intimacy communicates the level of social need being experienced and the type of social response desired.

Moreover, intimacy is more than just self-disclosure, but consists of an interactive aspect where this self-disclosure is validated and even reciprocated (Cordova & Scott, 2001). But to receive this validation, which is actually an empathetic response, a personalized message must be sent. What is being proposed is that intimacy is a personal message communicated through verbal and non-verbal
cues, which serves to get the attention of its target. For example, communicating, “I want to be loved” lacks the intimacy that is communicated in, “I want your love.”

That being said, it was observed that the confederate did not make eye-contact with the participants, an effect which could be achieved by looking into the camera. This may have decreased the level of intimacy communicated to participants, which in turn may have lowered their empathetic response towards him. It is therefore recommended that intimacy as a component of social need be given more attention, so that the confederate’s expression of high need also translates to an increase in intimacy.

**High Vulnerability and Emotional Bonding.** In Condition 4, where the confederate was perceived to be in a state of high vulnerability – that is, he was perceived to be in a state of both need and empathy – the factors that led to emotional bonding and casual bonding were the participants’ own state of high vulnerability, that is, a state of need and empathy, as well as their impression that the confederate was empathetic. This reiterates the point that individuals may be more interested in deducing whether their own state of vulnerability will be protected.

Yet, this is the reason the findings regarding romantic bonding were unexpected. Following the logic that in romantic relationships where the level of vulnerability experienced is greater (Moss & Schwebel, 1993), participants in Condition 4 would prioritize the protection of their vulnerable state by bonding with someone they perceived as empathetic – which has been based on a consistent pattern in the other Conditions. However, only participants’ high vulnerable state, that is a state of both need and empathy, was predictive of romantic bonding.
While this seemed perplexing at first glance, the only plausible explanation that could be offered is that participants in a state of high vulnerability – that is, a state of need and empathy – are prone to initiating romantic bonds based on the unconsciously perceivable emotional characteristics of their target. This may be indicative of an appraisal process which occurs at the sub-personal level. This notion finds support by research findings which have revealed that many psychological processes occur without the perceiver’s awareness, intention or control (Bargh, 1994; Dienstbier, 1979; Dutton & Aron, 1974; Foster, Witcher, Campbell, & Green, 1998). More specifically, misattribution of arousal theory suggests that when individuals experience strong emotions, such as fear (Dutton & Aron, 1974), aggression (Barclay & Haber, 1965) or even emotional arousal after exercising (Allen, Kenrick, Linder, & McCall, 1989; White & Kight, 1984), they may be unaware of the true source of their heightened emotional state and interpret their emotions as an experience of romantic attraction if a suitable target\textsuperscript{6} is present (Schachter, 1964; Schachter & Singer, 1962). Within these findings lies the suggestion that the true source of a person’s emotional arousal is not easily perceivable, and so the individual attempts to account for their feelings using available information. In a situation where a person of the opposite sex is present, heightened emotional states are often labeled as a romantic attraction towards that person (Dutton & Aron, 1989).

Within this study, there are findings which support the notion that the confederate’s expression of high vulnerability played an important role in the

\textsuperscript{6} This refers to moderator variables that should be taken into account such as whether the target is of the opposite sex.
romantic bond reported by participants, although participants may not have been conscious of this. First, it is important to establish that findings show that the state of vulnerability reported by participants in Conditions 3 and 4 did not differ significantly, yet the romantic bond reported by participants in Condition 4 was stronger than that in Condition 3, and in fact was the strongest of all romantic bonds found across conditions. The only observable difference between Conditions 3 and 4 that can be held culpable for the difference in romantic bonding is that in Condition 3 participants were exposed to a moderate level of vulnerability (the confederate’s display of high empathy), while participants in Condition 4 were exposed to a high level of vulnerability (the confederate’s display of high need and high empathy). Moreover, there is evidence that as the expression of vulnerability displayed by the confederate increased, so too did the vulnerability experienced by participants in each condition – even though pretest scores had recorded similar state of vulnerability across conditions.

The influence of the confederate’s state of vulnerability on the participants’ state of vulnerability appears to be characteristic of emotional contagion, which is the tendency to automatically synchronize, experience or express another person’s emotion (Hatfield, Cacioppo, & Rapson, 1993; Kimura, Daibo, & Yogo, 2008). Some of the most recent neural imaging findings have revealed that when exposed to the emotions of others, individuals automatically experience similar emotions (De Vignemont & Singer, 2006). As it relates to this study, what this could imply is that the function of automaticity can begin simply by being in the presence of another person in a vulnerable state and result in the experience of a romantic bond.
Interestingly, while romantic bonding is based on an automatic response in a high state of vulnerability, this effect does not occur for casual bonding (Dutton & Aron, 1989). This may help explain why participants’ responses expressly acknowledged the input of the confederate’s emotional state to emotional and casual bonding, but not romantic bonding, in Condition 4. Therefore, it seems that the general rule is that individuals seek to safeguard their own vulnerable state by initiating a bond relationship with someone they perceive as empathetic; especially for romantic relationships. However, when there is a mutual state of high vulnerability, romantic bonding is moderated by an appraisal process at the sub-personal level.

**Experiment 2**

Experiment 2 provides a cross-cultural component to understanding how vulnerability impacts emotional bonding in a non-western region, specifically, the Republic of Fiji. Cross-cultural studies facilitate the testing of the generality of findings (Berry, Poortinga, & Pandey, 1997), which is important for studies such as these which attempt to accurately represent a universal concept.

**Recap of Experiment 2**

The main finding in Experiment 2 indicated that only a state of empathy, but not impression of need, was a predictor of emotional bonding in Condition 2 (high need). In Condition 3 (high empathy) there was no evidence to substantiate the prediction that a state of need and an impression of empathy would lead to emotional bonding. As such, these findings did not provide adequate support to confirm Hypothesis 1.
Likewise, Hypothesis 2 found no support for the prediction that state of need, state of empathy, impression of need and impression of empathy would lead to a strong emotional bond. Neither of these variables was predictive of emotional bonding in Condition 4.

To better understand findings, ‘emotional bond’ was deconstructed and both hypotheses retested for their ability to predict casual bonding and romantic bonding. For Condition 2 (high need), it was found that state of empathy was a significant predictor of casual bonding and romantic bonding. However, there were no significant findings in Condition 3 or Condition 4. Thus, hypotheses 1 and 2 remained unsubstantiated.

One important demographic difference between Experiments 1 and 2 was the higher percentage of males in Experiment 2 (61.4%) than were present in Experiment 1 (54.3%). There were also differences in the pattern of emotional bond response across conditions for both experiments as the mean score for emotional bonding increased across Conditions 1 to 4 in Experiment 1, while in Experiment 2 the mean score for emotional bond increased from Conditions 1 to 3, but fell slightly in Condition 4.

Also of importance, there were no differences in participants’ posttest state of vulnerability nor in their impression of the target’s state of vulnerability between some conditions. Notably, there were no differences in the state of need reported by participants across conditions. For state of empathy, while there were differences between Conditions 1 and 2 and Conditions 1 and 3; there was no statistically significant difference between Condition 1 and 4 or any other pair-wise combination
of Conditions 2, 3 and 4. While there were statistically significant differences in the impression of need score between conditions, the exceptions were between Conditions 1 and 3, and Conditions 4 and 2. Lastly, while each condition recorded significant differences for impression of empathy when compared to Condition 1, there were no differences in any of the pair-wise combinations of Conditions 2, 3 and 4.

**Interpretation and Discussion of Findings in Experiment 2**

Experiment 2 did not yield findings that were supportive of the stated hypotheses. While this may be an accurate reflection of the model's inability to find support or represent how vulnerability leads to emotional bonding in the context of Fiji, a review of the execution of the experiment, as well as consideration of other presenting factors appear to account for the discrepancy in findings between Experiments 1 and 2.

Both Experiments 1 and 2 were conducted online. However, for Experiment 2, a computer laboratory was used to facilitate participants. This meant that participants would have been aware of the presence of the research assistants and other participants as they took part in the experiment. Such an environment may have been too clinical, and this could have unwittingly eliminated the intimacy of the interaction between the confederate and the participant. As highlighted in the analysis of Experiment 1, the confederate’s interaction with participants may have been too impersonal given the lack of eye contact and the inability to interact with participants directly. The setting used for Experiment 2 may have compounded this issue, thereby furthering reducing intimacy, which then interrupted the emotional bonding process.
Kanter, Jaffe, and Weisberg (1975) undertook research which led them to conclude that the mere presence of a third party can decrease intimacy and increase self-consciousness as the pair interacts with each other. It was noted that participants in Experiment 2 reported higher levels of need than did participants in Experiment 1 and this coupled with the fact that there were no differences in participants’ posttest state of need across conditions in Experiment 2, appears to support the notion that the presence of others may have led to increased self-consciousness among all participants in Experiment 2.

Another presenting factor was that while the male-female ratio was close to being even in Experiment 1, in Experiment 2, there were significantly more males than females. The outcome of Experiment 1 showed that overall, females reported a stronger emotional bond with the male confederate, and that even though the emotional bond reported by males and females were not significantly different in Condition 1 (low need – low empathy) and Condition 2 (high need), females reported a stronger emotional bond than males in Conditions 3 (high empathy) and 4 (high need – high empathy). Given that males may have a weaker bonding experience with a confederate of the same sex, the negative outcome of Experiment 2 could have been influenced by the large number of males. However, documented observations of the occurrence of emotional bonding in a state of vulnerability has shown that males are not exempt from forming powerful bonds with other males when in a state of vulnerability (Wong et al., 2006), and there is no reason to think this would be different for females as well. What the results of Experiment 2 may suggest is that for emotional bonding to occur there may be differences in the appropriateness of some expressions of vulnerability between individuals of the same sex when compared to
opposite sex dyads. For instance, the expression of vulnerability that would ignite an emotional bond between males may be different from male-female and female-female expressions of vulnerability.

In Condition 2 (high need), being in a state of empathy predicted emotional bonding. There is no obvious explanation for why a state of empathy would predict emotional bonding in Condition 2 (high need) but not in other Conditions, unless participants were to some degree aware of the confederate’s state of need and were responding to this. Alternatively, this could be a failure on the part of the tool measuring participants’ impression of the confederate’s state of need. Still, this does not account for why an emotional bond occurred only in Condition 2 (high need), given that there was no difference between the impression of need scores in Conditions 2 (high need) and 4 (high need – high empathy).

A Critical Evaluation of the Research Methods and Processes Used

In Chapter 1 there was a reflexive discourse stating the post-positivist stance taken by this researcher and a pre-emptive discussion of the strengths and limitations in the undertaking of the experimental design and the instruments and processes employed in this research. It is therefore only fitting to engage in critical reflection after the research has been conducted and results produced, as a more accurate examination of any shortcomings experienced during the actual execution of the experiment can be discussed in keeping with a commitment to transparency.

In reflecting on the interaction between participants and the confederate there appeared to be shortcomings in the research’s ability to replicate real-life encounters
that could lead to emotional bonding. This became apparent in Experiment 2 in particular, where the use of a computer laboratory to facilitate participants may have hindered emotional bonding due to participants’ awareness of the presence of others. There were still other factors present in both experiments which made the participant-confederate encounter less than realistic. For instance, the fact that the interaction between participants and confederate was unidirectional may have dulled the emotional bonding response participants would have experienced had they been of the impression that the confederate was aware of them and able to form an emotional bond with them. It is very likely that when need and empathy are expressed and perceived in face-to-face encounters there may be a greater desire or sense of obligation to respond in a way that would indicate that an emotional bond had been initiated. This line of reasoning is supported by a study conducted by Bazzini and Shaffer (1999) who found that participants, regardless of their relationship commitment status, were more likely to perceive a target as attractive if they first imagined that the target was interested in them as opposed to their best friend. In a second study, participants were lead to believe that they would have the opportunity to interact with an attractive person of the opposite sex who was available and interested in them or unavailable. Once again, the researchers found that all participants, whether they were in an exclusive relationship or an inclusive one, rated the available and interested target as more physically attractive and desirable as a romantic partner than the unavailable target (Bazzini & Shaffer, 1999).

A crucial aspect of Bazzini and Shaffer’s findings was that it overturned the interpretation of a prior study by Johnson and Rusbult (1989), who found that participants in highly committed relationships were more like to rate the photograph
of a target as less attractive than participants in less committed relationships. An examination of these research designs seems to suggest that when participants believe the target is able to establish an emotional bond with them, their experience of an emotional bond towards the target would be stronger. As it pertains to this research, it is likely that because participants’ perceived that the confederate was unaware of them and that there was no means of interacting with the confederate this may have weakened the emotional bonding experience.

Another point of importance is that participants were introduced to the confederate via a brief video clip in which he was focused on the person interviewing him and therefore never seems to make eye-contact with the participants watching him via video. It is possible that the clip was too short and the absence of eye contact did not present him as truly vulnerable. These factors are important since it has been shown that sustained vulnerability is of utmost importance in creating and facilitating a connection between persons (Livingston, 2004) and eye-contact is an important aspect in the initiation of relationships, with its absence signaling disinterest or a lack of acceptance (Frederick, Schafer, & Dobbertin, 1973). However, this will be given greater attention in the following subsection which critically evaluates the VTEB model, since it is possible that in addition to need and empathy, the level of intimacy experienced may also be an important factor in the emotional bonding process.

Despite the likelihood that such a brief and impersonal interaction between the confederate and the participants may have reduced the strength of the emotional bond participants experienced towards the confederate, this study showed evidence that emotional bonding had taken place nonetheless. The question that remains is whether
the strength of the emotional bond reported would have been stronger had the experimental design been able to accommodate participants engaging with the confederate in a more personal way.

Another matter that arose pertains to the possible need to further modify the need scales in order to better understand how emotional bonding is impacted by one’s state of need and impression of another person’s need. An assessment of the original need scales used in this study revealed that the items on the state of need scale that were the best predictors of emotional bonding were feeling sad, lonely and needy, while the items which were the best predictors of emotional bonding on the impression of need scale pertained to whether the confederate seemed sad and lonely. These items are related and could be classified as ‘social needs’, and their association with emotional bonding may be an indication that bonding maybe specifically as a result of a desire to fulfill social needs and not just a broad range of general needs. For instance, items such as hungry and thirsty, which measured physical needs did not appear related to emotional bonding.

On the other hand, it is also likely that the sample which accessed this research did not experience physical needs such as hunger or thirst to the extent that it would render them vulnerable. If one takes into consideration that all the participants in Experiment 1 were from a developed country, and that the majority of them had received schooling past the primary level and all were able to access online resources, which may be considered a privileged resource, these factors make it reasonable to assume that participants’ could be in a position to fulfill more basic physical needs such as hunger and thirst. So despite self-reports indicating that there were
participants who were very hungry and/or thirsty, perhaps their subjective experiences of these states did not cross into threshold of being in a truly vulnerable state. With these issues in mind, it is therefore necessary to further investigate the potential association between need and emotional bonding before a conclusion can be determined.

A Critical Evaluation of the VTEB Model

One of the most valuable contributions VTEB has made is the demystification of ‘vulnerability’ in light of the challenges encountered by previous attempts to define this concept (Luna, 2009). In providing clarification of the function of vulnerability as a natural feature of life this has restored a balanced perspective, as opposed to the skewed conception that it is solely an aversive state experienced by threatened demographic groups in dire need of help. Moreover, its identification of need and empathy as components of vulnerability enabled the development of an operational definition, which then made it possible to test the larger phenomenon of vulnerability and its impact on emotional bonding using an experimental design.

In testing the need-empathy model of vulnerability leading to emotional bonds as proposed by VTEB, there was confirmation in some areas, and where support was not found, it was unclear whether the fault lay within the model proposed by VTEB or the measuring tools, such as the scales used to measure state of need and impression of need. Further research would be necessary to clarify this.

One of the predictions made by VTEB, which was tested by Hypothesis 2, was that mutual vulnerability would lead to the strongest emotional bonds. While it was
evident that the emotional bond reported in Condition 4 was the strongest, as was predicted, at first glance it appeared that participants' impression of the confederate’s state of vulnerability did not contribute to this. However, closer examination of the data and reviews of previous research provided a rational interpretation of the results, which may in fact show support for Hypothesis 2. This finding is groundbreaking as never before has any research demonstrated in such a systematic manner how persons expressing vulnerability – as measured by need and empathy - can develop strong emotional bonds towards each other.

As it pertained to VTEB’s prediction that an individual in a state of need would form a moderate emotional bond with an individual in a state of empathy, as tested in Hypothesis 1, partial support was found for this as results showed that persons in a state of empathy would form an emotional bond with a person they perceived to be in a state of need. However, the reverse was not supported, that is, being in a state of need did not predict the development of an emotional bond with a person perceived to be empathetic, instead, once a target was perceived to be empathetic, this was the only criteria predictive of an emotional bond.

VTEB initially assumed that need and empathy carried the same weight in the emotional bonding process but results consistently showed state of empathy and impression of empathy playing more consistent roles. This however, may have been due to the need to re-vamp the state and impression of need scales.

This research sought to apply the VTEB model to predict when romantic and casual bonds would form. In this regard, the VTEB model once again proved to be quite accurate in many respects, but there were instances where it was apparent that
romantic bonding and casual bonding were the result of much more complex need-empathy combinations than was originally assumed.

In addition to evaluating VTEB using the scientific method, this research also explored how real-life events could disrupt the emotional bonding process when the need and empathy interactions proposed by VTEB are at work. One factor which may affect bonding would be the presence of competing alternatives. When an empathetic person is confronted with the overwhelming needs of many individuals, emotional bonding may not occur. For instance, VTEB would predict that a bond would be initiated between an empathetic individual who interacts with a person who is grieving the death of a parent and is in need of comfort. But if an empathetic person is confronted with numerous persons grieving the death of their parents and seeking comfort, it is perhaps unlikely that he or she would develop an emotional bond with each or even any of the grievers. Doctors and other healthcare professionals tend to experience this and often times become overwhelmed and eventually desensitized (Figley, 1995). It is also being proposed that in a similar manner, when a person in a state of need is in the presence of many empathetic individuals it may be unlikely that an emotional bond would develop with each or even any of these individuals. Using the same concept given in the previous example, if an individual is grieving the death of his or her parents and they receive comfort from numerous individuals, even if he or she develops an appreciation for this support, it is unlikely that an emotional bond would develop with one or each supporter.

Yet another factor which may disrupt the emotional bonding process described by VTEB could be challenges in understanding the cultural differences or norms.
regarding appropriate displays of need and empathy. For example, in the i-Taukei culture in Fiji, openly grieving the death of a loved one may not be perceived as appropriate in some instances (Vingerhoets & Cornelius, 2001), as such expressions of need could be perceived disparagingly as a sign of weakness and shunned. This does not necessarily mean there is no empathy felt towards the person in grief, but the response metered out may not be one that facilitates bonding so much as adherence to cultural expectations.

VTEB has provided an invaluable conceptual framework that illustrates how the interplay between need and empathy can result in emotional bonding. This has created the opportunity for research such as this to be conducted and in so doing has provided clarity as well as given rise to a number of questions that beg to be answered.

**Implications of Results and Future Directions**

The result of this research provides encouraging initial findings for VTEB, as well as constructive feedback relevant to everyday life as well as to some areas of Psychology. Results complement as well as contribute to existing literature. The phenomenon of emotional bonding in a state of vulnerability has been well documented in qualitative research, but the move to investigate it quantitatively has been long overdue. Being able to identify and measure the emotional states characteristic of vulnerability, has created this opportunity and revealed useful information and recommendations for future research. It is hoped that continued research will lead to the development of a predictive model of emotional bonding in a state of vulnerability.
**Vulnerability incites bonding.** One important finding this study produced is the exciting possibility that a person’s expression of vulnerability could induce a similar state of vulnerability which could in turn lead to romantic bonding. Being able to establish how and the extent to which vulnerability automatically leads to emotional bonding would be an exciting venture and groundbreaking in Psychology, specifically in the field of Neuropsychology. This may also provide greater insight into such events as trauma bonding and equip professionals within Clinical and Counseling Psychology with the necessary information to develop strategies which can be used to assist victims of abuse.

**Contribution to existing literature.** Findings from this research support existing literature which indicates that people seek to be understood and validated within relationships. Results highlight the role of empathy as a highly desirable characteristic in both casual and romantic relationships. Findings on need indicate that it motivates people to connect, and when expressed seeks a response of acceptance. These findings have the potential to enhance the quality of everyday life by providing a better understanding of what people desire from their relationships with others. A high value is placed on relationships as individuals actively seek them out and invest in them to ensure they are satisfactory. Failure to maintain healthy relationships with others can be very taxing as it can lead to costly counseling services (McLeod, 2013; Nemec et al., 2008), divorce (Weiner & Craighead, 2010) and poor health (Berscheid & Peplau, 1983). But all this can be avoided. By providing individuals with knowledge of how relationships can be initiated and strengthened, it is hoped that this will lead to more individuals taking charge of the outcome of their relationships.
instead of waiting helplessly for them to be initiated and its success determined by mere fate.

**Summary and Conclusion**

The aim of this research was to test the validity of the Vulnerability Theory of Emotional Bonding (VTEB). In Experiment 1, with 1,000 participants from the United States of America, the theory generally found some support. Findings for Hypothesis 1 found support in Condition 2 (high need) which predicted a weak emotional bond when a person in a state of need perceives another person in a state of empathy. However in Condition 3, where a state of need – impression of empathy combination were expected to show similar results, only an impression of empathy played a significant role in predicting emotional bonding. Hypothesis 2, where states of need and empathy and impression of need and empathy were expected to lead to emotional bonding, was only partially supported as impression of need did not play a significant role in predicting outcome. Nonetheless, the strongest emotional bond was found in Condition 4 as anticipated. Overall findings yielded a possible quantitative relationship between the strength of the emotional bond and the need and empathy expressed within a dyad.

As it pertains to its contribution to existing knowledge, this study has found grounds to propose that social needs and empathy play an important role in emotional bonding, but complements literature which suggests that physical need also may play an important role in the bonding process (Batson, Lishner, Cook, & Sawyer, 2005; Cwir et al., 2011; Harlow, 1958).
In addition, the notion that a high state of vulnerability leading to an automatic romantic bond (with a person of the opposite sex for heterosexuals) is of particular interest, as this may be the clue to understanding trauma bonding. Further research needs to be conducted to verify this, paying close attention to whether a mutual state of high vulnerability or an individual state of high vulnerability is a precursor to forging strong romantic bonds as seen in trauma bonding.

In Experiment 2, with a smaller sample size of 114 participants, the results were largely negative and difficult to interpret because of possible confounding variables, such as the high rate of males in the sample and the presence of other people during the administration of the experiment.

Although largely exploratory, this study has demonstrated the viability of developing and testing a rigorous, quantitative theory of emotional bonding – a first for the field of Psychology.
References


http://drjoe.carver.makeswebsites.com/clients/49355/File/love_and_stockholm_syndrome.html


*Journal of Experimental Child Psychology, 6*(3), 431-442.


Appendix A

Request to MTURK Workers to Participate (Screenshot)

**Instructions**

We are conducting an academic survey about emotions. We need you to answer some questions about emotions, to view a short video, and then to answer some additional questions. We do not anticipate that you will be exposed to any risk in this survey. At the end of the survey, you will receive a code to paste into the box below to receive credit for taking our survey.

Make sure to leave this window open as you complete the survey.

To begin the survey please copy and paste this link: [http://emotionstudy.org](http://emotionstudy.org) in a new window - do not click on the link. Please do not take this survey more than once. Thanks so much. When you are finished, return to this page to paste the code into the box.

Survey link:  [http://emotionstudy.org](http://emotionstudy.org)

Provide the survey code here:  e.g. 123456

Submit
Appendix B

Pretest: Picture of the Confederate Displaying Neutral Expression
Appendix C

Outline of the Online Survey

Here is the survey itself. We will begin with some basic questions about you. This information is being collected for research purposes and cannot be used to identify you. Please begin now:

Age*

- Select -

Gender*

- Male
- Female
- Other

Sexual Orientation*

- Straight
- Gay/Lesbian
- Bi-sexual
- Unsure
- Other

What country are you from?*

- Select -

Other, if country is not available on the list provided

Race/Ethnicity*

- Asian Indian
Asian Oriental (e.g. Chinese, Korean, etc.)
Asian Other (e.g. Cambodian, Pakistani, etc.)
Black or African American
Caucasian/White
Hispanic or Latino
Native American
Multiracial
Pacific Islander
Other

Highest level of education*
None
Grammar/Primary School
High School/Secondary School or equivalent
Two-year College/Associate's Degree
Masters Degree
Bachelors Degree
Post-Graduate Degree
Professional Degree (e.g. MD, DDS, DVM, LLB, JD, etc.)
Doctorate Degree (e.g. PhD, EdD, etc.)
Other

Marital Status*
Married

Single

Divorced

Separated

Widowed

How fluent are you in English?*

Not fluent 1 2 3 4 5 6 7 8 9 10 Highly fluent

How is your vision?*

Very poor 1 2 3 4 5 6 7 8 9 10 Very good

How is your hearing?*

Very poor 1 2 3 4 5 6 7 8 9 10 Very good

Are you currently, or have you ever been diagnosed with any disorder that impairs social cognition? (example, Autism Spectrum Disorders) *

Yes

No

Have you ever been diagnosed with cancer? *

Yes

No

If you indicated that you had been diagnosed with cancer, have you made a full recovery?

Yes
Have you had a close friend or relative who was diagnosed with cancer? *

- Yes
- No

If you indicated that a friend/relative was diagnosed with cancer, did your friend or relative make a full recovery?

- Yes
- No

Click below to continue.

Please answer the following questions about how you are currently feeling, and then click Continue.

I feel tired*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel anxious*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel sad*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel hungry*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel thirsty*

168
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel lonely*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel needy*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel caring*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel concerned*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel kind*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel soft-hearted*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel sympathetic*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel loving*

Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel affectionate*
Strongly Disagree 1 2 3 4 5 Strongly Agree

Continue

Please look at this photo, answer the questions below, and then click Continue.

How close do you feel to this person?*

Not at all 1 2 3 4 5 Quite a lot

How much do you like this person?*

Not at all 1 2 3 4 5 Quite a lot

How attracted are you to this person?*

170
How much do you love this person?*

Not at all  1  2  3  4  5Quite a lot

He seems tired*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems anxious*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems sad*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems hungry*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems thirsty*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems lonely*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems needy*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems caring*

Strongly Disagree  1  2  3  4  5 Strongly Agree
He seems concerned*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems kind*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems soft-hearted*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems sympathetic*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems loving*

Strongly Disagree  1  2  3  4  5 Strongly Agree

He seems affectionate*

Strongly Disagree  1  2  3  4  5 Strongly Agree

Continue

Participant Instructions

The video clip you are about to view is a short interview taken from a series of interviews that were recorded for the promotion of cancer awareness. The series of interviews was used to create a video about how cancer has affected various people's lives. Participants were recruited at a local park, where they were asked to participate in a voluntary interview. Please view the short video clip in its entirety.
before proceeding to the final part of the experiment. Please make sure your sound is turned on and your volume is turned up before you proceed. Okay, are you ready to go? Then click below to continue.

Based on the video you just saw, please answer the questions below, and then click Continue.

How close do you feel to this person?*  
Not at all 1 2 3 4 5 Quite a lot

How much do you like this person?*  
Not at all 1 2 3 4 5 Quite a lot

How attracted are you to this person?*  
Not at all 1 2 3 4 5 Quite a lot

How much do you love this person?*  
Not at all 1 2 3 4 5 Quite a lot

He seems tired*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems anxious*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems sad*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems hungry*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems thirsty*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems lonely*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems needy*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems caring*  
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems concerned**  
Strongly Disagree 1 2 3 4 5 Strongly Agree
He seems kind*
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems soft-hearted*
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems sympathetic*
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems loving*
Strongly Disagree 1 2 3 4 5 Strongly Agree

He seems affectionate*
Strongly Disagree 1 2 3 4 5 Strongly Agree

Now please answer this final set of questions and then click Continue.

I feel tired*
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel anxious*
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel sad*
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel hungry*
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel thirsty*
Strongly Disagree 1 2 3 4 5 Strongly Agree

I feel lonely*
I feel needy*

I feel caring*

I feel concerned*

I feel kind*

I feel soft-hearted*

I feel sympathetic*

I feel loving*

I feel affectionate*

Continue
Thank you for your help today!

Thank you very much for your participation and cooperation.

During the experiment you were asked to complete a survey about your emotional state and your emotional response to an individual presented in a picture and then in a video recording. The purpose of this experiment was to determine how emotional states can lead to the formation of emotional bonds.

This study has been approved by the University of the South Pacific Ethics Committee. If you have any questions regarding this study, would like to have your data removed from this study, or would like to receive information on findings after the data have been published, please feel free to contact the researcher, Camille J. Reid, at s11095733@student.usp.ac.fj or the researcher's supervisor, Professor Robert Epstein, at info@aibrt.org.
Appendix D

Participant Briefing and Informed Consent Declaration

Emotion Study

Thank you for indicating an interest in this study, which should take you between 10 and 15 minutes to complete. My name is Camille Reid and I am conducting research in the area of emotional connections.

I am seeking raters - persons who are able to watch a video and answer questions about how the video impacted them. If you decide to take part in this study, you are required to have good internet speed to be able to stream the video in real time, as well as a functional audio device so you can hear what is being said in the video.

You will be shown a video in which a young man talks about his attitudes toward illness. I do not believe that viewing the video or completing my survey will harm you in any way, but you should feel free to end your participation in my study if you feel discomfort or for any other reason.

By participating in this study, you are confirming that you understand and agree to the following:

1. I understand that to participate in this study I must be age 18 or older.
2. I understand that my participation is voluntary and that I am free to withdraw at any time.
3. I understand that I am providing information anonymously and that demographic information collected is confidential and cannot be used to identify me.
4. I agree to allow the data collected to be used for future research projects.
5. I further understand that completion and submission of this survey implies consent.

This study has been approved by the University of the South Pacific Ethics Committee. If you require further information on this research or would be interested in knowing the findings of this study, please feel free to contact me at: s11096733@student.usp.ac.fj.
## Appendix E

### Initial Confirmatory Analysis

**Original Factor loadings with 64 Items where "Thirsty" and "Hungry" load as independent components**

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*Note. Factor loadings < .4 are suppressed. Pre = Pretest Item; Post = Posttest Item.*

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### Appendix F

**Item Analysis of Posttest State of Empathy and Impression of Empathy Items with Emotion Bonding Items**

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Note. *p < .05, **p < .01, ***p < .001.
## Appendix G

### Item Analysis of State of Need and Impression of Need Items with Emotion Bonding Items

#### Item Analysis of Posttest State of Need and Impression of Need Items with Emotional Bond Items

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Note: *p < .05, **p < .01, ***p < .001.
Appendix H

Wording of Flyers and Handout Cards for Recruiting Participants from Fiji

Subject: Invitation to Take Part in an Emotion Study

My name is Camille Reid and I am conducting research in the area of emotional connections. I am seeking raters – persons who are able to watch a video and answer questions about how the video impacted them. This should take between 10 and 15 minutes.

If you are interested in taking part in this study, please come to the FALE postgraduate computer lab on Monday July 21, 2014 between 8:00am and 5:00pm. Participants who successfully complete the survey will be compensated FJ$1.50.