Rethinking Internal Working Models from a Developmental Perspective: Clarifying the Concept and Making a Case for a Sensitive Period of Attachment

Leah Bothe Manning
Graduate Center, City University of New York

How does access to this work benefit you? Let us know!

Follow this and additional works at: https://academicworks.cuny.edu/gc_etds

Part of the Developmental Psychology Commons

Recommended Citation

This Dissertation is brought to you by CUNY Academic Works. It has been accepted for inclusion in All Dissertations, Theses, and Capstone Projects by an authorized administrator of CUNY Academic Works. For more information, please contact deposit@gc.cuny.edu.
RETHINKING INTERNAL WORKING MODELS FROM A DEVELOPMENTAL PERSPECTIVE: CLARIFYING THE CONCEPT AND MAKING A CASE FOR A SENSITIVE PERIOD OF ATTACHMENT

by

LEAH BOTHE MANNING

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

2015
The manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the Dissertation requirements for the degree of Doctor of Philosophy

06/04/15
Date

06/05/15
Date

Deborah L. Vietze, Ph.D.
Chair of Examining Committee

Joshua Brumberg, Ph.D.
Executive Officer

Herb Saltzstein, Ph.D.
Laraine McDonough, Ph.D.

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK
Abstract

RETHINKING INTERNAL WORKING MODELS FROM A DEVELOPMENTAL PERSPECTIVE: CLARIFYING THE CONCEPT AND MAKING A CASE FOR A SENSITIVE PERIOD OF ATTACHMENT

by

Leah Bothe Manning

Adviser: Deborah L. Vietze, Ph.D.

Chapter 1 attempts to clarify the internal working model (IWM) by offering a revised and more precise definition of the concept. Chapter 2 discusses the existing IWM research and asserts what aims should be applied to future research to further clarify the IWM concept. Chapters 3 and 4 describe the current three studies that sought to test the validity of the proposed IWM definition by determining if: (1) attachment status during the first three years fluctuates as a function of changes in maternal sensitivity, (2) IWM status in middle childhood and adolescence remains stable independent of changes in maternal sensitivity, and (3) measures of IWMs are more predictive of peer-related social outcomes in childhood than measures of attachment behaviors.

Studies 1 and 2 used data from the nationally representative longitudinal NICHD Study of Early Child Care and Youth Development. Study 1 included 1016 participants who had attachment and maternal sensitivity data at 15-, 24-, and 36-months. Study 2 included 545 participants who had IWM and maternal sensitivity data at third grade, fifth grade, and 15-years.
Study 3 was a meta-analysis of 93 studies on the relation between attachment or IWMs and social outcomes with peers.

Results indicated that: (1) A direct relation did not exist between changes in maternal sensitivity and attachment status, but cumulative maternal sensitivity over time was related to attachment status. (2) IWMs in middle childhood and adolescence were stable across a 3- to 4-year interval, but were not stable over a 6-year interval. A relation existed between cumulative maternal sensitivity and IWM status. For the meta-analysis, (3) not enough heterogeneity was found in the sample of effect sizes to merit further analysis. This suggested that measures of attachment and IWMs are not different in their ability to predict peer-related social outcomes. These findings supported the proposal that attachment and IWMs are separate constructs because (a) the IWM in middle childhood and adolescence is more stable than attachment in infancy and early childhood, and (b) early attachment and the IWM in later childhood are differentially influenced by maternal behavior.
Acknowledgements

First and foremost, I would like to thank Deborah L. Vietze for all of her time and attention over the years. Dr. Vietze’s guidance and support for my ideas has been invaluable. I would also like to thank my other committee members, Herb Saltzstein and Laraine McDonough. Their thoughtful consideration has broadened my knowledge of the possible influences and applications of attachment-related research. Thank you to Martin Ruck, whose feedback on my early drafts helped me to organize my thoughts and arguments. Thank you to Yoko Takagi, for being my friend and for taking time out of her vacation to be my reliability coder (thank you!). Thank you also to my husband, Edward Manning, for being a constant reminder that the world extends past graduate school. To my father, Gary Bothe, for being a role model to me in my pursuit of a Ph.D. in psychology. To Judith Kubran and Maria-Helena Reis, for advocating for me throughout the bureaucracy of making my goals a reality. And finally, thank you to all the people at the University of Michigan Inter-University Consortium for Political and Social Research who provided me with access and training to use the NICHD Study of Early Child Care and Youth Development data.
Table of Contents

CHAPTER 1: Introduction .......................................................... 1
Defining the IWM Concept ...................................................... 2
   A. Varied Experiences with Caregivers ................................... 5
   B. Specific Relationships versus Relationships in General .......... 8
   C. Development of the IWM and a Sensitive Period of Attachment ......................................................... 10
       1. Resolving an Old Problem: Attachment’s Predictability in the Absence of Clear Continuity .......................................................... 12
           a. A Sensitive Period of Attachment .................................. 14
           b. The Stability of the IWM .............................................. 17
       2. The New Problem: How a History of Attachment Experiences Shapes the IWM ........................................... 18
   D. Summary of the Proposed IWM Construct Definition .............. 21

CHAPTER 2: Previous Research on Children’s IWMs and Applying the Currently Proposed IWM Definition ........................................... 23
Part I: Empirical Literature Review of Research on IWMs during Childhood ........................................... 23
   A. Main, Kaplan, and Cassidy (1985): The First Study Measuring IWMs ......................................................... 25
   B. Research on IWMs in Childhood since Main et al. (1985) .......................................................... 29
       1. Use and Modification of the SAT ........................................ 29
       2. Use and Modification of the AAI ........................................ 30
       3. Alternative IWM Measures ................................................ 31
   C. Critique of the Research on IWMs in Childhood .................... 34
       1. Not Testing IWM Construct Validity .................................. 34
2. The Unnecessary Over-complication of the Unconscious.........................36
   a. Defensive Exclusion..........................................................36
   b. Incoherent and Conflicting Models...................................38
3. Alternative Interpretations of the Relations Found...............................40
4. Critique Summary.....................................................................42
D. Going Forward with IWM Research.............................................43
Part II: Applying the Proposed IWM Definition.........................................45
   A. The Stability of Attachment and IWMs: The Influence of Changes in Caregiving ......46
   B. The Predictive Power of Attachment and IWMs on Social Outcomes..............48
   C. Rationale for the Proposed Studies.........................................50

CHAPTER 3: Methods ........................................................................52
Study 1: The Influence of Changes in Caregiving on Attachment from Infancy to 3-years.........52
   A. Participants........................................................................52
   B. Measures............................................................................53
      1. Maternal Sensitivity at 15-, 24-, and 36-months..........................53
      2. Attachment Status at 15-months..........................................54
      3. Attachment Status at 24-months..........................................56
      4. Attachment Status at 36-months..........................................57
      5. Child Characteristics..........................................................59
   C. Hypotheses..........................................................................60
Study 2: The Relation between Changes in Caregiving and IWM Stability in Middle
Childhood and Adolescence.............................................................60
A. Participants..................................................................................................................60
B. Measures.....................................................................................................................61
   1. Maternal Sensitivity in Third and Fifth Grades.........................................................61
   2. Maternal Sensitivity at 15-years.................................................................................61
   3. IWMs in Third and Fifth Grades..............................................................................62
   4. IMWs at 15-years.....................................................................................................63
C. Hypotheses..................................................................................................................64

Study 3: Meta-analysis Assessing the Predictive Power of Attachment and IWMs on Peer-
relations..........................................................................................................................65
   A. Selection of Studies....................................................................................................65
   B. Hypothesis................................................................................................................66

CHAPTER 4: Data-analysis and Results.................................................................................67
   A. Study 1......................................................................................................................67
      1. Transformation of Variables................................................................................67
      2. Correlating Maternal Sensitivity Z-scores and Attachment Statuses...................69
      3. Correlating Accumulated Categorical Maternal Sensitivity to Attachment Status...71
      4. Correlating Categorical Maternal Sensitivity to Child Characteristics................73
      5. Correlating Accumulated Categorical Maternal Sensitivity to Attachment Status
         when Controlling for Child Characteristics..........................................................74
   B. Study 2......................................................................................................................76
      1. Transformation of Variables................................................................................76
      2. Correlating IWM Statuses at Third Grade, Fifth Grade, and 15-years...............77
3. Correlating Maternal Sensitivity Z-scores and IWM Statuses ......................78

4. Correlating Accumulated Categorical Maternal Sensitivity to IWM Status ........80

C. Study 3 ..................................................................................................................81

1. Coding Studies for Meta-analysis ......................................................................81

2. Determining Effect Sizes .....................................................................................83

3. Analyzing the Weighted Mean Effect Size and Homogeneity of the Distribution ..85

CHAPTER 5: Discussion .............................................................................................87

A. Study 1: The Influence of Changes in Caregiving on Attachment from Infancy to 3-
years ..........................................................................................................................87

1. The Relation between Maternal Sensitivity and Attachment Status in Early
Childhood ...................................................................................................................88

2. The Relation between Maternal Sensitivity and Attachment Status Controlling for
Child Characteristics ................................................................................................91

3. The Impact of Early Maternal Sensitivity ............................................................94

4. Summary of Findings from Study 1 .................................................................95

B. Study 2: The Relation between Changes in Caregiving and IWM Stability in Middle
Childhood and Adolescence ....................................................................................96

1. Summary of Findings for Study 2 .......................................................................99

2. Limitations of Study 1 and Study 2 ......................................................................100

C. Study 3: Meta-analysis Assessing the Predictive Power of Attachment and IWMs on
Peer-relations .........................................................................................................100

1. Possible Explanations for the Lack of Heterogeneity .......................................101
2. Summary of Findings from Study 3 .......................................................... 103

3. Limitations of Study 3 ............................................................................. 103

D. Conclusions: Summary of Findings from Studies 1, 2, and 3 ...................... 103

References ........................................................................................................ 114
List of Tables

Table 1: Descriptive Statistics of Categorical Variables for Participants in Studies 1 and 2.....106
Table 2: Observed and Expected Counts, Chi-square Values and Effect Sizes for Child
Characteristics and Maternal Sensitivity at 15-, 24-, and 36-months......................107
Table 3: Percentages of Secure and Insecure Children within Maternal Sensitivity Groups
at 24-, and 36-months.........................................................................................108
Table 4: Chi-square Values, Effect Sizes, and Violation of Assumptions for Models at 24-
months and 36-months Controlling for Child Characteristics.................................109
Table 5: Secure and Insecure Counts for 24- and 36-month Groups Controlling for
Statistically Significant Child Characteristics..........................................................110
Table 6: Percentages of Secure and Insecure Children within Maternal Sensitivity Groups
at Third Grade, Fifth Grade, and 15-years.................................................................111
Table 7: Sample Size, Q statistic, and Critical Chi-square Values for Each Group in the
Meta-analysis............................................................................................................112
Figure 1: Stem and Leaf Display of Distribution of All Z Scores and Effect Sizes in the
Meta-analysis............................................................................................................113
CHAPTER 1
INTRODUCTION

At nearly half a century old, Bowlby’s (1969, 1973, 1980) theory about an infant’s bond to its caregiver still inspires discussion and study. One of its most influential facets is how this early relationship influences social relationships throughout life. Sroufe and Waters (1977) explained that the attachment relationship is an organizational construct for processing all subsequent social information. Bowlby (1969) called the mechanism for this influence the internal working model (IWM). Bowlby’s use of the term came from Craik’s (1943) concept of mental models, which are internal structures that represent information about the world the person comes in contact with (for review, see Bretherton & Munholland, 2008). Bowlby’s IWM is a mental model of the infant-caregiver attachment relationship. The IWM functions by shaping the individual’s perception of relational events. It structures the prediction of social outcomes and the construction of plans of action based on those predictions (Bowlby, 1973; Dykas & Cassidy, 2011; Thompson, 2006, 2008a). Although Bowlby acknowledged that internal mental models of other situations and relationships also exist, attachment was where he applied the concept. For this reason, going forward, the term IWM will specifically refer to an internal working model of the attachment relationship.

The IWM is thought to underlie attachments’ influence on social functioning, but the mechanism is poorly understood. Attachment theorists generally agree on the function of IWMs, but there is a lack of agreement about what constitutes an IWM. Thompson (2008c) described use of the IWM as a primarily metaphorical concept. Efforts to scientifically study this metaphorical concept have led to criticism of the concept itself. Hinde (1988) was the first to criticize IWMs by pointing out that, “an explanatory concept inadequately defined cannot be
falsified,” (p. 378). A few years later, Belsky and Cassidy (1994) expressed concern that IWMs were serving as a “catch-all, post-hoc explanation” for research findings (p. 384). Others argued that IWM research lacked theoretical clarity (Thompson, 2008a, 2008c; Thompson & Raikes, 2003; Waters, Crowell, Elliot, Corcoran, & Treboux, 2002). Thompson (2008a) stated that clarifying the concept was necessary in order to “refine the predictive claim of attachment theory and [its] guiding methodology,” (p. 356, bracketed word added).

The objective of this dissertation is to bring clarity to this fundamental, yet elusive, concept. Clarity may be gained by reexamining some of Bowlby’s original ideas in conjunction with work that attachment theorists have done on IWMs since the theory was proposed. However, this clarification will assuredly result in a collection of residual details previously explained by the ‘catch-all, post-hoc’ IWM conceptualization. In other words, resolving one problem will inadvertently create other problems. Therefore, a serious effort to reexamine the IWM concept also requires reexamining other assumptions of attachment theory. The secondary objective of this dissertation is to address the theoretical problems that will be created by clarifying the IWM concept.

**Defining the IWM Concept**

Although several appeals for a proper IWM definition have been made, definitions have seldom been proposed, and none of those offered have been adopted as generally acceptable by the field. For example, some suggestions have focused on the adult IWM, but have limited applicability to those interested in IWM development (e.g., Collins & Read, 1994; Pietromonaco & Barrett, 2000; Simpson & Rholes, 2002). Collins and Read (1994), in an attempt to retrospectively apply their adult IWM theory to the early years, reasoned that childhood IWMs were less elaborate versions of adult models. Vietze likened this approach to attempting to study
infant motor development by observing a walking adult (personal communication, September, 2013). Developmental processes cannot be presumed by investigating current functioning alone. There is a need to identify the IWM at its formation and then follow its influence forward if the IWM is an organizational construct used during subsequent social development.

Developmental efforts at clarification have drawn parallels between developing IWMs and the maturation of other cognitive structures. These structures include a child’s developing use of scripts, event representations, and of a theory of mind (Delius, Bovenschen, & Spangler, 2008; Fivush, 2006; Nelson, 1999; Waters & Waters, 2006). Finding parallels between the IWM and these cognitive phenomena may lend some convergent validity to the concept. However, it has also added confusion as to whether the IWM is a distinct construct or a variant on other cognitive structures. Shaver, Collins, and Clark (1996) outlined the ways in which IWMs are distinctive from other cognitive structures. They state that IWMs share features with scripts and schemas, but are also unique because they encompass elements such as emotion, behavioral strategies, and psychological defenses. Waters and Waters’s (2006) offered the notion of a ‘secure-base script’. They explained that scripts were not the only option for studying IWMs, but were simply a solid mechanism with which to explore them. Clarity is needed as to what uniquely defines a mental representation of attachment if attachment theorists are to continue treating the IWM as though it is distinct from other mental structures.

Other efforts to establish IWM’s convergent validity have focused on identifying common threads across psychological approaches. For example, Bretherton (1991, 1993, 1999, 2005) offered a consociation of psychoanalysis, social construction, and cognitive development. She described how processes from one approach elaborate on elements of the other approaches. For example, parent-child conversations about attachment related topics may influence what
information is accessible to the child, or repressed into the unconscious. Finding parallels across approaches indicates that they are all attempting to describe the same phenomenon. Belsky (2002) noted that although different fields use similar concepts and theoretical foundations, each ask “different questions and thus provide answers that are difficult, at least empirically, to integrate,” (p. 169). Similarly, Crittenden (1990) expressed concern that theoretical disagreement about IWMs was “defining denominations of believers” instead of facilitating communication (p. 272).

Defining IWMs has also been complicated by theorists’ attempts to take maturation into account. One theory about how IWMs change is that early basic IWMs are replaced over time with more sophisticated and complicated IWMs. Attachment scholars with this view have emphasized the need for IWM theorists to consider developments in the understanding of self, perspective taking, language, and representation (Ayoub, Fischer, & O’Connor, 2003; Bretherton, 1985, 1988, 1991; Cicchetti, Cummings, Greenberg, & Marvin, 1990; Collins & Read, 1994; Crittenden, 1990, 1992; Thompson, 1998, 2000). Another, but related view emphasizes the influence of life experiences such as ongoing verbal discourse, changing life circumstances, the development of new attachments, and experiences in psychotherapy (Bretherton, 1988, 1999; Collins & Read, 1994; Grossmann, 1999; Shaver & Mikulincer, 2002; Simpson & Rholes, 2002). Increased awareness of dynamic influences like these have added to the difficulty of reaching a consensus about the nature of IWMs.

Thompson (2008a) pointed out that, “In this atheoretical, data-driven era it is difficult, unfortunately, to devote time and attention to theory development,” (p.356). He also stated that IWM theory development was imperative, and without it, the “internal working model concept risks losing its originality and clarity,” (p. 356). A primary purpose of this dissertation is to
develop IWM theory in an attempt to rescue the concept from this currently precarious state of ambiguity. The following section addresses some major theoretical issues and arguments about IWMs. The focus will be on: (a) how a varied experiences with caregivers inform IWM formation, (b) whether the IWM’s influence on social cognition is generalized or relationship-specific, and (c) the development of IWMs. Descriptions of each problem will conclude with a suggested resolution to the disagreements described, and these suggestions will lead to a new IWM definition. This new definition is largely in agreement with the major tenets of IWM theory. It is based on what has been learned from previous studies exploring the concept. The suggested changes are primarily for clarity and parsimony.

**Varied Experiences with Caregivers**

One of the concepts that Bowlby adopted from his background in psychoanalysis was the long-term impact of early experiences. Holmes (1995) described how Bowlby rejected concepts like fantasy and wish fulfillment because he wanted to emphasize that interpersonal representations were the result of real-life experiences. Bowlby (1973, 1988) conjectured that children who experienced sensitivity, support, and encouragement from their caregivers should form IWMs characterized by the expectation of these qualities in future relationships. Another approach to understanding the influence of caregivers on IWM development has focused specifically on parent-child communication (Bretherton, 1988, 2005; Fivush, 2006; Nelson, 1999). In a review of studies, Bretherton (1988) concluded that communication characterized by openness, fluency, and coherence was associated with IWMs that were also open and coherent. More recently, attention has been given to the view that children co-construct their subjective past through joint reminiscing with their parents (Fivush & Haden, 2005; Nelson & Fivush, 2004). This view posits that children’s limited cognitive and language abilities lead them to be
somewhat dependent upon their parents’ contributions when constructing memories of subjective experiences. Similarly, Bowlby (1988) speculated that parents may directly and indirectly pressure their children to exclude certain information from being processed, such as denying a traumatic event occurred. Both the quality and the content of parent-child communications are believed to influence IWM formation.

Some developmental theorists have argued that theories like Bowlby’s assume a unilateral influence of the parent onto the child (Bell, 1968; Kuczynski, 2003; Lollis & Kuczynski, 2003). Although some attachment theorists may assume this, many are aware that people and their environments co-vary. For example, attachment researchers Sroufe and Egeland (1991) described the bi-directional path of influence, saying, “People selectively engage (and interpret) the environment, [and] environments, in the form of social interactants, respond differently to different children,” (p. 81, bracketed work added). Bowlby certainly suggested that parental behavior was formative, but he never described a unilateral parent-to-child direction of influence. Conversely, Bowlby’s theory was child-centric and focused almost entirely on the infant’s evolved mechanisms and behavioral systems. For Bowlby, caregiver behavior was considered part of the child’s environmental context. Knowing that infants’ individual actions or characteristics made them more or less likely to be responded to sensitively by their caregivers was not relevant for speculating on the impact of being responded to sensitively or insensitively. Caregiver behavior plays a large role in determining the child’s early experiences, but this does not imply that the child is passively impressed upon by the environment.

If caregiver sensitivity, the openness and fluency of conversations, and the content of attachment-related memory construction all shape children’s IWMs, then one theoretical problem is how this variety of influences shape the IWM. Each of these influences may
contribute different information to the IWM. The widely accepted approach to understanding multiple experiential influences on IWMs is also the difference between ‘secure’ and ‘insecure’ IWMs. A secure IWM is supposed to be a singular coherent model, shaped by reliable caregiver sensitivity, coherent reflection, and open discussion. Alternately, an insecure IWM is theorized to not be a singular model, but multiple conflicting models shaped by conflicting information (Bowlby, 1980; for review, see also Bretherton & Munholland, 2008 and Main, 1991).

The notion of conflicting models originates from the psychoanalytic view that the infant has some basic notion of what it needs and desires. Not having those needs and desires met is believed to result in anxiety that is then repressed into the unconscious. Bowlby (1980) posited that a person who experiences excessive anxiety develops separate conflicting IWMs for the same attachment relationship. One IWM contains information about the attachment figure as being warm and responsive, and another IWM contains information received during experiences of insensitivity and emotional pain. For example, caregiver may explicitly tell the child they are loved, but the child may also have experiences of abuse or neglect. The model of the caregiver as loving remains consciously accessible and the painful experience is repressed or dissociated from into the unconscious. Although Bowlby explained infants’ needs in terms of evolutionary predisposition instead of wish fulfillment, the notion of conflicting IWMs is a prime example of how Bowlby’s theory retained some psychodynamic elements.

The argument for separate conflicting IWMs depends upon the assumption that experiences of emotional pain are reallocated to the unconscious. An explanation that does not rely on assumptions of psychodynamic theory is that varied experiences are processed together. For example, instead of multiple conflicting IWMs arising from a child’s experience of ‘My mom tells me she loves me but she hits me,’ the experience may instead be processed as ‘My
mom tells me she loves me and she hits me.’ In the second option, there is no conflict and a singular IWM is informed by information from both experiences. Functionally speaking, a person with a singular IWM including both pieces of information might approach future relationships understanding love and hitting/getting hit as compatible, or at least not incompatible. Adopting this suggestion requires abandoning the assumption that the infant has an inherent expectation, or even a preference, regarding its caregiver’s behavior. The infant is evolutionarily predisposed to act in a way that maximizes survival (e.g., maintaining proximity to caregivers, crying out in distress), but evolutionary predisposition does not imply the presence of an inborn internal standard or expectation. With this view, the distinction between the IWMs of individuals with different caregiving experiences is no longer based on conflict, repression, or cohesiveness.

A practical cause for not accepting the current suggestion is that most measures used to capture and describe IWMs aim to identify conflict, repression, and cohesiveness. These measures have been used extensively, and decades of research has been published based on these measures. Fortunately, the current suggestion does not call for discarding the available measures. It will, however, require re-evaluating the interpretation of participant responses when using these measures. This will be discussed further in the review of the empirical literature to follow in Chapter 2.

Specific Relationships versus Relationships in General

One repeated point of contention among IWM theorists is the general versus specific nature of IWMs’ influence on the interpretation of social events. Critics of the IWMs’ general influence assert that people can have different models for different relationships such as various caretakers, peers, and romantic partners (Belsky & Cassidy, 1994; Crittenden, 1990; Shaver et
Bowlby’s view on the matter of general versus relationship-specific IWMs is unclear. He suggested that various relationships get assimilated into the singular existing IWM (1979), and he later also claimed that different models are formed for different parents (1988). Many who adhere to the relationship-specific perspective also see different IWMs as being organized hierarchically. The highest level consists of a generic abstract representation of attachment, mid-levels are comprised of increasingly differentiated categories of relationships (e.g., mother, father, close friends, romantic partners), and specific episodic memories comprise the lowest level. This view coincides with the suggestion that IWMs become more complex and elaborate with age and experience.

The problem with the hierarchical view comes from the lack of consensus regarding what the IWM concept should include and exclude. Each level of representation can be viewed as containing multiple distinct IWMs, or all levels can be seen as separate elements of a singular IWM. The view proposed here is for neither of these options. The current suggestion is that the IWM concept should only be considered the highest, most generic and abstract, level of representation. Fivush (2006) explained that a mental representation must be established before deviations from what is expected can be categorized. If the IWM is a formed by early interactions with caregivers, and its function is to color individuals’ perception of relational events thereafter, then it should be considered the initial-most mental representation to which subsequent social experiences are compared. Viewing the IWM this way places renewed emphasis on the importance of the earliest relationship, attachment to one’s caregiver. Narrowing the definition raises questions about how various caregivers, or changes in caregiving
quality, affect an IWM. This concern will be addressed in the next section on IWM
development.

**Development of the IWM and a Sensitive Period of Attachment**

The development of the IWM has been difficult to follow in the absence of a concise
definition of the concept. One aspect of this difficulty is the assumption that attachment and the
IWM form and develop parallel to one another. Additionally, changes in attachment security are
often equated to changes in the IWM. A clear distinction between attachment and the IWM will
allow for a more precise discussion of the possibly divergent developmental processes and
pathways of each.

Bowlby (1969) described how proximity-seeking behaviors indicating attachment
formation become observable during the latter half of the first year. The development of an
infant’s discriminate attachment and the development of locomotion for proximity seeking are
nearly, and conveniently, simultaneous. Evidence of the attachment relationship’s formation can
be observed through these proximity-seeking behaviors—as illustrated by Ainsworth, Blehar,
Waters, and Wall’s (1978) Strange Situation. These observable proximity seeking behaviors
have frequently been used to surmise the presence and operation of an IWM.

Bowlby’s theory contains elements of the cognitive developmental approach in addition
to the development of behavioral systems. For example, Bowlby (1969) described how infants
become capable of using a rudimentary cognitive map to aid in proximity-seeking. The next
major change in representational ability is the development of *goal-corrected partnership*, which
occurs around the third year (Bowlby, 1969). During this time, the child can conceive of the
caregiver as a participant with independent motivations and goals. The child then plans their
own actions accordingly. Bowlby did not directly associate this representational shift with the
development of the IWM, but the current suggestion is to do just that. If the IWM shapes the child’s perception of and predicted outcomes of relational events and plans of action in light of those predictions, then the development of goal-corrected partnership should illustrate a new capacity for and usage of an IWM. A few attachment theorists have emphasized the need to consider the child’s developing capacity for representation in the preschool years when considering structural changes of IWMs (Cicchetti et al., 1990; Crittenden, 1992; Thompson, 1998; 2000). The current suggestion is that the IWM is not formed until the preschool years, when the child is able to have a representation of other participants’ motivations and goals.

The notion that children must reach an undetermined level of cognitive maturity to develop an IWM is not entirely new. Main, Kaplan, and Cassidy (1985) acknowledged this possibility in their landmark study first measuring IWMs. Main et al. (1985) acknowledged the cognitive perspective that “construction of a primitive working model … must await a stage of relative intellectual advancement,” (p. 75). However, Main et al. (1985) did not agree with this perspective. They instead aligned themselves with attachment theorists Sroufe and Fleeson (1986) who presumed that IWMs exist for the young infant. Main et al. (1985) justified this decision citing Piaget’s (1954) assertion that knowledge is embedded in experienced events. They reasoned that because the attachment figure could not be separated from attachment-related events, even a rudimentary IWM of the self in relationship to others should exist “from the beginnings of representation,” (p. 75). This view has persisted. The assumption that attachment and IWMs develop simultaneously has contributed to the view that the phenomena are interchangeable.

Clearly distinguishing between the development of attachment during the first year and the development of the IWM around 3-years may add clarity to an old theoretical problem.
However, it also creates a new one. The old problem is in regard the predictive power of attachment in the absence of clear continuity. If the IWM, as the mechanism of attachment’s influence, is distinct from the attachment relationship, then the continuity of attachment is less important than the continuity of the IWM. The new problem then becomes explaining how various attachment experiences and fluctuating attachment quality influence the structure of the IWM that may form years after attachment behaviors have been established.

**Resolving an old problem: Attachment’s predictability in the absence of clear continuity.** Bowlby (1969) postulated that an attachment should be fairly stable over time, but research has indicated that the simple continuity of attachment over time is not the case. Thompson (1998, 2006) concluded that attachment could not be presumed stable between 12- and 24-months after a review of studies’ test and retest of Ainsworth et al.’s (1978) Strange Situation procedure. Attachment classifications are also not clearly continuous from infancy to early childhood (Bothe & Vietze, 2014; Bretherton, Ridgeway, & Cassidy, 1990; Groh et al., 2014; McCartney, Owen, Booth, Clarke-Stewart, & Vandell, 2004), nor from infancy to adulthood (Grossmann, Grossmann, & Kindler, 2005; Hamilton, 2000; Lewis, Feiring, & Rosenthal, 2000; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; Weinfield, Sroufe, & Egeland, 2000).

Evidence for some degree of continuity across time has added to the confusion. Fraley (2002) and Pinquart, Feußner, and Ahnert (2013) conducted meta-analyses on attachment’s stability from infancy to early adulthood. Both analyses concluded that attachment was only moderately stable. It is remarkable that there is any continuity given the variety of methodologies used to measure attachment across the lifespan, and yet, there is some continuity some of the time. Interpretation of results on attachment’s stability ends up being confusing,
complicated, and ultimately a matter of opinion. Those inclined to dismiss Bowlby’s suggestion of stability have evidence to refute it. Those inclined to accept Bowlby’s suggestion of stability attempt to address the lack of stability while still claiming continuity (e.g., Crowell & Waters, 2005; Waters, Hamilton, & Weinfield, 2000).

One reason Bowlby’s theory has thrived in spite of this complication is because of its predictive power. Longitudinal studies have repeatedly found relations between attachment and outcomes such as social competence, emotional regulation, and internalizing and externalizing problems (for review, see Dykas & Cassidy, 2011; Friedman & Boyle, 2008; Grossmann, Grossmann, & Waters, 2005). The theoretical problem is how attachment can be both unstable and predictive of later outcomes. Some attachment theorists interpret the moderate stability of attachment to mean that Bowlby’s original expectation of stability is reasonably accurate, thus justifying its predictive power. The current recommendation is to rethink the original theory in light of the newly proposed IWM characteristics. If there is a clear distinction between attachment and the IWM, and the IWM is responsible for attachment’s influence on later functioning, then the necessity of stability applies to IWMs and not attachment. This conceptualization is not in conflict with the original theory, it only reframes the roles of attachment and IWMs in later development. This new view might help to explain theoretical expectations and research outcomes. It may also and add clarity to understanding how IWMs serve as the mechanism of attachment’s developmental influence.

The proposed definition is that IWMs are distinct from attachment and that the IWM forms years after attachment has been established. Pinquart et al.’s (2013) meta-analysis of attachment stability lends support to this proposed idea. Pinquart et al.’s (2013) meta-analysis of 127 studies and more than 21,000 attachments showed that early attachment is significantly less
stable than attachment measured later in life. Long-term stability was more likely after
toddlerhood when attachment was measured using internal representations. Therefore, although
the expectation of stability does not apply to early attachment, it might instead apply to the later-
forming IWM. This could also mean that early attachment is flexible until an undetermined level
of cognitive maturity is achieved. At which point, a kind of sensitive period for attachment
development ends as the individual comes to rely more heavily on a more rigid mental
representation of the relationship.

A sensitive period of attachment. Bowlby (1969) addressed the idea of a sensitive period
for attachment in the first book of the Attachment and Loss series. He cites Hinde’s (1963) work
on imprinting to explain how 3- to 6-month-old infants are sensitive to forming discriminate
attachments. He further suggested that this ability becomes very difficult by the second year.
The possibility of a sensitive period of attachment has never been fully explored, seemingly
overshadowed by some of the theory’s more hallmark features. There is also the question of
whether this period should be considered sensitive or critical. A consideration of reactive
attachment disorder may help address this question. Reactive attachment disorder is described as
failing to form an early attachment due to grossly pathological care such as severe neglect,
repeated changes in caregivers, and institutionalized settings with high child-to-caregiver ratios
(APA, 2013). Outcomes for the disorder are usually bleak and marked by permanent behavioral,
social, and emotional disability. Troubling symptoms of deviant social relatedness persist even
in cases where children with reactive attachment disorder are able to form later selective
attachments.

The characteristics of reactive attachment disorder suggest that attachment may have
elements of both a sensitive and a critical period. There is likely a point where an attachment
must be established in order to avoid permanent developmental problems. Discriminate attachments can still be established after this point in some cases. For this reason, Bowlby’s (1969) original reference to this period as sensitive, and not critical, is probably the most accurate. Very young children are ready and able to develop attachments. Forming an attachment after the end of this period may be difficult but is not impossible.

Bowlby (1969) applied the sensitive period concept to the development of any discriminate attachment or the disruption of an established attachment. Recent attachment research suggests that the sensitive period may also apply to the changing quality of an ongoing attachment relationship. Several studies have results showing that attachment quality is associated with parental sensitivity (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Belsky, Rovine, & Taylor, 1984; DeWolff & van IJzendoorn, 1997; McElwain & Booth-LaForce, 2006; Nievar & Becker, 2008). Evidence has also been found suggesting that changes in parenting are associated with changes in attachment quality (Booth-LaForce et al., 2014; Egeland & Farber, 1984; Vaughn, Egeland, Sroufe, & Waters, 1979; for review, see Thompson 2006). Atkinson et al. (2000) found, in a meta-analysis on the relation between maternal sensitivity and attachment security in infants and toddlers, that the relation was moderated by the time between sensitivity and attachment assessments. Effect sizes for concurrent assessments were much larger than for nonconcurrent assessments. This possible sensitive period of attachment might be characterized by: (a) a readiness to form attachments, and (b) a readiness to adjust to changing qualities in caregiving, indicating a flexibility to early attachment.

Readiness to adjust to changing qualities in caregiving would also be in theoretical accordance with Bowlby’s ethological explanation of the function of attachment behaviors. Bowlby (1969) explained that attachment behaviors keep infants proximally close to their
caregivers, thereby increasing the likelihood of survival. Ainsworth et al. (1978) described different strategies children use for maintaining proximity to caregivers. Subsequent research has determined that these strategies are associated with different qualities in caregiving (for review, see Weinfield, Sroufe, Egeland, & Carlson, 2008). Very young children are still quite dependent upon their caregivers for survival in the few years extending past infancy. During this extended period, a child is likely to experience some changes in the caregiving environment. Therefore, it would seem advantageous to form attachments and to appropriately adjust attachment strategies in concordance with changes in caregiving.

Assuming the sensitive period of attachment to be true, it is still possible that there is some kind of impact of very early attachment in infancy. Thompson (1998) noted that secure classifications were more stable across 12- to 24-months than insecure classifications. Pinquart et al. (2013) also found that secure attachment was generally more stable over time than insecure attachment in a meta-analysis of attachment stability from infancy through adulthood. One explanation for this could be because stable, low-stress environments are more likely to produce secure children. Those children may be more likely to remain secure because their circumstances are less likely to change (Lamb & Bornstein, 1982, 1987; Maccoby, 1980; Waters, Merrick, et al. 2000). However, research findings suggests that the stability of secure attachment is not simply a reflection of a stable environment. Fish (2004) found that attachment in infancy, and not concurrent attachment, had an effect on cognitive and social outcomes at 4-years in a high-risk low-SES sample. Fish (2004) concluded that earlier secure attachments might be a protective factor against succumbing to the risk of low SES. Using a large non-risk sample, Belsky and Fearon (2002b) and the NICHD Early Child Care Research Network (2006) found that 3-year-olds who had been secure at 15-months were less likely to be affected by contextual
risk or changing parental quality than those who had been insecure. Similar findings suggest that early secure attachment is also protective against the development of emotional and behavioral problems (Dallaire & Weinraub, 2007; Maeve, Pasalich, McMahon, & Spiker, 2014; Tharner et al., 2012). Results like these indicate that early secure attachment might serve as a protective factor against changing environmental contexts.

**The stability of the IWM.** The IWM, once formed, should serve as a relational heuristic for approaching and understanding social interactions as previously theorized. Fraley (2002) described the two dominant views of later IWM development that he referred to as the *prototype perspective* and the *revisionist perspective*. The prototype perspective sees the early IWM as unchanged and influential on later interpersonal interactions. The revisionist perspective sees the early IWM as revised based on continued experience and development. Sroufe (1979) stated, “We cannot assume the early experiences will somehow be cancelled out by later experiences,” (p. 840). This illustrates the prototype view. However, Sroufe (1979) went on to say that the lasting consequences of early attachment are likely to be subtle and complex. This is probably due to the impact of the continued experiences and development emphasized by the revisionist perspective. Van IJzendoorn (1996) combined the prototype and revisionist perspectives by suggesting that people use a prototype of early attachment experiences, but this prototype can still be influenced later by environmental factors.

The current proposal refers back to the suggestion that the IWM should be considered the most generic and abstract representation of self-other relationships. Fivush (2006) explained that generic abstract representations operate on the highest level of cognition, and that these representations serve as a default expectation, remaining stable over time. Consequently, the IWM would be expected to remain unchanged throughout development. It is possible that later
social experiences would alter expectations of a specific person or category of persons, but the IWM would remain the same. A person or category of persons acting in violation of the IWM would be considered an exception to the IWM.

This new construct definition includes a distinction between social cognitive structures and the IWM foundation. The proposed definition suggests that the IWM is the foundation upon which information from subsequent social experiences is constructed atop. The construction is partially limited by the shape of the foundation it is built upon, but is more malleable. The structure can change as the person ages, becoming more complex—rooms are built, windows are added—and thus social cognition matures, but the foundation remains the same. This view of IWMs favors the prototype perspective, but does not dismiss the revisionist perspective. It instead reframes the revisionist perspective to apply to experiences that happen within the context of a stable IWM.

**The new problem: How a history of attachment experiences shapes the IWM.**

Accepting that the IWM does not develop parallel to attachment and appears only after years of potentially varied attachment experiences, questions then arise regarding how a history of attachment experiences informs the singular IWM. Possible experiences include: (a) interactions with a caregiver might fluctuate in quality, (b) the infant may gain or lose caregivers, and (c) most children have a variety of people to whom they become attached. In regard to multiple caregivers, the current view is in agreement with traditional perspectives that emphasize the influence of a principle caregiver.

Bowlby (1969) acknowledged that most infants develop multiple attachment relationships. These relationships are most often formed with parents, older siblings, and sometimes grandparents. These relationships can be inferred by observing the infant’s
proximity-seeking behaviors with each person. However, Bowlby (1969) went on to say that although “a plurality of attachment figures is probably the rule, these attachment-figures are not treated as equivalents to one another,” (p. 304). He went on to describe how a child’s discrimination among attachment figures is exhibited. A principle attachment is observable through by the quantity of attachment behaviors, the intensity of protest upon separation, and the circumstances under which the child is most likely to seek out the figure. The principle figure is the target of most child proximity-seeking behaviors, elicits more intense protest upon separation, and is more likely to be sought out when the child is hungry, tired, or sick. A singular principle figure can be identified for most children. This role is typically played by the natural mother.

The focus on the mother-child relationship in attachment theory and research has perpetuated for several reasons. Bowlby based his theoretical assertions about the importance of mothers on observations of attachment in human infants and on cross-species comparisons of females’ role in caregiving. Sociocultural trends still allot child-rearing responsibilities disproportionately to mothers. Research findings have also repeatedly indicated stronger relations between mother-child attachment and developmental outcomes compared to father-child attachment (see van IJzendoorn & DeWolff, 1997). However, the emphasis on mothers does not preclude the fact that some children’s principle attachment figure is not their natural mother. Oppenheim, Sagi, and Lamb (1988) studied the relation between various attachment relationships and the socioemotional development of Israeli children raise on a kibbutz (see also, Sagi-Schwartz & Aviezer, 2005). Children’s attachments with their mother, father, and metapelet were determined in infancy. Metaplot were professionals primarily responsible for the children’s caregiving. Oppenheim et al. (1988) found that infant-metapelet attachment was
significantly associated with socioemotional outcomes at 5-years, and the infants’ attachment to their mother and father was not. This supports the claim that most children will form a principle attachment to a singular person, and this person is likely to be the individual primarily responsible for the infant’s caregiving.

After a primary caregiver is identified, the child may still experience fluctuations in caregiving. A primary caregiver’s ability to be sensitive and responsive to the infant might improve or deteriorate due to changes external circumstances or intrapersonal functioning. Primary caregivers might also change, as in the case of full-time hired childcare or adoption.

There are several possibilities for how a history of attachment experiences prior to 3-years could inform an IWM. For example, early attachment experiences could be aggregated and averaged out, creating a kind of mean expectation of social encounters. Types of interactions that happen most frequently might be the most influential in IWM formation. More emotionally salient attachment-related events might be more likely to shape the IWM than less salient events. Or perhaps all of these options interact to determine the details of an individual child’s IWM. No research yet exists to test these hypotheses because the proposal of an IWM developing after attachment is new.

In the interest of parsimony, the current suggestion is that IWM qualities are most likely shaped by concurrent attachment at 3-years. If the long-term effects of attachment are not predictable until the IWM is formed, this could mean that early lapses in caregiving might not be as detrimental as previously believed. Therefore, the sensitive period for attachment might also serve as a grace period for caregivers. Such a grace period would still be expected to have certain parameters. For example, if attachment quality at 3-years is uniquely crucial in IWM formation, some amount of lead-time would still be required before the third-year attachment
relationship is established. In other words, attachment quality at 3-years would be expected to be a product of a history of interactions before 3-years. If this were the case, the amount of time required for a young child to either form or change a principle attachment would need to be explored. Also, even if the sensitive period of attachment is characterized by a readiness to adjust to changing qualities in caregiving, very traumatic attachment experiences may be more difficult to overcome than less traumatic experiences. If this were the case, a very traumatized infant or toddler might subsequently require a higher degree of sensitivity over a longer period of time before a secure attachment can be established.

**Summary of the Proposed IWM Construct Definition**

The American Psychological Association (1954) explained that, “The vagueness of the construct is an inevitable consequence of the incompleteness of the current psychological theory, and cannot be rectified faster than theory grows and is confirmed,” (p. 15). For this reason, a new and more precise definition for the IWM construct has been proposed in light of Bowlby’s original theory and the research and theoretical arguments that have followed it. This definition is in agreement with the central tenets regarding the IWM’s function in shaping individuals’ perceptions of relational events, and the assertion that individuals’ IWMs are shaped through early interactions with a primary caregiver. The currently proposed construct definition diverges from traditional IWM theory in several ways. The new definition describes the IWM construct as a singular mental representation of the self in relationship to others. This representation should operate on the most abstract and general level of cognition. The IWM is expected to develop around 3-years of age, corresponding with what Bowlby deemed the emergence of goal-corrected partnership.
In conjunction with this new IWM conceptualization is the suggestion that the first few years of life might be a sensitive period for attachment. During this time, the child is expected to form attachments and adapt to changing experiences with caregivers. Therefore, attachment quality is expected to generally reflect the quality of the most recent interactions with a principle attachment figure. Various child-caregiver experiences are proposed to be processed cohesively, instead of as separate and possibly conflicting. The sensitive period of attachment is expected to end around 3 years of age with the development of the IWM. After this point, the IWM becomes foundational to subsequent social cognition and resistant to change, having the greatest influence on social interactions thereafter.
CHAPTER 2
PREVIOUS RESEARCH ON CHILDREN’S IWMs AND APPLYING THE CURRENTLY PROPOSED IWM DEFINITION

The traditionally loose IWM definition has allowed psychological theorists and researchers from a variety of approaches to stake some claim in the concept. Researchers have investigated the IWM’s hypothesized influence on various outcomes, including social, emotional, and cognitive functioning. The study of IWMs has also been shaped by an increasing awareness of dynamic and developmental factors like maturation and environmental changes. This awareness has left some IWM researchers paralyzed by a seeming overwhelming number of ever-changing variables. The result is that those interested in studying IWMs are trapped in a paradox of either being too willing or too hesitant to conduct research on the poorly defined concept. Even so, to would be unwise to uniformly dismiss the IWM research that has been conducted until this point. A greater understanding of the available research can help to guide researchers toward what may remain helpful in studying IWMs, and away from what may be adding to the confusion. Part I of this chapter is a description and critique of the research on IWMs during childhood. Part II of this chapter will discuss the benefits of the currently proposed IWM definition compared to IWM conceptualizations up to this point. Part II will also address how testing the current IWM definition should proceed.

Part I: Empirical Literature Review of Research on IWMs during Childhood

A vast amount of research has been conducted over nearly three decades in attempt to understand IWMs. The total body of work on IWMs is best described as scattered and cumbersome. Attempting to identify an organizational thread in this mass of research revealed a collection of key issues that complicated the process. These issues included a focus on parent
IWMs versus child IWMs, distinguishing between usage of the word ‘child’ in terms of age and in terms of relationships to one’s parents, and the interchangeable use of the attachment and IWM concepts.

First, a large portion of the IWM research has focused on parents’ IWMs and the transgenerational patterns of attachment phenomena. These studies have explored how parents’ IWMs influence their children’s attachment behaviors, family dynamics, and the quality of parent-child interactions (Crittenden, 1988; Fish, 1993; Fonagy, Steele, & Steele, 1991; George & Solomon, 1996; Koren-Karie, Oppenheim, & Getzler-Yosef, 2008; Macfie, McElwain, Houts, & Cox, 2005; van IJzendoorn, 1995). Conclusions from this research have sometimes included suggestions about how parents’ IWMs may impact their children’s IWMs. However, any suggestion about what may be occurring in children’s minds without attempting to measure it directly is limited to speculation. Research involving direct measurements of children’s IWMs has primarily explored relations among attachment and the social-emotional processes that attachment is believed to influence. This research most directly addresses questions related to the function and development of IWMs. After narrowing focus to these studies alone, there still remains great variation within the research. These studies vary in how attachment and IWMs are defined and measured, as well as the outcomes they are expected to influence.

Second, while reviewing the IWM literature, it became clear that the term ‘child’ was used in two capacities. It was sometimes used in reference to participants’ age, and other times it was used in reference to participants’ relationship to their parents. As a result, some work that has been claimed to contribute to understanding childhood IWMs has been based on measurements of IWMs in participants who were not children. Adults’ reflections on childhood experiences may inform researchers about adults’ current state of mind with regard to
attachment, but it is unlikely that an adult’s report can provide useful for understanding IWM development. As Belsky (2002) stated in regard to IWM research, “Ignoring developmental antecedents while studying concurrent psychological and relationship correlates exclusively, risks—literally and figuratively—leaving the baby out of the bath-water,” (p. 170).

Lastly, many researchers have been loose in their usage of the attachment and IWM concepts. This is largely a product of the lack of clear theoretical distinction between the phenomena, as described in the previous chapter. Another complication is that measures of attachment and IWMs produce classification systems that are both interpreted in terms of security and insecurity. The shared terms make it difficult to clearly distinguish between things like ‘secure’ attachment behaviors and ‘secure’ attachment representations. As a result, attachment and IWMs are often treated interchangeably, as though they are one in the same, or as though one denotes the other. By doing this, researchers have over-complicated the theoretical concepts by treating them as mutually inclusive, and over-simplified the research by treating measures as though they all measure the same thing.

The studies selected for this review of the empirical IWM literature were selected based on the issues described above. The only studies included for review are those that involved a direct measurement of the IWMs of participants under the age of 18-years. Choosing delineating criteria for distinguishing between measures of attachment and IWMs seemed premature given their interchangeable usage. Instead, the measures researchers used to capture IWMs will simply be described and discussed.

**Main, Kaplan, and Cassidy (1985): The First Study Measuring IWMs**

Bowlby (1988) referred to case studies to demonstrate his points about the nature and function of IWMs. Main, Kaplan, and Cassidy (1985) were the first to attempt to explicitly
measure the IWM of attachment. Main et al.’s (1985) report was a contribution to a monograph dedicated to the current status of attachment theory, relevant research, and directions for theoretical growth. Their study aimed to explore how infants’ early attachment behaviors were related to children’s and parents’ IWMs five years later. Although their hypotheses were never made explicit, Main et al.’s (1985) goal was to show that “mental processes vary as distinctively as do behavioral processes as a function of differing internal working models,” (p. 78).

Main et al. (1985) began their review of the IWM concept by referencing psychoanalytic theorists Ronald Fairbairn (1946), Anna Freud (1952), and René Spitz (1966). They described how, in psychoanalytic theory, an infant perceives the caregiver as good or bad depending on whether or not the caregiver fulfills the infant’s needs. Like Bowlby, Main et al. (1985) wanted to emphasize the role of experienced events and deemphasize concepts like fantasy and wish fulfillment. They were interested in exploring the complexities of IWMs rather than dichotomous elements of good and bad. Also like Bowlby, they did not discard all psychodynamic elements. The authors’ description of IWM’s function reflected psychodynamic beliefs. Unconscious processes were expected to play a role in “obtaining or limiting access … to information regarding attachment-related experiences, feelings, and ideations,” (p. 67).

The view of the IWM as residing and functioning in the unconscious was also manifested in Main et al.’s (1985) measures. References to Main et al.’s (1985) study have primarily focused on their usage of two or three well-known measures, though the study included six measures in total. They compared the Strange Situation (Ainsworth et al., 1978) in infancy to five measures of the child, each parent, and parent-child interactions when the children were 6 years old. The 6-year measurements included an observational measure of overall functioning, ratings of the children’s responses to a family photograph, observations of a parent-child
reunion, the Separation Anxiety Test (Klagsburn & Bowlby, 1976), and the Adult Attachment Interview (George, Kaplan & Main, 1984). This review will focus on the latter two measures, as they became the most influential in subsequent IWM research.

Main et al. (1985) administered the Separation Anxiety Test (SAT; Klagsburn & Bowlby, 1976) at 6-years to assess the children’s IWMs. The SAT is a semi-projective measure created to capture how children ages 4- to 7-years might respond in situations where they are separated from their parents. Klagsburn and Bowlby (1976) did not claim that the SAT measured IWMs. They believed the measure could aid in studying the development of personality and psychopathology, and that it would be useful for clinical and educational assessments.

Klagsburn and Bowlby (1976) did not test the reliability for the measure, but did conclude a degree of validity after finding a relation between children’s SAT responses and teacher-ratings of the children’s adjustment in school.

During the SAT, the child is presented with a series of images and stories about children being separated from their parents (e.g., parents go out for the evening and leave the child at home). Each story is followed by questions about what the story-child feels and might do next. Participant responses to being asked how the depicted child might feel are rated for emotional openness. High scores are given to responses characterized by being open to feelings of sadness or disappointment; low scores are given to non-responsiveness or denying an emotional reaction. Main et al. (1985) also rated participant responses of what the depicted child would do next for constructiveness. High scores were given to responses characterized by suggestions of how the child might regain access to the parents; low scores were given to responses indicating extreme passivity (e.g., “I don’t know” or doing nothing) or suggestions that decreased parental accessibility (e.g., locking one’s self away).
Main et al. (1985) administered the Adult Attachment Interview (AAI; George, Kaplan & Main, 1984) to each parent when their child was 6 years old. The AAI is a semi-structured interview designed to tap into adults’ attitudes about attachment relationships, as well as their memory of their own attachment relationship with their parents. Secure responses are characterized by a readiness, ease, and openness to discussing the topic, and a lacked ideation of their parents or experiences (e.g., “Everything was perfect!”). Insecure responses are characterized by dismissal of the attachment relationship as unimportant, or a preoccupation with the relationship with their parents. Transcripts were also explored for contradictions and inconsistencies, which were more common in insecure responses. For example, an insecure adult might describe a parent as loving, but then only recalls memories of the parent being punitive.

Main et al.’s (1985) data analysis explored the relation between the children’s attachment in infancy and the outcomes at 6-years. The most consistent finding was that Strange Situation classifications with mothers were more strongly correlated with the 6-years measurements than classifications with fathers. Children’s SAT ratings for emotional openness positively correlated with attachment to mother in infancy \( r = .59, p < .001 \), as did ratings for constructiveness \( r = .59, p = .001 \). Based on these results, the authors concluded that the theorized connection between early attachment behaviors and later mental representations of attachment had been supported. Children who had been secure in infancy showed a pattern of being open and at ease when confronted with the various attachment-relevant stimuli. In contrast, children who had been insecure in infancy seemed restricted and uneasy.

Another finding was that parents’ AAI ratings were positively correlated with their infant’s attachment to the corresponding parent (mothers \( r = .62, p < .001 \); fathers \( r = .37, p < \)
Mothers with AAIs characterized by incoherence were more likely to have had their infant classified as insecure in the Strange Situation five years earlier. The authors suggested that a mother who is resistant to certain aspects of their own historical experiences would also be resistant to acknowledging and responding to certain aspects of her child’s experience. This resistance was believed to manifest as insensitivity due to the mother’s selective attention and responsiveness to her infant. This was then expected to influence the child’s subsequent development of insecurity.

**Research on IWMs in Childhood since Main et al. (1985)**

Research most immediately following Main et al.’s (1985) study was similarly focused on early and middle childhood. The majority of the research on childhood IWMs has been conducted on this age group because it has been going on for the longest period of time. Investigations into the IWMs of older children and adolescents began around the turn of the century, and studies attempting to measure infant IWMs have only begun to be conducted within the last seven years. These studies have varied widely in their methodological approaches, ranging from traditional to innovative. The current presentation and discussion of these studies will be organized according to their methodological similarities and dissimilarities to the Main et al. (1985) study. The findings of these studies will be described briefly here; select studies will be described in greater detail in the critique.

**Use and modification of the SAT.** A large number of researchers have made continued use of the SAT, and some have expanded and modified the SAT procedures. Slough and Greenberg (1990) created a variation of the SAT by asking participants what they would personally feel and do in the separation scenarios in addition to what the depicted child would feel or do. Wright, Binney, and Smith (1995) created a revised version of Slough and
Greenberg’s (1990) SAT for 8- to 12-year-olds using depictions of older children in age-appropriate settings and scenarios. Other research using the SAT has been focused on exploring the relation between SAT responses and various concurrent variables. Shouldice and Stevenson-Hinde (1992) further validated the SAT by comparing 4-year-olds’ SAT responses to concurrent attachment behaviors. Easterbrooks and Abeles (2000) found that more secure SAT responses at 8-years were concurrently associated with better adaptation in school, fewer behavior problems, and greater ease in self-evaluations than less secure SAT responses. Walsh, Symons, and McGrath (2004) found that responses to the SAT and responses to hypothetical pain experiences at 4- and 5-years were systematically related. And Clark and Symons (2009) found that 5- to 9-year-olds who gave secure SAT responses saw themselves more positively, and made more positive attributions about others’ intentions than children who had given insecure responses.

**Use and modification of the AAI.** Several years following the Main et al. (1985) study, Main (1999) clarified that the AAI should not be used to measure adult attachment or IWMs. Instead, she explained that the AAI measured adults’ current “state of mind with respect to attachment,” (p. 862). Since this clarification, some researchers using the AAI have been mindful to refer to these ‘states of mind’, while others have continued to use the AAI as a measure of IWMs and adult attachment. But even for those mindful few, the change in terminology has been largely superficial.

Some researchers of childhood IWMs made use of the AAI and its derivatives for measuring the IWMs of older children and adolescents. Zimmermann (1999) presented 16-year-olds with social rejection vignettes, and found that secure AAI responses were associated with more flexible attributions, and greater access to personal feelings than insecure responses. Spangler and Zimmermann (1999) found that 16-year-olds with secure and insecure AAI
responses reacted differently to videos of adolescents and adults in emotional interactions. Only secure adolescents’ facial expressions corresponded with the emotions they reported; insecure adolescents’ facial expressions did not predictably correspond to their reports of emotion. Joubert, Webster, and Hackett (2012) used the Adult Attachment Projective Picture System (AAP; George, West, & Pettem, 1999), a clinical assessment method for adults similar to the AAI, to investigate the relation between attachment, cognitive functioning, and dissociative symptoms in 11- to 17-year-olds. They found that adolescents with insecure AAP responses were also likely to report experiencing dissociative symptoms. This relation was mediated by cognitive impairments in selective attention and working memory.

Other researchers interested in the IWMs of later childhood and adolescence have used versions of the AAI specifically modified for the age group. Ammaniti, van IJzendoorn, Speranza, and Tambelli (2000) used the Attachment Interview for Childhood and Adolescence (AICA; Ammaniti et al., 1990) to test the stability of IWMs from later childhood into early adolescence. The primary difference between the AICA and the AAI is that the language is simplified. Target, Fonagy, and Shmuel-Goetz (2003) created an adaptation of the AAI for children between 8- and 13-years called the Child Attachment Interview (CAI). The CAI uses AAI coding features as well as additional features for measuring the extent of constructive conflict resolution, and to what extent children give a balance of positive and negative traits to attachment figures.

**Alternative IWM measures.** Several researchers of childhood IWMs created altogether different measures than those used by Main et al. (1985). Examples include the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), the Attachment and Current Relationship Interview (ACRI; Scheuerer-Englisch, 1989) and the Manchester Attachment Story
Task (MCAST; Green, Stanley, Smith, & Goldwyn, 2000). One of the more widely used measures is Bretherton, Ridgeway, et al.’s (1990) Attachment Story Completion Task (ASCT). The ASCT includes depictions of a child separated from its parents, as well as scenarios where children commonly experience distress (e.g., accidentally spilling juice, skinning their knee). Scenarios are acted out using toy figures, and after each story the child is asked ‘What will happen next?’ Children’s responses are traditionally coded similarly to the SAT according to emotional openness, willingness to respond, and coherence. However, some researchers have elected to focus on other response details such as described maternal responsiveness (Verschueren, Marcoen, & Schoefs, 1996) story themes (Page & Bretherton, 2001) and the number of responses children generated (Bretherton, Prentiss, & Ridgeway, 1990; Delius, Bovenshen, & Spangler, 2008).

Researchers utilizing the ASCT have also explored the relation between children’s IWMs and a variety of correlates. Bretherton, Ridgeway, et al. (1990) found that attachment status in infancy was positively but weakly correlated with the ASCT at 3-years; a stronger positive correlation was found concurrent attachment classifications. Verschueren et al. (1996) found that 5- to 6-year-olds who completed ASCT scenarios with maternal non-responsiveness were also likely evaluate themselves as perfect, but not as being liked or accepted. Page and Bretherton (2001) found that ASCT responses of 5-years-olds with divorced parents correlated with concurrent teacher-rated peer competence. In a cross-sectional sample of children between 3- and 7-years, Delius et al. (2008) found that older children generated more ASCT responses than younger children. All children generated more responses for questions about themselves than for questions about other people. Dubois-Comtois, Cyr, and Moss (2011) found that the emotional qualities of mother-child conversation at 5-years predicted ASCT response themes in
8-year-olds. Vaughn et al. (2011) found that ASCT responses were modestly positively correlated with concurrent sleep quality in 3- to 4-year-olds. And Wong et al. (2011) found that 2- to 3-year-olds’ ASCT responses were related to the children’s concurrent attachment behaviors and their mothers’ performances in an attachment-related story completion task.

Other innovative attempts to capture and describe IWMs have come from studies involving techniques used for studying attention and the violation-of-expectation. Bosmans, De Raedt, and Braet (2007) and Bosman, Braet, Koster, and De Raedt (2009) compared 9- to 13-year-olds’ responses to IWM inventories to their performance in attention tasks. These tasks entailed the presentation of stimuli and measuring participants’ response time in milliseconds. Both studies’ results indicated that children with less secure IWMs attended longer to pictures of their own mother than an unknown woman; more secure children did not show this response pattern. The authors concluded that this supported the view that the IWM functioned, at least in part, by regulating attention.

Techniques that do not depend upon verbal reports of internal processes have also been useful for exploring the possibility of IWMs in infants. Johnson, Dweck, and Chen (2007) and Johnson et al. (2010) showed 1-year-olds abstract animations depicting interactions between a ‘child’ shape and a ‘parent’ shape. Infants’ reactions were then compared to their Strange Situation attachment status. Results of these studies indicated that insecure infants looked longer at depictions illustrating a responsive ‘parent’, as well as depictions of the ‘child’ approaching the responsive ‘parent’. The authors’ conclusions were that infants looked longer at scenarios that were most unfamiliar to them, and that the violation-of-expectation indicated the functioning of an IWM.
Critique of the Research on IWMs in Childhood

As a cornerstone, the Main et al. (1985) study has often been referred to for the factual justification of ideas rather than being closely critiqued. Failing to acknowledge the weaknesses of even a groundbreaking study risks the validity of all the subsequent research that study will inspire. Each point of the following critique will begin by discussing points of weakness in the Main et al. (1985) study, and will then address how subsequent research duplicated these weaknesses. Critiqued points will include the failure to test the IWM construct’s validity and the unnecessary over-complication of unconscious processes. This section will conclude with a discussion of the IWM researchers that have offered interpretations of their results alternative to the orthodox views of IWMs.

Not testing IWM construct validity. Cronbach and Meehl (1955) explained that, “Construct validity must be investigated whenever no criterion … is accepted as entirely adequate to define the quality to be measured,” (p. 282). The APA Committee on Psychological Tests (1954) laid out three specific procedures for assessing construct validity. First, conducting an experiment can determine if the predicted influences of the construct were supported. Second, finding correlations with measures hypothesized to be related to the construct in combination with not finding correlations with measures thought to be unrelated to the construct. And third, a factor analysis could support the construct. It is possible that Main et al. (1985) might have been attempting to do one half of the second option. But the extent to which their correlations supported the validity of IWMs was limited because no attempt was made to determine a lack of correlation with hypothetically unrelated measures. A possible reason for this is because the IWM definition was too broad, lacking the defining characteristics of what it was not. Another possible reason could be the general tendency for researchers to look for
confirming rather than refuting evidence. The present opinion, however, is that it is unlikely that the authors were looking to validate the construct at all. Main et al.’s (1985) treatment of the available IWM definition as adequate was illustrated in their measures’ aim of capturing unconscious processes. Looking for evidence refuting the existence of unconscious processes is conceptually impossible. Additionally, their study design and data analysis most directly tested the predictive validity of early attachment, not IWMs.

Most all of the studies that followed Main et al. (1985) also correlated IWMs measures with other phenomena without seriously investigating a lack of correlation to hypothetically unrelated phenomena. It might be possible to deduce divergent validity of IWMs by re-examining the available research, and paying particular attention to associations that were not found. But no studies were constructed with the goal of finding evidence of what the IWM was not associated with.

One example of this is Slough and Greenberg’s (1990) extension of the SAT to include question about what the participant would personally feel and do in the separation scenarios. Comparing 5-year-olds’ responses to concurrent attachment status, Slough and Greenberg’s (1990) results indicated that more secure children were likely to give similar responses for what the story-child would feel and do and what they would personally feel and do. Less secure children gave different responses for the story child than they gave for themselves. If these results had been interpreted in the interest of establishing divergent validity, they might have found evidence for the IWM’s role in evaluating the self in relationships and not others in relationships. Instead, the authors maintained the predominate conceptualization of IWMs at the time, and interpreted their findings in terms of unconscious defensive processes. This interpretation will be discussed further in the following section.
The unnecessary over-complication of the unconscious. Main et al. (1985) interpreted children’s restricted SAT responses, and mothers’ incoherent AAI responses, as evidence of the unconscious defensive processes that characterize insecure IWMs. Bowlby (1980, 1988) talked about IWMs in terms of unconscious defensive processes, so it follows that research on IWMs should involve activating and identifying these processes. However, the relations that Main et al. (1985) identified can also be explained without referring to unconscious processes. For example, responses from children that were interpreted as avoidant (e.g., “I don’t know” or non-responsiveness) could have been because those children did not know how to respond.

An alternative explanation may be that children’s ability to talk about emotional topics is limited by what they have practice talking about. If the child has a limited amount of experience discussing feelings of loss or fear, the child’s inability to talk about those feelings may be due to a lack of practice. That lack of practice is likely because the child comes from a family that does not discuss those kinds of experiences. Looking at it this way, parents’ and their children’s similar unresponsiveness to certain emotionally charged attachment stimuli makes sense. Although more succinct explanations like these exist, most IWM researchers have followed Main et al.’s (1985) lead, and continued to insert unconscious processes into their interpretations of participant responses and study results. This is most often reflected through the authors’ interpretations that reference defensive exclusion and conflicting IWMs.

Defensive exclusion. Slough and Greenberg (1990) and Wright et al. (1995) both found that less secure children were more likely to give different responses to SAT questions of what the depicted child would do compared to what the participant would personally do. The authors concluded that these results supported the theory of defensive exclusion. Less secure children were open to imagining the experiences of a hypothetical child, but had difficulty reporting on
their subjective experiences in the same situations. A more parsimonious interpretation of their results could be that the self-versus-other distinction is a more observable in insecure children’s responses than secure children’s responses. Perhaps reporting on themselves requires children reference back to experienced events, whereas reporting about another child requires them to access a script of what a ‘typical’ child would do in such scenarios. That would imply that secure children’s personal experiences and their scripts about ‘typical’ children are not drastically different, whereas they are for insecure children.

Dubois-Comtois et al.’s (2011) study examined the longitudinal relation between mother-child conversations, attachment behaviors, and children’s IWMs. Mother-child conversations were observed when the children were 5 years old, and the conversations were coded for the expression of affective information. Expression of affective information was assessed according to the amount of *integration* (promotion of introspection), *minimization* (avoiding or devaluing), *exaggeration* or embellishment, and *chaos* (sudden hostile or withdrawn behaviors). Children’s IWMs were measured three years later using an adaptation of the ASCT. Responses to the ASCT were classified as *confident* (parents responded promptly and effectively), *casual* (the child denied having a problem or solved it on their own), *preoccupied* (the child seemed distracted from the task, such as giving attention to minor details of the story or the play material itself), or *frightened* (the danger was either chaotic or unresolved). Results indicated that emotional integration in mother-child conversations was associated with confident IWMs, affect exaggeration was associated with preoccupied IWMs, and affect chaos was associated with frightened IWMs.

Dubois-Comtois et al. (2011) concluded that their study emphasized the importance of the quality of conversations with caregivers in the development of IWMs. They also concluded
that their findings supported Bowlby’s (1980) suggestion that open communication would result in less defensive exclusion. An alternative explanation is that the children were mimicking their mothers’ modeled behavior. For example, mothers who engaged in or encouraged emotional embellishment in conversations had children who gave excessive attention to minor details. Mothers who engaged in or encouraged sudden expressions of negative emotions had children who described markedly negative scenarios. This more parsimonious explanation agrees with the authors’ assertion of the importance of the quality of communication with caregivers, but does not refer to unconscious forces.

**Incoherent and conflicting models.** Another issue regarding IWMs and the role of the unconscious is the view that insecure children have multiple conflicting IWMs. Insecure children are expected to have a consciously accessible IWM of the parent as loving and responsive, as well as an IWM shaped by painful experiences that is repressed into the unconscious. This view has led some researchers to conclude that their results indicate the presence of conflicting IWMs in insecure participants. For example, Verschueren et al. (1996) reported on two studies investigating how kindergarteners’ IWMs related to their sense of self and perceived social acceptance. Both studies included the use of Cassidy’s (1988) puppet interview, which requires children to report about themselves from another’s perspective. Children’s responses were coded for general positive or negative tone (e.g., whether or not the puppet liked or wanted to play with the child), as well as openness to imperfection (e.g., whether or not the puppet ever saw the child as ‘bad’). Results from the first study indicated that children with negative-perfect puppet interview responses (e.g., reported themselves as not liked, but never bad) were also likely to report themselves as being accepted by their mothers. Results from the second study indicated that children who gave negative-perfect self-descriptions were
also likely to describe ASCT scenarios in which the mother was non-responsive. Verschueren et al. (1996) considered the results of both studies together. The types of children likely to report maternal non-responsiveness were also likely to report being accepted by her, therefore, the authors interpreted their findings as evidence of inconsistent or conflicting IWMs.

A simpler alternative explanation for Verschueren et al.’s (1996) findings is that children can perceive themselves as accepted while also experiencing their mothers as non-responsive. Verschueren et al.’s (1996) measure of maternal acceptance included items that determined whether or not the child perceived their mother as taking them places they liked, cooking their favorite foods, and talking to them. Maternal responsiveness was determined by how the children’s description of maternal responsiveness during the ASCT, and the ASCT scenarios involve children expressing negative emotions such as crying, regret, and fearfulness. It is possible that some children experience mothers who are adept at acknowledging and incorporating the child’s preferences (highly accepting) and are less adept at responding sensitively to the child’s negative emotions (non-responsive). Even so, the finding that these children were more likely to give negatively toned, rigidly perfect self-evaluations is still valuable. Perhaps children with highly accepting, non-responsive mothers are acutely aware of the conditional nature of their mother’s responsiveness, as illustrated by the child’s report that they are not always liked (negative tone). Also, if maternal non-responsiveness to the expression of negative emotions results in a lack of experience addressing negative topics, then those children’s ability to openly acknowledge their shortcomings might be inhibited (perfect). This explanation agrees with the assertion that children’s perception of caregiver interactions influences their self-perceptions, but does so without needing to refer to conflicting models.
In a study on older children, Spangler and Zimmermann (1999) found that insecure adolescents’ facial expressions were not predictably related to their emotional reports. After determining the quality of 16-year-olds’ attachment representations using the AAI, participants were shown video clips of adolescents and adults having positive and negative interactions with one another. While watching the video, participants’ facial expressions were recorded using electrodes to measure the activity of smile and frown muscles (procedural level response). Following each scene, participants reported how emotionally positive or negative they perceived each scene to be (declarative level response). Results indicated that all participants were able to report differences between the positive and negative scenes, but only the secure adolescents had facial expressions that corresponded with the emotions they reported. Insecure adolescents’ facial expressions did not predictably correspond to their reports of emotion, especially for the negative emotions.

Spangler and Zimmermann (1999) concluded that their results were psychobiological evidence supporting incoherence in insecure IWMs, but alternative explanations exist. First, less facial reactivity to negative emotions in insecure participants could be attributed to a higher threshold for expressing negative emotion. Second, although the finding was more pronounced for negative emotions, insecure adolescents were less facially reactive to both the negative and positive scenes. This could be due a general difference in the tendency toward outward expression. Both of these alternative explanations suggest that Spangler and Zimmerman’s (1999) findings are valuable without referring to conflicting IWMs.

Alternative interpretations of relations found. Although interpretations of IWM research findings have primarily been traditional, a few researchers have attempted to offer alternative interpretations of their findings. For example, Bretherton, Prentiss, et al. (1990)
conducted a longitudinal study exploring the different qualities of children’s responses to the ASCT between 3- and 4.5-years. Their primary finding was that the children’s developmental progress was clear; children were able to elaborate more on family relationships and roles when they were older. Bretherton, Prentiss, et al. (1990) concluded that it was unclear how ASCT responses captured IWMs of attachment, and there was a possibility that the ASCT could be a social-cognitive task alone. This uncertainty was due to the lack of a clear IWM definition. The ASCT could be an attachment-related social-cognitive task, but it was not clear that IWMs of attachment were any more or less than just that.

Page and Bretherton (2001) used an expanded version of the ASCT on 5-year-olds with divorced parents to see how IWMs for each parent related to teacher-ratings of social competence. Instead of coding for qualities like openness and coherence, the authors coded the ASCT responses for specific themes. Results indicated that ACST responses were still significantly predictive of teacher-rated social competence. Mother-related attachment themes were overall the most predictive of teacher-rated social competence, and gender patterns emerged for other themes. For example, father-related attachment and empathy was correlated with teacher-rated social competence positively for boys and negatively for girls. The authors suggested that a high degree of attachment and empathy with the father in boys was likely reflective of fathers’ actual involvement. For girls, high attachment and empathy with the father might reflect an over-concern, or sense of responsibility for the father’s well being in reaction to parental conflict. Page and Bretherton’s (2001) interpretation attributes differences in IWM qualities to real-life circumstances rather than unconscious processes.

Bosmans, De Raedt, and Braet (2007) also offered alternative explanations to their findings regarding IWM’s relation to attention tasks. Their study compared 9- to 13-year-olds’
responses to an IWM inventory (IPPA; Armsden & Greenberg, 1987) to performance in the Exogenous Cueing Task (ECT; Posner, 1980) assessing attentional bias. During the ECT, images of either the child’s mother or unknown women appeared. Participants were instructed to press a button as soon as they detected a picture of their mother. Reaction time between the picture presentation and the pushed button was measured in milliseconds, and indicated the length of time participants attended to the picture before reacting to it. Results showed that children with less secure IWMs attended longer to the mother than the unknown woman; this effect was not found in more securely attached children. The authors concluded that this supported the assertion that IWMs regulate attention, and went on to offer a variety of explanations for the association. One possibility was that mothers may be more emotionally salient for less secure children, thereby holding their attention longer. Alternately, less-secure children may need to spend more time confirming their mother’s image than they would need to conclude that a woman is unfamiliar.

Critique Summary

A major problem with IWM research is that it has not been constructed with the goal of testing the construct’s validity. Researchers have been disproportionately involved in confirming relations between IWMs and variables the construct is hypothesized to include or influence. Little to no attention has been given to the construct’s divergent validity. This practice has been a major source of the criticism that the concept is a catch-all explanation for research findings.

Another problem with IWM research has been the overwhelming tendency for researchers to interpret findings by referencing unconscious processes. Alternative explanations provided support for the psychodynamic emphasis on early interactions with caregivers without relying on extraneous explanations like defense mechanisms. Caregivers might model behaviors
that children then emulate; caregiver behavior might also limit the amount of practice the child has in discussing certain feelings or topics. Psychodynamic theorists may take an extra step by referring to unconscious processes to explain why this lack of practice occurs (e.g., avoidance and repression), but this extra inference is not required to explain the relation observed. The tendency to interpret results through a psychodynamic lens has even distracted from opportunities for exploring the divergent validity of the IWM concept. For example, insecure children’s incongruent responses to questions about themselves versus another child have been interpreted as ‘conflicting’. Instead, this difference may indicate that IWMs apply only to the self in relationships and not to others in relationships.

Lastly, it is important to note that even though many IWM measures were developed to identify and measure unconscious processes, this does not preclude the usefulness of these measures. As illustrated, responses patterns of IWM measures can be interpreted in alternate ways. Regardless of whether or not unconscious forces motivate differences in responses, it is safe to assume that differences in responses delineate differences in IWMs.

**Going Forward with IWM Research**

Bowlby (1982) said, “Without good theory as a guide, research is likely to be difficult to plan and to be unproductive, and findings are difficult to interpret,” (p. 676). The quandary attachment researchers are currently in might very well be the result of poor theory, but the fault is not entirely Bowlby’s. If anything, the comprehensiveness of his theory might have left attachment theorists that followed with the false impression of the theory’s perfection, or at least, completion. Bowlby’s usage of the IWM concept has been described as metaphorical, and when elaborating on the topic, he appeared to fall back on his psychoanalytic training. The product was a concept that was not clearly defined, and the defining characteristics Bowlby did provide
were not empirically testable. Inspired researchers went eagerly forward looking for evidence of the inadequately defined IWM. As a result, Bowlby’s prediction came to pass, and the research findings regarding IWMs have been collectively difficult to interpret.

Even though Bowlby’s theory relied on his psychodynamic training, Holmes (1995) described Bowlby’s frustration with the psychoanalytic community’s dogmatism and lacking of scientific inquiry. He may have been trying to reconceptualize his psychoanalytic-inspired theory in a behavioral and cognitive light in order to give it scientific validity. As a result, Bowlby was a black sheep among the psychoanalysts of his time. Many current-day champions of Bowlby’s theory are themselves psychodynamic theorists who also dismiss much of the classic psychoanalytic canon, but maintain the belief in the role of the unconscious. The clinical psychodynamic influence on IWM research is evidenced by the semi-projective clinical assessment measures used to capture and qualify IWMs.

Generally speaking, those in the psychodynamic clinical field have been concerned whether theory is effective when applied, rather than empirically pursuing the extent to which a theoretical concept is accurate. However, a pursuit of accuracy is necessary in order for the IWM concept to maintain, as Thompson (2008a) said, its originality and clarity. One way to begin this pursuit is to stop constructing IWM research with such a heavy reliance on psychodynamic theory, and to begin giving more attention to more observable and testable aspects of IWM theories. Doing so would make research easier to plan, and would produce results that translate more easily across psychological disciplines. Not doing so would be contradictory to Bowlby’s own goals of decreasing theoretical dogmatism and increasing scientific inquiry. Afterwards, it is all psychologists’ prerogative to interpret findings in the context of their preferred approach.
Although the IWM concept is a small fraction of Bowlby’s massive theory, this fraction is the crucial mechanism connecting early attachment experiences to later social outcomes. If early attachment is to be believed as having any developmental potency, the IWM must be understood as more than a metaphor. Modern attachment researchers must be careful that paying due respect to an inspiring theory does not give rise to becoming remiss in their empiricism. This requires that researchers of IWMs pick up where Bowlby left off. Future research should emphasize IWM features that are empirically testable, deemphasizing theoretical features like the unconscious. Also, future research should include active attempts at ascertaining the validity of the IWM construct, as defined within the bounds of its testable parts.

PART II: Applying the Proposed IWM Definition

The validity of the IWM concept can only be tested after a clear and testable definition has been offered. The first chapter outlined a proposal for a new IWM definition taking into account decades of theory and research devoted to the concept. This new definition is in agreement with the original theory regarding the IWM’s function of shaping perceptions of future relational events, and the formative role of early interactions with caregivers. The current suggestion is that the IWM is formed after the child achieves a certain level of cognitive maturity. The expectation is that this occurs around 3-years of age, corresponding with what Bowlby called goal-directed partnership. Once formed, the IWM is expected to operate at the highest-most, generic and abstract level of representation, and thereby remain stable over time. And this generic abstract representation of the self in relationships will serve as the default expectation for subsequent personal relational events.

In conjunction with the proposal of a later-forming IWM is the suggestion of a sensitive period of attachment. Attachment is expected to form as Bowlby originally theorized, during the
second half of the first year. Over the next few years, the child is expected to be receptive to changes in caregiving, and this receptiveness should manifest as fluctuations in the child’s attachment quality. This sensitive period is expected to end once the IWM is formed, when the child comes to rely more heavily on the mental representation of personal relationships.

Conceptualizing IWMs and attachment in this way specifies the differential development and function of each phenomena. Early attachment behaviors are changeable, whereas the later-forming IWM is stable. Early attachment behaviors serve the purpose Bowlby originally theorized, to keep young children physically proximate to their caregivers. Flexibility in early attachment behaviors may aid in maintaining proximity in the face of changing caregiving environments. Afterwards, the later forming and more stable IWMs serves as a relational heuristic for understanding future social interactions. The current suggestion is that what has been traditionally viewed as the predictive power of attachment is in fact the predictive power of the IWM. This new conceptualization of IWMs is more testable than previous IWM definitions. Distinguishing between a sensitive period for attachment and the IWM creates the opportunity to test the convergent and divergent validity of each. If the proposed conceptualization is accurate, then the following would be expected:

• Attachment before 3-years should change in response to changes in caregiving, and IWMs after 3-years should remain relatively stable independent of changes in caregiving.
• IWMs measured after 3-years should be more predictive of social outcomes than attachment measured before 3-years.

The Stability of Attachment and IWMs: The Influence of Changes in Caregiving

As discussed in the previous chapter, attachment has been found to be only moderately stable from infancy to adulthood (Fraley, 2002; Pinquart et al., 2013). Research findings indicate
that changes in attachment quality are associated with changes in caregiving (e.g., Booth-LaForce, et al., 2014; Egeland & Farber, 1984; Vaughn, Egeland, Sroufe, & Waters, 1979; for review, see Thompson, 2006). Atkinson et al.’s (2000) meta-analysis of studies on infants and toddlers indicated that concurrent assessments of attachment and maternal sensitivity were much more strongly associated than nonconcurrent assessments. And Pinquart et al.’s (2013) meta-analysis found that representational measures of attachment were more stable beyond toddlerhood than behavioral measures in infancy. Taken together, this research suggests early changes in attachment correspond within changes in caregiving, whereas later representations of attachment do not.

Testing the changeability of attachment and caregiving requires longitudinal data that includes multiple measurements of each over time. The National Institute of Child Health and Human Development’s (NICHD) Study of Early Child Care and Youth Development (SECCYD) is a comprehensive longitudinal study that meets these requirements. The SECCYD dataset has proven useful for many researchers exploring the tenets of attachment theory (for review, see Friedman & Boyle, 2008). Several of these studies have already used this database to investigate relationships between attachment and quality of caregiving (Belsky & Fearon, 2002a; Booth-LaForce, 2014; McCartney et al., 2004; McElwain & Booth-LaForce, 2006; McElwain, Cox, Burchinal, & Macfie, 2003, NICHD, 2001, 2006; Raikes & Thompson, 2008). Of these studies, only two explored the relation between attachment and changes in caregiving. McElwain et al. (2003) explored how changes in maternal sensitivity from 6-months to 3-years was associated with attachment at 3-years. They found that children more secure at 3-years had experienced greater levels of mean maternal sensitivity, as well as greater increases in maternal sensitivity. More recently, Booth-LaForce et al. (2014) explored how changes in parenting were
associated with changes in attachment from early childhood to late adolescence. Compared to participants who remained secure, they found that participants who were consistently insecure and who changed from secure to insecure experienced lower levels and greater decreases in maternal sensitivity.

Although both McElwain et al. (2003) and Booth-LaForce et al. (2014) explored how changes in parenting was associated with attachment, neither study was constructed in a way that tested the currently proposed conceptualization of attachment and IWMs. McElwain et al. (2003) treated attachment at 3-years as an outcome to maternal sensitivity up to that point. This does not address if attachment up to 3-years fluctuates as a function of changes in caregiving. Booth-LaForce et al. (2014) consolidated attachment assessments over the first three years into a singular attachment status for early childhood, and then compared early childhood status to AAI classification at 18-years. This approach also does not address fluctuations in attachment up to three years. Additionally, the decision to compare early attachment behaviors to AAI classifications followed traditional assumptions that attachment and representational measures are comparable.

**The Predictive Power of Attachment and IWMs on Social Outcomes**

Longitudinal projects have repeatedly produced studies finding relations between attachment and factors associated with social outcomes (for review, see Dykas & Cassidy, 2011; Friedman & Boyle, 2008; Grossmann, Grossmann, & Waters, 2005). A variety of social outcomes for children have been explored, including peer-relations, behavior problems, and romantic relationships. Attachment’s influence on behavior problems risks being too broad because characteristics such as general hostility, hyperactivity, and noncompliance may influence, but are not exclusive to, social engagement. Attachment’s influence on romantic
relationships is too narrow because of the high level of intimacy involved, and also because such relationships are most applicable to older children. Attachment’s influence on peer-relations is broad enough to be inclusive of a variety of ages and relationships within childhood, and is not so broad to include qualities that are not exclusively social. For this reason, further discussion of children’s social outcomes will focus on peer-relations.

Given the quantity of research available exploring attachment and peer-relations, several meta-analyses have been conducted. In his seminal articles on the technique, Glass (1976, 1977) asserted that the meta-analysis was not only effective, but was required in order to grasp the meaningful patterns in a collection of various works all aimed at answering the same question. Schneider, Atkinson, and Tardif’s (2001) meta-analyses exploring attachment and peer-relationships included 63 studies. The overall effect size they found was small-to-moderate \( r = .20 \). Effects were larger for peer relations in middle childhood and adolescence than for early childhood. They reasoned that characteristics central to the attachment relationship such as intimacy, security, and trust were more prevalent in preadolescent and adolescents’ peer relationships than for younger children.

Schneider et al.’s (2001) conclusions about the effect of age were limited because of the disproportionately large sample of studies using younger participants (less than 8-years, \( n = 59 \)) compared to studies using older participants (8-years and older, \( n = 16 \)). The authors attributed the underrepresentation of studies on older children to their decision to exclude studies that used self-reported measures of attachment. Aimed at correcting for Schneider et al.’s (2001) limitations, Benson, McWey, and Ross (2006) accessed 53 studies with participants between 10- and 20-years, and included studies with self-reported attachment measures. They found a substantial overall effect size between adolescent attachment and peer relations \( d = .54 \) that was
stable across study characteristics. And in a follow-up to Schneider et al.’s (2001) study, Pallini, Baiocco, Schneider, Madigan, and Atkinson (2014) performed a meta-analysis of 44 studies that had been conducted since the previous analysis. The inclusion criteria and coding of the studies remained the same as used by Schneider et al. (2001). The overall effect size Pallini et al. (2014) found was comparable to the earlier study \( r = .19 \). Pallini et al.’s (2014) brief report did not address whether the difference in effect size between early and later childhood had been replicated. Each of the previous meta-analyses explored the degree to which attachment predicts social outcomes with peers, but none were constructed with the aim of exploring the unique impact of IWMs. This was due to the tendency of researchers to use attachment, IWMs, and the measures of each interchangeably.

Rationale for the Proposed Studies

The NICHD SECCYD is an excellent opportunity to test if attachment changes as a function of changes in caregiving over the first three years. Previous studies using the SECCYD dataset have already indicated that, over the first three years, the measures of attachment are either weakly or not correlated in this sample (e.g., Bothe & Vietze, 2013; Groh et al., 2014; McCartney et al., 2004; NICHD, 2001) and quality of caregiving is not always consistent (e.g., Booth-LaForce et al., 2014; McElwain et al., 2003, NICHD, 2006). But a study does not yet exist using this dataset to explore if attachment during the first three years fluctuates as a function of changes in caregiving during the first three years. Therefore, Study 1 will use the SECCYD dataset to test for this possibility.

Few studies have used the SECCYD dataset to explore development in later childhood and adolescence compared to those exploring early childhood, and studies using the database to explore IWMs are non-existent. However, the SECCYD dataset includes observations of parent-
child interactions and self-reported measures of attachment at three time points in middle childhood and adolescence. The current expectation is that self-reported measures of attachment plausibly tap into IWM representations because they are based on the participants’ interpretation of events and relationships. Similarly to Study 1, Study 2 will explore to what extent IWMs change as a function of changes in caregiving. The currently proposed IWM conceptualization suggests that IWMs remain stable independent of changes in caregiving.

Studies 1 and 2 test the differential development of attachment and IWMs. Study 3, a meta-analysis, explores the differential influence of attachment and IWMs on peer-relations. A meta-analysis is an appropriate technique for exploring the relations between attachment behaviors, IWMs, and peer-relations because of the large quantity of research that exists on the topic. Previous meta-analyses have already shown a relation between attachment and peer-relations, but these studies did not differentiate between attachment and IWMs (Benson et al., 2006; Pallini et al., 2014; Schneider et al., 2001). Based on the current theoretical argument, effect sizes are expected to be much larger in studies correlating IWMs to peer-relations than studies correlating early attachment behaviors to peer-relations.

Taken together, Studies 1, 2, and 3 will test the validity of the proposed differential development and function of attachment and IWMs. The expectation is that the findings of these studies will indicate that: (a) the changeability of early attachment is accounted for by changes in caregiving, (b) IWMs in middle childhood and adolescence are stable independent of changes in caregiving, and (c) IWMs are more predictive of social outcomes than attachment behaviors. Such findings would support the assertion that attachment and IWMs are independent constructs, and as independent constructs, it is the IWM that accounts for the stability and predictability traditionally attributed to attachment.
CHAPTER 3

METHODS

The purpose of this research is to explore the construct validity of the newly proposed IWM definition, and the proposal that a sensitive period exists. This will be done by examining the stability of early attachment and IWMs in the context of changes in caregiving, and the power of each to predict social outcomes. Studies 1 and 2 will use the nationally representative longitudinal NICHD Study of Early Child Care and Youth Development (SECCYD) database. Study 1 tests if changes in attachment before 3-years changes as a function of changes in caregiving. Study 2 tests if IWMs in middle and later childhood remain stable independent of changes in caregiving. Study 3 is a meta-analysis exploring if measures of IWMs after 3-years are more predictive of social behaviors than attachment measures before 3-years.

Study 1: The Influence of Changes in Caregiving on Attachment from Infancy to 3-years

Participants

Beginning in 1989, the NICHD team of researchers enrolled a diverse sample of children and their families from 10 sites across the United States in or around: Little Rock, Arkansas; Orange County, California; Lawrence, Kansas; Boston, Massachusetts; Morganton, North Carolina; Pittsburgh, Pennsylvania; Philadelphia, Pennsylvania; Charlottesville, Virginia; Seattle, Washington; and Madison, Wisconsin. In 1991, during selected 24-hour periods within a 10-month period, 8,986 women were approached in the hospital after the birth of their child and screened for eligibility and willingness to participate in the study. For a more detailed description of the sampling procedures, refer to the NICHD Early Child Care Research Network (2006) study. In an effort to obtain a normative sample, participants were excluded if: (a) the
mother was under 18; (b) the child was hospitalized for more than seven days following the birth or had obvious disabilities; or (c) the mother had a known or acknowledged substance abuse problem. Participants were also excluded if the mother did not speak English or the family planned to move. The data used in Study 1 is from Phase I collected from families when the infant was 1- to 36-months old. Participants for Study 1 were selected from a total of 1,364 possible participants. Participants were selected if they had attachment and corresponding maternal sensitivity data at all of the available time points (15-months, 24-months, and 36-months). The resulting sample for this study is $N = 1016$ (51.1% male). The sample was 82.5% Caucasian, 11.5% African-American, and 6.0% other ethnicities.

Measures

**Maternal sensitivity at 15-, 24-, and 36-months.** Following the example of previous studies using the SECCYD dataset, caregiving will focus on maternal sensitivity. This decision is because of prevailing cultural trends of mothers serving as primary caregivers, and because the SECCYD only assessed attachment statuses with mothers. It made sense to explore caregiving data for the parent with whom the child’s attachment status was determined.

Mother-child interactions were observed in the home when the child was 15 months old, and in a laboratory when the child was 24 and 36 months old. The rating scales for the 15- and 24-month observations were developed for the SECCYD. Videotapes of the interactions were rated on 4-point global qualitative scales (1 = very low, 4 = very high). The composite score of maternal sensitivity at 15- and 24-months is the sum of the following scales: mothers’ sensitivity to nondistress, reverse-scored intrusiveness, and positive regard. The 36-month rating scales were adapted from Egeland and Heister’s (1993) teacher task rating scale, and used 7-point qualitative rating scales (1 = very low, 7 = very high). Composite maternal sensitivity at 36-
months is the sum of the following scales: maternal supportive presence, hostility (reverse scored), and respect for child’s autonomy. Cronbach’s alphas for composite scores of maternal sensitivity at all ages ranged from .70-.78; interrater reliability was determined by intraclass correlation coefficient, and ranged between .83-.84 (see NICHD Early Child Care Research Network, 1999).

**Attachment status at 15-months.** The Strange Situation procedure (Ainsworth et al., 1978) was conducted when the infants were 15 months old (+/- 1 month). The following is the description of the Strange Situation procedure from the NICHD Study of Early Child Care Phase I Instrument Document:

The mother and child are videotaped in an unfamiliar playroom in a series of 3-minute episodes designed to increase the child's stress and activate the child's attachment system. In the first two episodes the mother and child get accustomed to the playroom and the child is encouraged to explore the toys; then an unfamiliar adult female enters and sits quietly; after a minute she talks with the mother; after another minute she attempts to engage the child; after the third minute the mother leaves the room quietly. The mother returns after a 3-minute separation; if the child is distressed the separation is curtailed. Three minutes later the mother leaves again, and the child is left alone for three minutes. Again, if the child is distressed the episode is curtailed and the stranger returns. After three minutes, or sooner if the stranger cannot comfort the child, the mother returns.

The videotape of the Strange Situation is watched by a trained coder. Four child behaviors are rated in each of the reunions: Proximity and contact seeking; Contact maintaining Resistance; and Avoidance. The organization of the child's attachment and exploratory behaviors, especially in the reunion episodes, is analyzed and classified into
one of three major classifications: Secure (Group B), insecure-avoidant (Group A), and insecure-resistant (Group C). Secure infants use the mother as a secure base for exploration. If they are distressed during the separation they seek comfort and contact with her at reunion, which reduces their anxiety and enables them to return to exploration. If they are not distressed by the separation they nevertheless show a strong desire to interact or communicate with the mother. Avoidant infants show conspicuous avoidance of proximity or interaction with the mother at reunion, even if invited by the mother to approach or play. They are generally not distressed by separation, or if distressed, it is due to being alone and not to the mother's absence. Resistant infants are quite distressed by separation and display both contact and proximity seeking behavior at reunion, combined with interaction and contact resisting angry.

The ABC typology just described is the "classic" classification system in the field. In recent years researchers have rated the child's behavior according to the extent to which it was "disorganized/disoriented" with respect to attachment. Rather than being a pattern of behavior, disorganization/disorientation describes behavior that is inexplicable (without immediate goal or rationale) or explicable only if it is presumed that the child is afraid of the parent or is inhibited in approach to the parent without being able to shift attention elsewhere in the environment. Indices of disorganization and disorientation include sequential or simultaneous displays of contradictory behavior patterns, stereotypes and anomalous postures, freezing and stilling, and apprehension of the parent. When disorganization is rated 6 or above on a 9-point scale, a primary "D" classification is assigned, followed by a secondary ABC classification if the infant's behavior is classifiable in the traditional system. If this is not the case, a secondary classification of
"U" is applied, meaning "unclassifiable in the traditional ABC system". Rarely, an infant will receive a primary "U" classification, meaning that the behavior is not classifiable in the traditional system but is not otherwise disorganized (pp. 186-187).

The construct validity of the Strange Situation has been supported by several studies (e.g., Ainsworth et. al., 1978; Belsky, Rovine, & Taylor, 1984; Grossmann, Grossmann, Spangler, Seuss & Unzner, 1985). Intercoder agreement for this sample using the five-category system was 83% (see Groh et al., 2014).

**Attachment status at 24-months.** The Attachment Behavior Q-set (Waters & Deane, 1985) was conducted when the infants were 24 months old. The following is the description of the Attachment Behavior Q-set procedure from the NICHD Study of Early Child Care Phase I Instrument Document:

The Attachment Q-set consists of 90 cards that observers sort into fixed piles from “most descriptive” to “least descriptive” of the child. The cards are sorted based on a predefined distribution (in our case 4-6-10-15-20-15-10-6-4). Each card describes a behavioral characteristic of children from 18-24 months. The items are sorted to provide a summary of a child’s attachment behavior as observed during a 2-hour home visit. Items most characteristic of the child are placed at one end of the distribution (piles 9, 8, and 7). Items most uncharacteristic of the child are placed at the opposite end (piles 1, 2, and 3). Items that were not observed in the visit or are neither characteristic nor uncharacteristic of the child are placed in the center piles. An item’s placement in the sort determines its score. The most characteristic items receive scores of nine, the items most unlike the child receive the scores of one. The final sort conforms to a symmetrical, unimodal distribution with a specified number of items in each pile.
In the NICHD Study of Early Child Care, one observer (except for reliability visits in which two observers will go) visited the home and observed the normal, everyday routine at a time when just the mother and the child (and a younger child, if any) are present. The trained observer made notes of child’s behavior that was naturally occurring or in response to semi-structured situations introduced by the observer. These were a small book with surprise windows, a snack, and a hide-and-seek game. These semi-structured activities were introduced during the last hour of observation. Immediately after the observer returned from the home visit, the Q-sort was performed based on memory and notes taken during the visit. The resulting profile was correlated with the profile of a prototypically secure child, as determined by experts in the field, and the correlation of the subject’s Q-security score. Criterion sorts for security and dependency were provided by Everett Waters. These criterion sorts result from the averaged sorts of 6-10 experts who have been asked to provide a description of the “hypothetically most secure child” and the “hypothetically most dependent child”. The procedure yields attachment construct scores for security, dependency, sociability as well as a social desirability score for control purposes (pp. 10-12).

Only the score for attachment security will be utilized in this study. The construct validity of the Attachment Behavior Q-set has been supported by a meta-analysis conducted by van IJzendoorn, Vereijken, Bakermans-Kranenburg, and Riksen-Walraven (2004). Inter-observer reliability for this sample was determined as .96 using the intraclass correlation coefficient (see Groh et al., 2014).

**Attachment status at 36-months.** A modified Strange Situation procedure based on recommendations by Cassidy, Marvin, and members of the MacArthur Working Group on
Attachment (1992) was used to assess attachment security at 36-months. The following is the description of the 36-month Strange Situation procedure from the NICHD Study of Early Child Care Phase I Instrument Document:

In this procedure, designed to be moderately stressful for the child, the mother and child were invited to make themselves comfortable in a room containing a basket of toys, a beanbag chair, a chair for the mother, and a schoolhouse with small plastic figures. After three minutes the mother was signaled to leave. The first separation lasted 3 minutes, unless the child was distressed. After a 3-minute reunion, the mother left again, and the second separation lasted for 5 minutes, unless the child was distressed, in which case the mother returned to the room early. The assessment was terminated after 3 minutes of the second reunion. Research assistants at the 10 sites were trained and certified to conduct this modified Strange Situation according to standard procedures.

The child’s behavior during the assessment was classified according to the system developed by the MacArthur Working Group on Attachment (MacArthur; Cassidy & Marvin and the MacArthur Working Group on Attachment, 1992). The MacArthur coding system classifies preschoolers as secure (B) or insecure (A, C, and D). Secure (B) children are able to resolve the stress of the separation and resume calm, comfortable interaction with the parent. Insecure-avoidant (A) children maintain extreme neutrality toward the parent, and even after reunion rarely express either positive or negative emotion toward the parent. Insecure-ambivalent (C) children show fussy, helpless, whiny, and/or resistant behavior toward the parent. They may seek contact, but find it unsatisfactory. Insecure-controlling/insecure-other (D) children are either controlling or show combinations of strategies, such as avoidance and ambivalence, or avoidance and
controlling behavior, during the reunions. Controlling children take charge of the reunion, usually in either a caregiving (role-reversal) or punitive manner. A child showing more than one type of controlling behavior is classified as controlling-general. Coders also make a global 9-point security rating, in which 1 = Very insecure, 3 = Insecure, 5 = Probably secure, 7 = Secure, and 9 = Very secure (pp. 187-188).

The validity of Strange Situation procedures modified for preschoolers has been supported by several studies (Booth, Rose-Krasnor, McKinnon, & Rubin, 1994; Cicchetti & Barnett, 1991; Barnett, Kidwell, & Ho Leung, 1998). Inter-coder agreement for this sample using the four-category system was 75.7% (see Groh et al., 2014).

**Child characteristics.** Data on child characteristics of gender, temperament, and intellectual development were included as possible mediating factors in the relation between maternal sensitivity and child attachment. Temperament was assessed by mothers when the children were 6-months of age using the Early Infant Temperament Questionnaire (Carey & McDevitt, 1978; Medoff-Cooper, Carey, & McDevitt, 1993). The questionnaire included an item rating overall temperament: “My baby’s temperament is: (a) about average, (b) more difficult than average, and (c) easier than average.” Ratings of 6-month temperament were available for 98.6% of the sample (n = 1002). No reliability or validity information was available for the item rating overall temperament, therefore, temperament will be discussed in terms of maternal perceptions of child temperament instead of implying a definite characteristic of the child. Intellectual development was assessed by an independent observer at 15-months using the Bayley Scales of Infant Development – Mental Development Index (Bayley, 1969; Rhodes & Bayley, 1984). The Bayley Scales Mental Development Index assesses abilities such as sensory-perception, memory, learning, problem-solving, and early verbal communication.
The measure was standardized on 1,262 children from 2- to 30-months of age. Reliability for the standardized sample was above .80. Ratings of intellectual development at 15-months were available for 98.5% of the sample \( (n = 1001) \).

**Hypotheses**

The hypotheses for Study 1 are: (a) Attachment statuses are systematically related to maternal sensitivity. Lower maternal sensitivity will be associated with insecure status, higher maternal sensitivity will be associated with secure status. (b) Changes in mother’s sensitivity will predict changes in children’s attachment status. (c) Different patterns of maternal sensitivity, examined collectively over time, might have differential impact on attachment status outcomes. And (d) the relation between maternal sensitivity and child attachment is likely mediated by child characteristics.

**Study 2: The Relation between Changes in Caregiving and IWM Stability in Middle Childhood and Adolescence**

**Participants**

Phase II of the SECCYD collected data when the children were 3 years old until first grade (6- to 7-years). Phase II includes maternal sensitivity data at 54-months and first grade, but includes no measures of either attachment or IWMs. The SECCYD dataset includes self-reported measures of attachment at three time points in middle childhood (Phase III) and adolescence (Phase IV). The current expectation is that self-reported measures of attachment plausibly tap into IWM representations because they are based on the participants’ interpretation of events and relationships. Therefore, the data used in this study is from Phase III and IV of the SECCYD data. Participants for Study 2 were selected from a total of 1,009 possible participants retained through Phase IV. Participants were selected if they had corresponding IWM and
maternal sensitivity data at all of the available time points (third grade, fifth grade, and 15-years). The resulting sample for this study is $N = 545$ (45.9% male). The sample was 82.6% Caucasian, 10.6% African-American, and 6.8% other ethnicities.

**Measures**

**Maternal sensitivity at third and fifth grades.** Mother-child interactions were observed in the home when the child was in third grade, and in a laboratory when the child was in fifth grade. The interactions included a discussion task and a planning activity. The rating scales were developed for the SECCYD from Pianta’s (1994) rating scales for parent-child interactions with preschoolers. Observers rated videotapes of interactions on 7-point global qualitative scales (1 = very low, 7 = very high). Composite scores of maternal sensitivity were derived by summing scales of supportive presence, respect for autonomy, and reverse-coded hostility. The NICHD SECCYD Phase III Instrument Document reported the interrater reliability of maternal sensitivity composite scores as Pearson correlations: third grade = .77 and fifth grade = .75.

**Maternal sensitivity at 15-years.** Adolescent-mother interactions were videotaped at their home when the child was 15 years old. The adolescent picked discussion topics from a list of possible topics. All topics were common areas of disagreement for adolescents and their parents (e.g., chores, homework). The interactions were videotaped; assessments were of parent behavior, adolescent behavior, and the dyadic interaction. Only assessments of mothers’ behavior will be used in this study. Observers rated mothers’ behavior on a 7-point scale (1 = very low, 7 = very high) derived from Allen, Hauser, Borman, and Worrell’s (1991) coding system for autonomy and relatedness (see also Allen, Hauser, Bell, & O’Connor, 1994). A composite maternal sensitivity code was the sum of the following scales: validation/agreement,
engagement, reverse-coded inhibited relatedness, reverse-coded hostility/devaluation, respect for autonomy, and valuing/warmth. The NICHD SECCYD Phase IV Instrument Document reported internal reliability of the maternal sensitivity composite as Cronbach’s alpha = .81.

**IWMs in third and fifth grades.** Children were administered the Relatedness Questionnaire (Toth & Cicchetti, 1996; Lynch & Cicchetti, 1991, 1997) in their own home when they were in third grade, and again in a laboratory setting in fifth grade. The Relatedness Questionnaire is a 17-item questionnaire derived by Toth and Cicchetti (1991) from Wellborn and Connell’s (1987) *Assessment Package for Schools*. It is designed to gain information about children’s representations of their relationship with their mother, teacher, and best friend. Each relationship is inquired about separately, and the child rates each item on a 4-point scale (0 = not true, 3 = very true). The SECCYD administered Relatedness Questionnaires only inquiring about the children’s relationship with their parents and teacher; only ratings of maternal relationships will be included in this analysis.

The Relatedness Questionnaire produces subscales of *emotional quality* and *psychological proximity seeking*. Emotional quality (EQ) indicates the degree of positive and negative emotions the child reports experiencing within the relationship. An example of an EQ item is, “When I am with my mother, I feel loved.” Psychological proximity seeking (PPS) indicates the degree to which the child desires to be psychologically closer to the individual. An example of a PPS item is, “I wish my mother paid more attention to me.” The combination of these subscales results in five patterns of relatedness: (a) optimal—very high EQ / very low PPS, (b) deprived—very low EQ / very high PPS), (c) adequate—moderate EQ and PPS, (d) disengaged—very low EQ and PPS, and (e) confused—very high EQ and PPS.
The Relatedness Questionnaire was administered again in a laboratory setting when the children were in fifth grade, and included 15 additional items from the Security Scale (Kerns, et al., 1996). These items were designed to test the child’s perception of security with their parent. Items address the degree to which the child perceives their parent as responsive and available, the degree to which the child relies on the parent in times of stress, and the child’s interest and ease in communicating with the parent. The items are presented as either/or statements about other children. For example, “Some kids find it easy to trust their mom, but other kids are not sure if they can trust their mom.” The child indicates which statement they agree with more, and then rates how true the statement is of them on a 4-point scale (0 = not true, 3 = very true). Only scores associated with the mother-child relationship will be used in this study. The NICHD SECCYD Phase III Instrument document reported the internal reliability for the mother-child relationship in the fifth grade version of the Relatedness Questionnaire as Cronbach alphas: EQ = .82, PPS = .81, and security = .77.

**IWMs at 15-years.** The children completed a questionnaire designed to measure their relationships with their parents at 15-years of age. The Parental Relationship Questionnaire was adapted from the Behavioral Systems Questionnaire (Furman & Wehner, 1999; Furman & Simon, 2004; Furman, Simon, Shaffer, & Bouchey, 2002), which measures adolescent’s relationships with their parents, friends, and romantic partners. The SECCYD Phase IV instrument document explains that the Parental Relationship Questionnaire was chosen as a shorter and more cost-effective alternative to the AAI.

The Parental Relationship Questionnaire consists of sections assessing attachment style, caregiving style, and affiliation. The attachment style section explores the extent to which the adolescent feels they can turn to their parents in times of need. The caregiving style section
assesses the adolescent’s comfort level with responding to their parents’ needs. The affiliation section assesses how invested the adolescent is in the relationship with their parents. Adolescents responded to items on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Each section includes items that are expected to tap into characteristics of being secure, dismissing, or preoccupied. A composite score is computed as the mean score of each characteristic across all sections. A singular security status was determined according to the characteristic for which the child received the overall highest score. For example, overall higher scores on dismissing items indicate a dismissing IWM. The internal consistency for the parent-related composite score is Cronbach alpha = .88 (Furman, 1996; Furman & Simon, 2004).

**Hypotheses**

The hypotheses for Study 2 are: Children’s IWMs will (a) remain stable over time, and (b) this stability is independent of changes in maternal sensitivity. Participants’ ratings on all questionnaires will be transformed into either being secure or insecure. The argument was made earlier that continuing to distinguish IWMs according to security and insecurity might perpetuate the conceptualization of IWMs and attachment as interchangeable. However, agreeing to keep the phenomena theoretically separate does not necessarily preclude using parallel classification systems. If the attachment relationship informs the IWM’s structure, the two phenomena might share characteristics. The current decision for categorizing IWMs is based on this reasoning, as well as the practical limitations of the available measures. Unlike Study 1, Study 2 does not include measurements of child characteristics for two reasons. First, factors such as early temperament and IQ do not seem applicable to older children. Second, taking into account potentially moderating child characteristics did not seem necessary because the hypothesized expectation is that IWMs would remain stable.
Study 3: Meta-analysis Assessing the Predictive Power of
Attachment and IWMs on Peer-relations

Selection of Studies

Studies for the meta-analysis investigating attachment and the IWM’s influence on peer-relations were included if they meet the following criteria: (1) Participants were 18 years old or younger at the time of all measurements. (2) The measure of attachment / IWM were concurrent with or proceeded the social outcome—excluding cases where social outcomes were measured first. (3) There was a measure children’s attachment to their parents—excluding studies that focus exclusively on attachment to other figures (e.g., teachers, friends, and romantic partners). (4) The social outcome was explicitly with peers and not their parent(s), family, or other adults. In cases where it was impossible to isolate peer-related behaviors from a general social outcome, the outcome was included if peer-related items made up at least 50% of the measure. (5) The study’s social outcome was not exclusively problem behaviors or disorders (e.g., externalizing behavior problems, anxiety, withdrawal, etc.). Hostile and aggressive behaviors were included if the behaviors were explicitly directed at peers—excluding outcomes that captured general hostility and aggressiveness. And lastly, (6) the study was written in English.

Using these criteria, studies were identified from the reference lists of other meta-analyses (Benson et al., 2006; Pallini et al., 2006; Pinquart et al., 2013; Schneider et al., 2001) and from previous work on my master’s thesis entitled “Gender differences in Insecurely Attached Children: A Longitudinal Study Comparing Social behaviors with Peers at 54-Months, Kindergarten, and First Grade.” A search for studies was also conducted using the PsycInfo, Google Scholar, and the ProQuest Dissertation and Theses databases. Keyword combinations included ‘attachment,’ ‘attachment representation,’ ‘internal working model,’ ‘IWM,’ ‘peer
relations,’ ‘social behavior,’ and ‘social competence.’ Finally, the reference lists of each retrieved article were searched for additional studies. Information was requested from the authors of studies in cases where an article met the inclusion criteria but did not contain enough information to determine the relation between the attachment / IWM and social outcomes. Based on the given criteria, a total of 86 studies were included in the current meta-analysis. Appendix A is a reference list of these studies.

Hypothesis

The hypothesis for Study 3 is: Studies predicting peer-relations using representational measures will have significantly larger effect sizes than studies using behavioral measures of attachment. Following Pinquart et al. (2013) analysis of attachment stability, a distinction will be made between behavioral and representational measures of attachment. Behavioral measures will be treated as measures of attachment; representational measures will be treated as measures of IWMs.
CHAPTER 4
DATA-ANALYSIS AND RESULTS

Study 1

The purpose of Study 1 was to test if changes in maternal sensitivity are systematically related to changes in attachment status over the first three years. There was also the possibility that the collective impact of changes in maternal sensitivity over time have differential impact on children’s attachment status. Child characteristics were included as possible moderators of the relation between maternal sensitivity and child attachment.

Transformation of Variables

Maternal sensitivity raw scores at 15-, 24-, and 36-months were standardized into z-scores in order to maintain statistical assumptions of normal distribution. Maternal sensitivity z-scores were converted into categorical rankings of sensitive and low sensitivity for the portions of the analysis that utilize categorical groupings. Mothers were considered sensitive if their score was above -1 standard deviation from the mean; low sensitivity was assigned to scores of -1 standard deviation and below. This method of categorization considered mothers exhibiting both average and high sensitivity as sensitive, and only mothers exhibiting especially low sensitivity were classified as less sensitive.

Bayley Scale IQ scores were also standardized to maintain statistical assumptions of normal distributions. The mean and standard deviation of the non-standardized IQ scores was $M = 108.9, SD = 13.7$. Bayley Scale IQ z-scores were converted into categorical rankings of high, average, and low according to standard deviations from the mean for purposes of grouping. Children with IQ scores one standard deviation above the mean were considered to have high IQs, children with IQ scores between -1 and +1 standard deviations from the mean were
considered to have average IQs, and children with IQ scores one standard deviation below the mean were considered to have low IQs. Attachment status at 15-, 24-, and 36-months were transformed into either secure or insecure. Strange Situation classifications at 15- and 36-months were transformed as follows: B classifications were considered secure, classifications of A, C, and D were considered insecure. Percentages of secure classifications at 15- and 36-months were 61.5% and 62.6%, respectively. The Attachment Behavior Q-set at 24-months is a dimensional measure of attachment security; therefore, a criterion cut-off was determined to convert continuous scores to secure and insecure categories.

Waters (2003) suggested a criterion cut-off of .30 be used to designate secure and insecure. His suggestion was based on the typical proportions of secure (70-65%) and insecure (35-30%) children in randomly selected samples (e.g., Ainsworth et al., 1978; van IJzendoorn & Kroonenberg, 1988). Applying the suggestion to the current sample resulted in nearly half (46.9%) of the participants being classified as insecure at 24-months. This seemed high in comparison to expected typical proportions, as well as in comparison to the classification percentages at 15- and 36-months. While it is possible that insecurity peaks in toddlerhood, the choice was made to determine a more conservative 24-month criterion cut-off. Percentages of insecure children at 15- and 36-months were averaged, and the lowest scoring children up to 37.95% of the sample were considered insecure. This set the Attachment Q-set criterion sort cut-off at .258. The number and percentage of participants according to the categorical rankings of gender, temperament, IQ, attachment, and maternal sensitivity at each time point are presented in Table 1.

Previous studies using this sample have indicated that attachment status at these three time points were not correlated (e.g., Bothe & Vietze, 2013; Groh et al., 2014; McCartney et al.,
A Chi-square analysis was used to confirm this. Only secure and insecure attachments at 24- and 36-months were significantly correlated, $\chi^2(1, N = 1016) = 6.88, (p < .01)$. The effect size was only approaching small (Phi = .08).

**Correlating Maternal Sensitivity Z-scores and Attachment Statuses**

The first hypothesis for Study 1 was that attachment statuses would be systematically related to maternal sensitivity. Lower maternal sensitivity would be associated with insecure status; higher maternal sensitivity would be associated with secure status. Binary logistic regression analyses were used to test to what extent maternal sensitivity z-scores at 15-, 24-, and 36-months predicted attachment at each time respectively. Secure status was coded as 0 and insecure status was coded as 1.

Maternal sensitivity at 15-months did not significantly predict attachment status at 15-months. Maternal sensitivity at 24-months significantly predicted attachment status at 24-months ($\chi^2(1, 1016) = 38.28, p < .000$). Nagelkerke’s $R^2$ is a pseudo $R^2$ indicating the percentage of variability in a binary dependent variable accounted for by a continuous independent variable. The Nagelkerke’s $R^2$ of .05 indicated a weak relationship between maternal sensitivity and attachment status. Prediction success overall was 64%. There was 90% prediction success for secure and 21.5% for insecure. The regression weight value indicated that a one-unit increase in maternal sensitivity was associated with a .41 decrease in the likelihood of being insecure (Wald criterion = 36.65, $df = 1, p < .000$). Maternal sensitivity at 36-months significantly predicted attachment status at 36-months ($\chi^2(1, 1016) = 26.21, p < .000$). Nagelkerke’s $R^2$ of .04 indicated a weak relationship between maternal sensitivity and attachment status. Prediction success overall was 63.1%. There was 93.4% prediction success for secure and 12.4% for insecure. The regression weight value indicated that a one-unit
increase in maternal sensitivity was associated with a .33 decrease in the likelihood of being insecure (Wald criterion = 25.35, $df = 1$, $p < .000$). These findings support the hypothesis that attachment status is systematically related to maternal sensitivity, at least at 24- and 36-months. Lower maternal sensitivity was associated with insecure status, and higher maternal sensitivity was associated with secure status.

The second hypothesis for Study 1 was that changes in mother’s sensitivity would predict changes in children’s attachment status. Two slopes for maternal sensitivity were calculated. One slope represented the change from 15-24 months, the other represented change from 24-36 months. Participants were placed in groups according to attachment status patterns from 15-24 months and 24-36 months. Participants fell into one of four groups for each time range: (a) secure-secure, (b) secure-insecure, (c) insecure-secure, and (d) insecure-insecure. Secure-secure and insecure-insecure groups were expected to be predicted by consistent maternal sensitivity indicated by slopes close to zero. Negative slopes indicating a drop in maternal sensitivity were expected to predict the secure-insecure group, and positive slopes indicating a drop in maternal sensitivity would predict the insecure-secure group. Multinomial logistic regression analyses were used to test for this possibility.

Neither overall model, for change from 15-24 months or from 24-36 months, was statistically significant. The only statistically significant relation was found from 15-24 months for the secure-secure group (Wald criterion = 4.94, $df = 1$, $p < .05$). The regression weight value indicated that a one-unit increase in slope was associated with a .19 increase in the likelihood of being in the secure-secure group. Therefore, when change in maternal sensitivity was calculated as slopes, these findings did not support the hypothesis that changes in children’s attachment status corresponded with changes in mother’s sensitivity.
Correlating Accumulated Categorical Maternal Sensitivity to Attachment Status

The third hypothesis of Study 1 was that different patterns of maternal sensitivity, examined collectively over time, might have differential impact on attachment status outcomes. The hypothesis was tested using categorical maternal sensitivity. Participants were divided into groups according to categorical maternal sensitivity patterns to assess the cumulative effects of changing maternal sensitivity over time. Groups at 15-months were designated by those who experienced concurrent sensitive maternal behavior (S) or less sensitive maternal behavior (L). Four groups were possible at 24-months by including the previous and concurrent time points: SS, SL, LS, and LL. Eight groups were possible at 36-months, by including the previous two and concurrent time points: SSS, SSL, SLS, SLL, LSS, LSL, LLS, and LLL.¹

Chi-square analyses were used to determine the association between 15-month groups and 15-month attachment status, 24-month groups and 24-month attachment status, and 36-month groups and 36-month attachment status. The relation between 15-month maternal sensitivity and 15-month attachment was not significant. The relation between the four groups at 24-months and attachment at 24-months was significant, $\chi^2(3, N = 1016) = 28.46, p < .000$, and the effect size was small (Cramer’s $V = .17$). The relation between the eight groups at 36-months and attachment at 36-months was also significant, $\chi^2(7, N = 1016) = 47.52, p < .000$, and the effect size at 36-months was small (Cramer’s $V = .22$). These findings support the hypothesis that patterns of maternal sensitivity, examined collectively over time, have differential impact on attachment status outcomes.

It was decided to group participants based only on 24- and 36-month maternal sensitivity

¹ The first letter in the group label indicates categorical maternal sensitivity at 15-months; the second letter indicates maternal sensitivity at 24-months; the third letter indicates maternal sensitivity at 36-months.
because the 15-month relation was non-significant. The purpose of this analysis was to determine if groups determined using only the later two time points would be more strongly related to attachment status at 36-months than all three time points of maternal sensitivity together. A Chi-square analysis showed that although the relation was significant, $\chi^2(3, N = 1016) = 39.36, p < .000$, the effect size was smaller for groups using two time points (Cramer’s $V = .20$) compared to groups using all three time points (Cramer’s $V = .22$). Subsequent analysis of 36-month attachment security continued to be predicted by all three points of maternal sensitivity for this reason.

Observed and expected percentages of secure and insecure children in each 24- and 36-month group were then examined. Some groups’ observed-to-expected percentages were more dramatically different than others. The null expectation was that secure children should account for 60-65% percent of every group at each time. Groups differing from this expectation tended to have lower counts of secure children and higher counts of insecure children. The percentages of the secure and insecure classifications within the 24- and 36-month groups are presented in Table 3. A note has been made of groups when the percentages are markedly different than expected (≤ 50% secure).

Secure children made up less than 50% of the total count at 24-months for only the SL and LL groups (41.0% and 47.8%, respectively). The likelihood of a child being secure at 24-months was less than expected when their mother’s sensitivity either changed from sensitive to low-sensitivity (SL), and when their mothers’ sensitivity was consistently low (LL). Secure children made up less than or equal to 50% of the total count for the SLS, LSS, LLS, and LLL groups at 36-months (42.4%, 50.0%, 47.6%, and 16.0%, respectively). The likelihood of a child being secure at 36-months was less than expected when their mothers’ behavior fluctuated from
15- to 24-months and then became sensitive at 36-months (SLS and LSS), and when mothers were consistently low in sensitivity from 15- to 24-months and then became sensitive at 36-months (LLS). The likelihood that a child would be secure was as expected when mothers’ behavior fluctuated from 15- to 24-months and then became less sensitive at 36-months (SLL and LSL), or were consistently sensitive from 15- to 24-months—regardless of sensitivity of 36-months (SSS and SSL). The likelihood of a child being secure at 36-months was lowest (16%) when maternal sensitivity was consistently low over time (LLL).

**Correlating Categorical Maternal Sensitivity to Child Characteristics**

Chi-square analyses were used to test the extent to which categories of maternal sensitivity at each time were related to child characteristics of gender, maternal-reported temperament, and intellectual development. Chi-square values, the observed and expected counts, and effect sizes when significant for the association between maternal sensitivity at each time and each child characteristic are shown in Table 2. Fifteen-month maternal sensitivity was not significantly associated with gender, but 24- and 36-month maternal sensitivity were. Boys were less likely than expected to have mothers rated as sensitive at both time points. Girls showed the opposite pattern at both time points. Temperament was significantly associated with maternal sensitivity at all time points, and the pattern of association was the same at all time points. Mothers who reported that their child’s temperament as more difficult or as average difficulty at 6-months were less likely than expected to be rated as sensitive. Mothers who reported their child’s temperament was easier than average showed the opposite pattern. Intellectual development at 15-months was significantly associated with maternal sensitivity at 15- and 24-months. Children with low IQs were less likely than expected to have mothers rated
as sensitive at both time points. Children with high IQs showed the opposite pattern, and children with average IQs had the expected proportions of sensitivity and less sensitivity. Correlating Accumulated Categorical Maternal Sensitivity to Attachment Status when Controlling for Child Characteristics

The fourth hypothesis for Study 3 was that the relation between maternal sensitivity and child attachment would be mediated by child characteristics of gender, maternal-rated temperament, and IQ. Chi-square analyses were conducted to assess the cumulative effects of changing maternal sensitivity over time while controlling for each child characteristic separately. The Chi-square assumption of less than 20% of the cells containing an expected count of at least 5 was occasionally violated due to increasingly smaller group sizes. Although this may compromise the tests’ validity to a certain degree, it was decided to note these results with caution rather than to disregard them all together.

Fifteen-month maternal sensitivity was still not significantly associated with 15-month attachment, even when each child characteristic was controlled for. Maternal sensitivity patterns were significantly associated with attachment status at 24- and 36-months when controlling for child characteristics. Significant differences between observed and expected counts were found for boys and girls, for children rated by their mothers as having an average or easy temperament, and for children with average IQ scores. Effect sizes at 24-months were small and ranged from .25 for girls at 36-months to .13 for children rated by their mothers as having an easy temperament. These effect sizes are comparable to the non-controlled for model. The Chi-square statistics, effect sizes when statistically significant, and whether or not the assumption was violated for models controlling for child characteristics at 24-months and 36-months are displayed in Table 4. All groups’ secure and insecure counts for the statistically significant
controlled for child characteristics are presented in Table 5. Groups are emphasized when observed counts are noticeably (≤ 50% secure) and dramatically (≤ 25% secure) different than the expected counts.

Results are presented first describing patterns of maternal sensitivity from 15- to 24-months predicting attachment at 24-months, and then describing maternal sensitivity across all time points predicting attachment at 36-months. The group whose mothers went from sensitive to less sensitive (SL) were consistently less likely than expected to be secure and more likely to be insecure at 24-months across all characteristics. The group whose mothers transitioned from less sensitive to sensitive (LS) was only less likely than expected to be secure at 24-months if the children were male. Consistently low sensitivity (LL) was associated with a lower likelihood of being secure at 24-months if the child was male, or was reported as having an easy or average temperament.

The most dramatically different observed-to-expected counts were found when exploring the relation between maternal sensitivity at three time points and attachment at 36-months, moderating for child characteristics. The group whose mothers were less sensitive only during toddlerhood (SLS) was less likely than expected to be securely attached at 36-months if the child was female, was reported as having an easy temperament, or had an average IQ. This difference was especially pronounced for female children. The group whose mothers showed low sensitivity at 15-months only (LSS) were less likely than expected to be secure if they were boys, and especially if they had been rated as having an easy temperament. The group whose mothers showed consistent low sensitivity until 36-months (LLS) was less likely to be secure than expected for all significant characteristics, except for those with average IQs. The group who experienced a peak in maternal sensitivity in toddlerhood (LSL) was less likely than expected to
be secure if they were girls, were rated as having an average temperament, and especially if they had an average IQ. And lastly, the group who experienced low sensitivity with their mothers at every time point (LLL) was the least likely to be secure regardless of all controlled-for variables. These findings support the hypothesis that, the relation between maternal sensitivity and child attachment is mediated by some child characteristics, and the influence of these characteristics varies depending on the pattern of maternal sensitivity over time.

**Study 2**

The purpose of Study 2 was to determine if the IWM remains stable independent of changes in maternal sensitivity over time. Data transformations and analyses in Study 2 follow the same reasoning as was laid out in Study 1. The primary difference between Study 1 and Study 2 is the expectation of different results. Children’s IWMs in Study 2 were expected to remain stable independent of maternal sensitivity over time. Potentially moderating child characteristics were not included in this study for two reasons: (a) factors such as early temperament and infant IQ did not seem applicable to middle childhood and adolescence, and (b) the expectation that IWMs would be stable did not necessitate the identification of moderators.

**Transformation of Variables**

Maternal sensitivity raw scores at third grade, fifth grade, and 15-years were standardized into z-scores. Maternal sensitivity z-scores were then converted into categorical rankings of *sensitive* and *low sensitivity* using the same method described in Study 1. The number and percentage of participants according to gender and experience of maternal sensitivity at each time point are displayed in Table 1.

The status of IWMs at third grade, fifth grade, and 15-years were transformed into either a *secure* or *insecure* category. Transformations of the Relatedness Questionnaire at third and
fifth grades followed Toth and Cicchetti’s (1996) suggestion that optimal and adequate patterns of relatedness could be considered equivalent to secure. Deprived, disengaged, and confused patterns were considered equivalent to insecure. Security Scale scores at fifth grade were converted to secure and insecure classification according to criteria recommended by Kerns et al. (1996). The top two-thirds of the distribution was considered secure, and the bottom one-third was considered insecure. Transformation of the Parental Relationship Questionnaire at 15-years maintained secure statuses as secure, and considered dismissing and preoccupied statuses to be insecure.

**Correlating IWM Statuses at Third Grade, Fifth Grade, and 15-years**

The first hypothesis for Study 2 was that the IWMs would remain stable over time. Chi-square analyses were used to test this hypothesis for children’s IWMs at third grade, fifth grade, and 15-years (all \( N = 545 \), all \( df = 1 \)). Only IWM statuses at third grade and 15-years were not correlated, \( \chi^2 = .00, (p = 1.00) \). Third grade IWM status was significantly correlated with both the Relationship Questionnaire (\( \chi^2 = 43.10, p < .001 \)) and the Security Scale (\( \chi^2 = 23.06, p < .001 \)) at fifth grade. Phi values indicated effect sizes were .28 and .21, respectively. Both measures of IWM status at fifth grade correlated significantly with each other (\( \chi^2 = 60.14, p < .001, \Phi = .33 \)). Fifteen-year IWM status was significantly correlated with IWM status in fifth grade according to both the Relationship Questionnaire (\( \chi^2 = 11.82, p < .01 \)) and the Security Scale (\( \chi^2 = 20.71, p < .001 \)). Effect sizes were .15 and .20, respectively. These findings support the hypothesis that the IWM remains stable over a few years, however, the IWM is less stable over larger assessment intervals.
The Chi-square results for the two fifth-grade IWM measures were compared to determine if only one measure could be used for subsequent analyses. Neither the significance of the relations nor the amount of variance accounted for by each was dramatically different. It was decided to use only the Relationship Questionnaire status at fifth grade for subsequent analysis in order to maintain continuity between IWM measures at third and fifth grades. The number and percentage of participants’ IWM security categories at each time point are presented in Table 1. The proportions of children with secure IWMs at all time points far outweigh the children with insecure IWMs. Additionally, there were far more children with secure IWM statuses at these ages (secure = 75.8 - 92.5%) compared to the amount of children classified as securely attached in Study 1.

**Correlating Maternal Sensitivity Z-scores and IWM Statuses**

The second hypothesis of Study 2 was that the IWM would remain stable independent of changes in maternal sensitivity. The first step was to test if concurrent maternal sensitivity and child IWMs were correlated. The second step was to test if changes in maternal sensitivity were related to changes in IWM status. Binary logistic regression analyses were used to test to what extent maternal sensitivity z-scores at third grade, fifth grade, and 15-years predicted IWM status at each time respectively. Secure IWM status was coded as 0, and insecure IWM status was coded as 1.

Concurrent maternal sensitivity significantly predicted IWM status at all ages. Maternal sensitivity at third grade significantly predicted IWM status at third grade ($\chi^2(1, 545) = 6.43, p < .05$). Prediction success overall was 87.9%. There was 100% prediction success for secure and 0% for insecure. The regression weight value indicated that a one-unit increase in maternal sensitivity was associated with a .32 decrease in the likelihood of being insecure (Wald criterion
Maternal sensitivity at fifth grade significantly predicted IWM status at fifth grade ($\chi^2(1, 545) = 19.90, p < .000$). Prediction success overall was 92.5%. There was 100% prediction success for secure and 0% for insecure. The regression weight value indicated that a one-unit increase in maternal sensitivity was associated with a .65 decrease in the likelihood of being insecure (Wald criterion = 20.54, $df = 1, p < .000$). Maternal sensitivity at 15-years of age significantly predicted IWM status at 15-years ($\chi^2(1, 545) = 12.20, p < .000$). Prediction success overall was 76.1%; 100% for secure and 1.5% for insecure. The regression weight value indicated that a one-unit increase in maternal sensitivity was associated with a .34 decrease in the likelihood of being insecure (Wald criterion = 12.16, $df = 1, p < .000$).

Nagelkerke’s $R^2$’s at first grade, fifth grade, and 15-years (.02, .09, and .03, respectively) indicated very weak relations between maternal sensitivity and IWM status. These findings indicate that concurrent maternal sensitivity and child IWMs are related, but for the secure IWM status alone.

Two slopes for maternal sensitivity were calculated to represent change from third to fifth grades, and from fifth grade to 15-years to assess if changes in maternal sensitivity corresponded with changes in IWM status. Participants were placed in four groups according to IWM status patterns across these time points. Two multinomial logistic regression analyses were used to test if changes in maternal sensitivity from third grade to fifth grade or from fifth grade to 15-years corresponded with changes in IWM status. Neither overall model was statistically significant, nor were any statistically significant relations found for individual groups. These findings support the hypothesis that the IWM remains stable independent of changes in maternal sensitivity. However, the results from Study 1 indicated that—in spite of the lack of relation
between slopes of change and status outcomes—it was necessary to also test if patterns of maternal sensitivity over time were associated with IWM status outcomes.

**Correlating Accumulated Categorical Maternal Sensitivity to IWM Status**

Participants were divided into groups according to maternal sensitivity patterns to assess the cumulative effects of changing maternal sensitivity over time—two groups at third grade (S, L), four groups at fifth grade (SS, SL, LS, LL), and eight groups at 15-years (SSS, SSL, SLS, SLL, LSS, LSL, LLS, LLL). Chi-square analyses were then used to determine the association between third-grade groups and third-grade IWM status, fifth-grade groups and fifth-grade IWM status, and 15-year groups and 15-year IWM status. The relation between third-grade maternal sensitivity and third-grade IWM status was significant, $\chi^2(1, N = 545) = 12.34, p = .001$, and the effect size was small (Phi = -.15). The relation between the four groups at fifth grade and IWM status at fifth grade was significant, $\chi^2(3, N = 545) = 24.06, p < .000$, and the effect size was small (Cramer’s $V = .21$). The relation between the eight groups at 15-years and IWM status at 15-years was also significant, $\chi^2(7, N = 545) = 25.57, p = .001$ and the effect size was small (Cramer’s $V = .22$). These findings refute the hypothesis that the IWM is independent of changes in maternal sensitivity.

Observed and expected percentages for each group were examined to further explore the relation between accumulated maternal sensitivity and IWM status at each time point. The observed percentages for all groups are shown in Table 6. Each group where the observed and expected percentages differ by at least 10 points has been noted. Children who experienced sensitive mothers at third grade and who were then low in sensitivity at fifth grade (SL) had a higher likelihood of having an insecure IWM at fifth grade. Children who experienced consistent levels of sensitivity from third to fifth grade (SS, LL), and children who experienced
less sensitivity in third grade and sensitivity in fifth grade (LS), did not have noticeably different than expected percentages of secure and insecure IWMs. It should be noted that 37.5% of the cells in the fifth grade model had an expected count of less than 5. This violates Chi-square assumptions; therefore these results should be interpreted with caution.

Four of the eight groups at 15-years resulted significantly different observed percentages than were expected. Children whose mothers were sensitive at third grade and were then less sensitive at fifth grade and 15-years (SLL) had a higher likelihood of having an insecure IWM at 15-years. Children who experienced less maternal sensitivity at third grade were more likely than expected to have an insecure IWM at 15-years if their mothers’ sensitivity fluctuated from fifth grade to 15-years (LSL, LLS) or was consistently low at all time points (LLL). All other 15-year groups did not have noticeably different than expected percentages of secure and insecure IWMs. These findings refute the hypothesis that the IWM status would be independent of changes in maternal sensitivity.

**Study 3**

Study 3 is a meta-analysis of 93 studies measuring the relation between attachment behaviors, IWMs, and peer social outcomes. This meta-analysis examined if different study characteristics—primarily whether measures of attachment or IWMs predicting social outcomes with peers—had significantly different effect sizes. The hypothesis was that representational measures of IWMs would have significantly larger effect sizes than behavioral measures of attachment.

**Coding Studies for Meta-analysis**

Sample size and year of publication were recorded for each study. Codes were created for publication status (1 = published, 2 = unpublished), the participants’ risk-status (1 = not at
risk, 2 = at risk, 3 = both), the country in which the study took place (1 = United States and Canada, 2 = Israel, 3 = Sweden, 4 = Netherlands, Belgium, Germany—consolidated because of the low number of studies in each, and 5 = Other), and the lab or project the study came out of (1 = NICHD Study of Early Child Care and Youth Development, 2 = Minnesota Longitudinal Project, 3 = Haifa Longitudinal Study, 4 = Uppsala Longitudinal Study, 5 = Other, and 6 = Not specified).

Many studies contributed more than one effect size. Effect sizes within studies were coded according to whether the predictive variable was attachment or an IWM. Behavioral measures were treated as measures of attachment; representational measures were treated as measures of IWMs (1 = Attachment, 2 = IWM). Self-reported measures of attachment were considered representational because they are based on the participants’ interpretation of events and relationships. Effect size codes were also created to specify if the peer-related social outcome was negative, hostile, aggressive, or rejecting (1 = not negative, 2 = negative). Additional effect size codes not applicable to the current analysis (e.g., reporter of the social outcome, age at the time of measurements, interval between measurements) were also created for possible in-depth analyses at a later point.

The author did all of the coding. Coding reliability was determined using a second coder—a recent Ph.D. graduate of developmental psychology from the same program. Both raters coded 12% of the studies. Inter-rater reliability was determined using Cohen’s kappa. Inter-rater agreement was very good (kappa = .86). Differences on coding were conferred upon to reach consensus.
Determining Effect Sizes

Effect sizes for each study were calculated as $r$, the correlation between attachment or IWM classifications and peer-related social outcomes. When effect sizes were not explicitly reported in the study, $r$s were calculated with DSTAT 1.10 software (Johnson, 1993) using the available reported information of means, standard deviations, group sizes, Cohen’s $d$, $F$-, $t$- and, $p$-values. Several studies presented results for boys and girls as separate groups. In these cases, $r$s were determined for boys and girls separately.

Another prevalent concern was the different ways researchers operationalized and reported attachment and IWM variables. Some studies used continuous measures of attachment or IWM status. Other studies compared secure to insecure groups, and others compared more than two groups (e.g., secure, insecure-avoidant, insecure-resistant). In cases where more than two groups were compared, correlations were determined from comparisons of the secure group to each insecure group separately (e.g., secure to insecure-avoidant, then secure to insecure-resistant). Secure groups’ ns were divided evenly across comparisons so that secure participants were not counted multiple times.

Some studies used attachment / IWM measures that produced multiple scales for individual participants. For example, a single measure may provide a score for secure, avoidant, and dismissing responses, resulting in three separate scores for each participant. When a scale of security was available, the security scale was used in lieu of the other scales. In cases where there was no explicit scale of security, $r$s were obtained for each of available scales.

The 93 studies included in this meta-analysis yielded a total of 454 effect sizes. The following analytic procedures were followed according to Lipsey and Wilson’s (2001) recommendations for conducting a meta-analysis. All $r$s were transformed into Fisher’s $z$ scores
(Zr) for the purpose of stabilizing the variance of the effect sizes across studies (M = .10, SD = .28). The ‘Windsorizing’ technique was used to prevent the disproportionate influence of outliers. Twenty-four out-lying Zr scores were identified at ± 2 standard deviations from the mean. These scores were recoded at the value of ± 2 standard deviations (+2 SD = .67, -2 SD = -.46).

The next step was to create a set of independent effect sizes because many studies contributed more than one Zr. This was done in order to not violate statistical analysis assumptions of independent data points. Independent data points (Zri) were created according to study sample, the constructs of attachment versus IWM predictors, and negative versus not negative outcomes. Studies that contributed a singular Zr score maintained that score as their Zri score. Multiple Zr scores from a singular study were averaged if the same type of prediction (attachment or IWM) and outcome (negative or not negative) variables were used for all correlations. If a study included Zr scores with different types of predictors or outcomes, then separate Zri scores were identified for each construct (i.e., attachment predicting negative outcomes, attachment predicting non-negative outcomes, IWM predicting negative outcomes, and IWM predicting non-negative outcomes). This process resulted in 133 independent effect sizes. The distribution of all Zr and Zri scores are presented as a stem and leaf display in Figure 1.

Weights were then calculated to adjust for the number of Zr scores contributing to each Zri score. Independent effect sizes computed from more Zr scores were given more weight than independent effect sizes derived from fewer Zr scores. Weight was calculated as \( N - 3 \), where \( N \) equals the number of Zr scores used to calculate Zri. The \( N - 3 \) calculation is equivalent to the
inverse of the squared standard error of $Z$, (see Lipsey & Wilson, 1991, p. 64) and has been used
in other meta-analyses, such as Piquart et al. (2013).

**Analyzing the Weighted Mean Effect Size and Homogeneity of the Distribution**

The first steps in the data-analysis was to determine if the weighted mean effect size was
significantly different than zero, and if the sample of effect sizes was sufficiently heterogeneous
to merit further analysis. The weighted mean effect size and 95 percent confidence intervals
were calculated for the entire sample (weighted mean $ES = .06$, $UL = .32$, $LL = -.21$). The mean
effect size for the entire sample was not statistically significant because the confidence interval
included zero. The $Q$ statistic was then used to test for homogeneity in the sample of
independent effect sizes. The $Q$ statistic is distributed the same as a Chi-square, where the
degrees of freedom equal the number of effects sizes in the sample minus one. The null
hypothesis of homogeneity can be rejected if the value of $Q$ is greater than the Chi-square critical
value. The value of $Q$ (52.07) for the total current sample ($N = 133$) was not greater than the
critical value of Chi-square for 100 degrees of freedom (124.34). This indicated that the
distribution of the independent effect sizes around the mean was no greater than would be
expected from sampling error alone.

Additional tests of homogeneity were conducted to test the possibility of finding a
heterogeneous sample within a specific group of independent effect sizes. Independent effect
sizes were first grouped and tested according to study characteristics of year published, risk
status of the sample, country in which the study was conducted, and lab or project. Next,
independent effect sizes were grouped according to the predictive variable of attachment and
IWM, and outcomes as either negative or not negative. The $Q$ statistic indicated that none of the
group-specific samples were sufficiently heterogeneous to warrant additional analysis. These
findings refute the hypothesis that studies predicting peer-relations using representational measures would have significantly larger effect sizes than studies using behavioral measures of attachment. The sample size, $Q$ statistic, and critical Chi-square values for each group are presented in Table 7.
CHAPTER 5
DISCUSSION

The purpose of Studies 1, 2, and 3 were to test the validity of the IWM definition and sensitive period of attachment proposed in Chapter 1. The aim of these studies was to validate the assertion that attachment and IWM are independent constructs. It was hypothesized that this independence would be illustrated by showing: (a) the instability of attachment and the stability of the IWM, (b) the differential impact of maternal behavior on attachment and the IWM, and (c) the differential power of attachment and IWMs to predict social outcomes with peers. The purpose of Study 1 was to determine if attachment status during the first three years changes as a function of changes in caregiving. The purpose of Study 2 was to determine if the IWM in middle childhood and adolescence remained stable independent of changes in caregiving. Study 3 investigated if measures of IWMs were better predictors of social outcomes with peers than measures of attachment.

Study 1: The Influence of Changes in Caregiving on Attachment from Infancy to 3-years

The overall findings from Study 1 are in concordance with previous findings that maternal sensitivity influences attachment outcomes (e.g., Belsky et al., 1984; DeWolff & van IJzendoorn, 1997; McElwain & Booth-LaForce, 2006; Nievar & Becker, 2008). A unique contribution of this study is the finding that patterns of changing maternal sensitivity over the first three years may predict attachment status better than maternal sensitivity at any one time alone. This study also explored the extent to which the relation between maternal sensitivity and attachment outcomes was mediated by child characteristics of gender, maternal-reported temperament, and infant IQ.
The Relation between Maternal Sensitivity and Attachment Status in Early Childhood

One hypothesis of Study 1 was that changes in attachment status would be systematically related to changes in maternal sensitivity. First, the relation between concurrent maternal sensitivity and attachment was explored. Concurrent measures of maternal sensitivity and attachment were not associated at 15-months, and were weakly related at 24- and 36-months. The association was in the expected direction. Sensitive mothers were more likely to have secure children and less sensitive mothers were more likely to have insecure children. The lack of relation between maternal sensitivity and attachment at 15-months was found when maternal sensitivity was analyzed as both a continuous and a categorical variable. This consistency held when the possible moderating impact of child characteristics was considered. This suggests that children’s attachment quality at 15-months may be determined by variables other than concurrent maternal sensitivity. Attachment at 15-months may be better predicted by maternal behavior that occurs before 15-months. Fifteen-month attachment status may also be more strongly influenced by other factors, such as child characteristics like temperament.

Slopes of change in maternal sensitivity were calculated to test if changes in attachment security coincided with changes in maternal sensitivity across two time points. Slopes were calculated from 15- to 24-months and from 24- to 36-months. The findings indicated that the slope of change in maternal sensitivity was not a sufficient predictor of stability or change in the child’s attachment status. This indicates that the change from one attachment status to the other is not directly associated with a simple increase or decreases in maternal sensitivity.

The second hypothesis of Study 1 was that different patterns of maternal sensitivity collected over time would be related to attachment status outcomes. This hypothesis was supported. Maternal sensitivity from 15- to 24-months significantly predicted attachment status...
attachment status at 36-months. This suggests that the effect of maternal behavior on attachment may be better understood as having a collective impact over time rather than focusing exclusively on concurrent maternal sensitivity at any specific time point. Although effect sizes were small, the effect size increased slightly over time. Thirty-six-month attachment status was better predicted by maternal sensitivity across three time points than 24-month status had been predicted by maternal sensitivity across two time points. This indicates that more information on the pattern of maternal behavior over several time points is beneficial for understanding the collective impact of maternal behavior on attachment. This supports the developmental view that predicting outcomes is most successful when considering a history of experiences collected over time, rather than the relation among concurrent experiences or between time points.

Proportions of secure to insecure children were explored to further examine the impact of maternal behavior over time. The findings indicated that analyses based on proportions of secure and insecure statuses in a sample might be more useful than the likelihood of an individual being secure or insecure. In previous research, the proportions that emerge in randomly selected samples across cultures are about 65-70% secure and 30-35% insecure (Ainsworth et al., 1978; van IJzendoorn & Kroonenberg, 1988). The impact of maternal sensitivity may be best understood by examining the likelihood that a group of children will conform to or deviate from these proportions. If the variation in a sample is distributed so that the sample is representative of all children, then different proportions of secure and insecure children in different groups can be assumed to be due to the factor they were grouped by. In other words, an analysis of proportions within a group may account for the interplay between variations among children and the influence of the child’s environment.
The results for maternal sensitivity from 15- to 24-months as a predictor of attachment at 24-months will be discussed first, and maternal sensitivity at 15-, 24-, and 36-months as a predictor of attachment status at 36-months will be discussed next. Children were significantly less likely than expected to be secure—and more likely to be insecure—when maternal sensitivity was either consistently low (LL) or changed from sensitive to less sensitive (SL). The expected proportion of secure and insecure children at 24-months was found when maternal behavior was consistently sensitive (SS) or changed from low to sensitive (LS). This may indicate that a mother who is less sensitive in infancy has the expected likelihood of having a secure or insecure child by toddlerhood, so long as she becomes sensitive. Conversely, a mother who is less sensitive during toddlerhood is more likely to have an insecurely attached toddler regardless of how sensitive she was during the child’s infancy.

The expected proportions of attachment statuses at 36-months were found for children who experienced consistently sensitive maternal behavior from 15- to 24-months, regardless of maternal sensitivity at 36-months (SSS and SSL). Children were also distributed secure and insecure in the expected proportions if they had experienced a fluctuation in maternal sensitivity from 15- to 24- months and then experienced low sensitivity at 36-months (SLL and LSL). This finding was surprising because children in groups experiencing the same early fluctuation and then sensitive mothering at 36-months (SLS and LSS) were less likely than expected to be secure. This suggests that fluctuations in caregiving quality followed by low sensitivity have better outcomes than fluctuations in caregiving followed by sensitivity.

It is possible that fluctuations in sensitivity are inherently low quality because they are unstable. Perhaps a child who experiences fluctuations and then low-sensitive caregiving has acclimated to the mother’s on-again off-again behavior. In contrast, a child who experiences
fluctuations and then sensitive behaviors are possibly still adjusting to the mother’s changeability. Another way to explain the same pattern is that a mother showing fluctuations followed by low sensitivity (SLL and LSL) is more often less sensitive than sensitive. A mother showing fluctuations followed by sensitivity (SLS and LSS) is more often sensitive than not. Therefore, a child who experiences a generally sensitive mother with occasional lapses may not have as much opportunity to adjust to the mother’s changeable behavior compared to a child whose mother is generally low in sensitivity with sensitive moments.

The children who were the least likely to be secure at 36-months were those who experienced consistently low maternal sensitivity across all three time points (LLL). Only 16% of the children in this group were secure at 36-months. Consistently low maternal sensitivity across all three time points may be indicative of other factors that decrease the likelihood of secure attachments. Such factors might include abuse or parental stressors like poverty, depression, or marital discord. It is noteworthy, however, that 16% of the children experiencing consistently low maternal sensitivity were classified as secure. This suggests that other factors, in addition to maternal behavior, are involved in determining attachment security.

The Relation between Maternal Sensitivity and Attachment Status Controlling for Child Characteristics

The last hypothesis of Study 1 was that the relation between maternal sensitivity and child attachment might be mediated by child characteristics such as gender, maternal-reported temperament, and IQ. When these factors were included as mediators, the effect sizes of the models were comparable to the non-mediated models. Although predictability did not increase, these models indicated differences in the effect of cumulative maternal sensitivity over time depending on child characteristics. Significant relations were found in models for both boys and
girls, for children rated by their mothers as having an average and easy but not difficult temperament, and for children with average but not very high or low IQs in infancy. For brevity, only the most extreme deviations in the expected-to-observed proportions will be discussed.

Girls who experienced a decrease in sensitivity in toddlerhood (SLS) were significantly less likely than expected to be secure at 36-months. This suggests that something about being female may affect the way a child reacts to lack of maternal sensitivity in toddlerhood. There may also be a qualitative difference in how low-sensitivity is expressed by a mother toward a daughter compared to a son. The same decrease in sensitivity during toddlerhood did not produce different than expected proportions of secure and insecure boys.

Children with an average infant IQ who experienced a peak in sensitivity in toddlerhood (LSL) were significantly less likely than expected to be secure at 36-months. This may indicate something uniquely problematic associated with experiencing sensitive behavior only in toddlerhood for children with an average infant IQ. Perhaps a child who benefits from an increase in maternal sensitivity during toddlerhood will have the detrimental effects of a subsequent decline in sensitivity magnified. In other words, this child may adapt to the transition from less-sensitive to sensitive care only to have to re-experience, and therefore re-adjust to, less-sensitive care over again.

The explanation for why the pattern was found to affect children with average IQs and not very high or low IQs might stem from differences in awareness and coping skills. One speculation is that the attachment behaviors of a child with a very low IQs might not be strongly associated with maternal sensitivity because of the child’s limited ability to accurately detect and react to the mother’s behavior. Alternately, a child with a very high IQs might be able to better cope with fluctuations in maternal care. For example, a child with a high IQ might be able to
distinguish specific contexts of a mother’s less sensitive behavior (e.g., she is tired or distracted, but will be available again soon). The differences across the IQ models suggests that children with average IQs may be disproportionately responsible for previous findings associating maternal sensitivity and attachment. The inclusion of children with very low and very high IQs may cause the relation to appear less powerful than if samples were restricted to children with average IQs.

Children rated by their mothers as having an easy temperament at 6-months and who experienced low sensitivity only at 15-months (LSS) were significantly less likely than expected to be secure at 36-months. This was unexpected. The portion of the analysis associating maternal sensitivity to child characteristics indicated that mothers who rated their child as having an easy temperament were more likely to behave sensitively at all time points. Therefore, children rated as easy and also experienced low sensitivity are the minority. This implies an incongruity between mothers’ evaluation of their children and their behavior towards their children for this group. These infants may not be reacting in noticeably discontented ways (i.e., crying, irritability). Or these mothers may be unaware of their infants’ discontented reactions to their insensitive behavior. Or perhaps these mothers’ reports do not reflect the child’s actual temperament. For example, these mothers’ reports might be more affected by social desirability or comparison to an older sibling who was markedly more difficult. Regardless of the cause of the incongruity, being rated as easy and experiencing low sensitivity early in infancy dramatically decreased the likelihood these children were secure at 36-months.

Lastly, consistently low maternal sensitivity across all time points (LLL) dramatically decreased the likelihood of secure attachment at 36-months even when mediating for child characteristics. As a comparison, groups experiencing consistently low maternal sensitivity
across only two time points (LLS and SLL) did not show the same pattern. Again, it is likely that consistently low maternal sensitivity across all time points may indicate the presence of additional factors that may decrease attachment security.

The Impact of Early Maternal Sensitivity

The groups that showed no difference between the expected and observed proportions of secure and insecure children at 36-months were in the SSS, SSL, and SLL groups. For these groups, the expected proportions of secure and insecure children were observed across all moderated and un-moderated models. The finding that children who experience consistent maternal sensitivity are more likely to be secure is not surprising. More surprising, children were just as likely to be secure if their mothers were consistently sensitive early on and then less sensitive at 36-months (SSL), or were only sensitive at 15-months and were then consistently low in sensitivity (SLL). This supports the argument that early sensitivity might set a foundation for becoming and staying secure. It is also compatible with previous findings that early secure attachment classifications are protective in the face of changing environments (Belsky & Fearon, 2002b; Fish, 2004; NICHD, 2006). If mothers were sensitive at both 15- and 24-months, by 36-months maternal sensitivity did not make a noticeable difference (SSS and SSL).

Explaining the pattern for the SLL group is slightly more complicated. Early maternal sensitivity at 15-months alone might serve as a protective factor, but this was not observed when predicting attachment status at 24-months. When mothers were sensitive at 15-months and then less sensitive at 24-months (SL), children’s chance of being concurrently secure at 24-months dropped. However, if the mother’s behavior remained consistently less sensitive from 24- to 36-months (SL at 24-months becoming SLL at 36-months), then their children had the expected
likelihood of being secure. This group appears to have adjusted to the mothers’ less sensitive behavior.

**Summary of Findings from Study 1**

The findings of this study support previous findings that changes in parenting are associated with changes in child attachment (for review, see Thompson, 2006). Unique contributions of this study are the benefits of considering: (a) the predictive power of patterns of change in maternal behavior over several time points, and (b) the proportions of secure and insecure children in groups compared to individual likelihoods. Findings indicate that patterns of change in maternal sensitivity were more predictive than direct correlations between concurrent sensitivity and attachment quality. The effect on attachment security may also be best understood in terms of the impact on typical proportions of secure and insecure statuses. When the children were grouped according to the pattern of maternal sensitivity they experienced over time, some groups’ proportions of being secure and insecure were significantly different than expected.

There is no evidence at this time that attachment researchers or theorists have attempted to explain why these proportions (65-70% secure, 30-35% insecure) repeatedly emerge. One possible reason for the larger proportion of secure statuses is because the secure status is more likely to remain stable (Pinquart et al., 2013; Thompson, 1998). A secure status at any time point may increase the likelihood of a child remaining secure at a later time point, thereby increasing the number of secure children compared to insecure children. Some theorists have suggested that the stability of security is reflective of the stable environment that is most likely to foster a secure attachment (Lamb & Bornstein, 1982, 1987; Maccoby, 1980; Waters, Merrick, et al., 2000). However, the findings of Study 1 indicate the explanation is not as simple. The
groups who experienced maternal sensitivity consistently from infancy to toddlerhood (SS), and from infancy to 3-years (SSS), were distributed 66% and 67% secure, respectively. This indicates that the typical proportions of secure and insecure statuses are observable even when maternal behavior is sensitive and stable. Another possible explanation is that typical proportions of secure and insecure statuses may reflect the proportion of parents who are being sensitive to their children. In other words, 65-70% of children may be secure at any given time point because about 65-70% of mothers are adequately attuned and responsive to their children. However, the findings of this research indicated that maternal sensitivity was only weakly associated with attachment quality, and only for the two latter time points.

If stable environments and sensitive parenting do not solely account for the proportion of secure to insecure attachment statuses, then other factors must be considered. Possible factors might include other attachment figures and environmental stressors (e.g., Belsky & Cassidy, 1994; Thompson, 1998), but the current suggestion is for a more organismic view. The same way that Bowlby (1969) theorized infants have a natural inclination to attach to a caregiver, it is feasible children may also have a natural inclination to be securely attached. Even children who experienced low sensitivity at all three time points had a 1 in 7 chance of being secure by 36-months. If this speculation were true, the findings of this study would suggest that the propensity toward security is most likely to come to fruition when mother’s behavior is sensitive—and if not always sensitive, then at least sensitive early in infancy and then consistent.

**Study 2: The Relation between Changes in Caregiving and IWM Stability in Middle Childhood and Adolescence**

Findings from Study 2 demonstrated that maternal sensitivity is weakly associated with the IWMs of children in middle childhood and adolescence. An unanticipated finding was that
the proportion of children with secure IWMs in this older sample was much larger than the proportion of securely attached children in Study 1. This could be due to the previously suggested speculation of a propensity toward security—the more time that passes, the more likelihood the children become eventually secure. This finding might also be because the IWM measures were self-report. Children at this age may be more likely to perceive their relationship with their mother as secure, and this perception may not reflect the true quality of the mother-child relationship. Finally, it is possible that participants who had been secure during an earlier phase of the SECCYD study were more likely to be retained for later phases of the study. A comparison of these children’s statuses from Study 1 to Study 2 would be necessary to assess the validity of this possibility.

The first hypothesis of Study 2 was that IWM statuses would remain stable over time. This was supported from third to fifth grades and from fifth grade to 15-years, but was not supported from third grade to 15-years. This indicates that although there is a significant degree of stability for intervals of 2-5 years, change did occur during the 6- to 7-year interval between the first and last IWM assessments.

The second hypothesis of Study 2 was that IWM stability would be independent of maternal sensitivity. Maternal sensitivity was first correlated with concurrent child IWM status at each time point. Maternal sensitivity weakly predicted IWM status at all ages; however, this was only true for children with secure IWMs. Fifteen-years was the only age where maternal sensitivity predicted insecure IWM outcomes, and did so only 1.5% of the time. Next, slopes of change in maternal sensitivity were calculated from third grade to fifth grade and from fifth grade to 15-years. The slopes were not sufficient predictors of stability or change in child IWM status. This supports the hypothesis that change in maternal sensitivity is not associated with
change in child IWMs. However, because of similar findings in Study 1, it was important to determine if patterns in accumulated maternal sensitivity over time were better predictors of IWM status than slopes of change alone.

Patterns of maternal sensitivity over time were significant predictors of IWM status. The effect sizes were small, and increased over time with the inclusion of more maternal sensitivity data points. Similar to Study 1, the significant differences in the observed-to-expected proportions in Study 2 indicated fewer than expected secure children and more than expected insecure children. The greatest effect of maternal behavior on child IWM at fifth grade was found for the group of children whose mothers had changed from being sensitive to less sensitive (SL). The opposite pattern—an increased likelihood of having a secure IWM at fifth grade—was not found for children whose mothers had been less sensitive and then became sensitive (LS). Children who experienced consistently low sensitivity (LL) were slightly, but not dramatically, more likely than expected to have an insecure IWM at fifth grade. This indicates that a child with a initially sensitive mother is more likely to be affect by the mother’s subsequent insensitive behavior.

The eight maternal-sensitivity groups predicted IWM status at 15-years with slightly more power than the four groups predicted IWM at fifth grade. Children had the expected likelihood of having a secure IWM at 15-years if mothers had been initially sensitive at third grade, regardless of changes in maternal sensitivity thereafter. The only exception was for the children who had experienced sensitive mothers at third grade and then consistent low sensitivity thereafter (SLL). These children were markedly more likely than expected to have an insecure IWM at 15-years. Children who had experienced initially low sensitivity in third grade were more likely than expected to have an insecure IWM at 15-years regardless of changes in their
mother’s behavior thereafter. The exception was for children whose mothers were less sensitive at third grade who then became consistently sensitive (LSS). These children had the expected likelihood of being secure or insecure at 15-years.

These findings indicate that maternal sensitivity early in middle childhood may serve as a buffer against the possible negative impact of the mother’s later behavior on IWMs in adolescence. Alternately, maternal insensitivity early in middle childhood may impact adolescent IWMs negatively regardless of the mother’s later behavior. However, it is possible that the effects of early maternal sensitivity in middle childhood can be over-ruled by her later behavior only if her later behavior is consistent.

**Summary of Findings from Study 2**

The findings of Study 2 were that children in middle childhood and adolescence are more likely than not to report having a secure IWM of the maternal relationship. The quality of an IWM is likely to remain stable over a span of several years, but there is the possibility of change the more years that span between assessment periods. Maternal behavior predicted IWMs in middle childhood and adolescence, but did so differently depending on the degree of sensitivity children experienced at third grade.

A child experiencing sensitivity early in middle childhood may adjust their expectations of the mother so the relationship can continue to be viewed in a positive light. If the mother fluctuates in sensitivity, then the quality of the child’s IWM may become influenced by factors other than her behavior. Other such factors might include: (a) The child’s increased ability to rationalize the mother’s less sensitive behavior. (b) Better memory and a longer history of experiences with the mother provide the child with more memories of sensitivity to reference when reporting on the relationship. And (c) the influence of confirmation bias if the child
believes the mother is generally warm, caring, and supportive. All of these could be cognitive ways of maintaining a general inclination toward secure parental attachments. A child who experiences a less sensitive mother earlier in middle childhood may, by adolescence, interpret subsequent fluctuations in the mother’s sensitivity negatively as inconsistency. In this case, the same cognitive abilities (i.e., rationalization, memory, and confirmation bias) may work to increase the likelihood of an insecure IWM.

**Limitations of Study 1 and Study 2**

It is important to acknowledge that the construction and interpretation of these studies were based on the assumption that a child’s attachment status follows as a result of the mother’s behavior. However, maternal behavior is also affected by child behavior (Bell, 1968; Kuczynski, 2003; Lollis & Kuczynski, 2003). It is possible that changes in sensitivity are based on maternal adjustments in response to the child’s attachment behavior. A mother may become more or less sensitive toward the child when the child behaves in secure or insecure ways towards her. Future research on the interaction between maternal behavior and attachment, and between maternal behavior and IWMs, would benefit from using temporally close but non-concurrent measures in order to determine the order of influence. Another option could be to code parent-child interactions at a micro-level to better ascertain the dynamic nature of these interactions. Also, although the SECCYD sample is large, utilizing an even larger sample would be useful due to the increasingly smaller group sizes as more time points were considered in grouping.

**Study 3: Meta-analysis Assessing the Predictive Power of Attachment and IWMs on Peer-relations**

A meta-analysis was conducted to explore if measures of attachment or IWMs differed in predicting social outcomes with peers. The hypothesis was that representational measures of
IWMs would be better at predicting social outcomes with peers than behavioral measures of attachment. This hypothesis was expected to be supported by finding that the effect sizes of studies with IWM measures as predictors would be larger than studies using attachment measures as predictors. The finding was that effect sizes were not sufficiently heterogeneous to merit additional analysis refuted this hypothesis. This was surprising, primarily because previous meta-analyses on attachment predicting social outcomes—where ‘attachment’ was inclusively defined as behavioral and representational measures—did find heterogeneity among effect sizes (Benson et al., 2006; Pallini et al., 2014; Schneider et al., 2001).

**Possible Explanations for the Lack of Heterogeneity**

One possible explanation for the difference between this and other meta-analyses lies in how the social outcomes were defined. The current meta-analysis focused exclusively on social outcomes with peers, and efforts were made to exclude hostile or dysfunctional behavior that was not specifically aimed at peers. The current search for applicable studies began by going through the reference lists of Benson et al. (2006), Pallini et al.’s (2014), Schneider et al. (2001), and Pinquart et al. (2013). The first three are meta-analyses of attachment’s influence on peer-relations, and the last is a meta-analysis on attachment stability. Several studies from these lists were excluded from the current meta-analysis because the social outcome was dysfunctional and not peer-specific. The most common example of this was usage of the Child Behavior Checklist (Achenbach & Edelbrock, 1981) scales for internalizing and externalizing behavior problems. It is possible that previous heterogeneity in effect sizes came from the differences correlating attachment to pathological behaviors like these.

Another reason studies included in the previous meta-analyses were excluded from the current study was because the social outcomes were not specific enough to peers. Some
measures of social competence required the respondent to report on their perception of the child in a variety of social situations. Such instances included interactions with family members or compliance to adults’ commands. The decision to exclude these studies was based on the belief that children’s behaviors with adults and family were not equivalent to children’s behaviors with peers. It also seemed likely that parental reports of children’s compliance to adult commands would be highly correlated with parental attachment, but not be conceptually associated with the child’s behavior with peers. In cases where it was possible to determine what percentage of a measure included peer-specific items, the outcome was included if peer-related items made up at least 50% of the items. Most of the time, however, these cases were simply excluded.

One interpretation of these findings could be that significant variability in the effect sizes was lost by intentionally excluding all non-peer interactions. If this were the case, then attachment and IWMs might be best associated with parent- and adult-child interactions and not generalize onto child-peer interactions. This would support arguments that attachment and IWMs are relationship-specific (Belsky & Cassidy, 1994; Crittenden, 1990; Shaver et al., 1996; Shaver & Mikulincer, 2002; Simpson & Rholes, 2002; Thompson, 1998). It is not currently possible to determine if the criteria for studies’ exclusion led to the lack of heterogeneity in the current meta-analysis. Previous meta-analyses did not code for the outcome pathology or peer-specificity as potentially moderating variables.

Another possible reason for the lack of heterogeneity might be due to the broad inclusion of correlations between attachment or IWMs and social interactions—many of which were non-significant. Of the 454 total effect sizes, 63% of them were non-significant. Many of these effect sizes were correlations between security status and micro-level social interactions such as affect, facial expressions, and frequency of vocalizations. The inclusion of such a large quantity
of small and insignificant effect sizes may have muted the contributions of larger significant effect sizes. This would have occurred when the independent effect sizes were computed by averaging multiple effect sizes within each study. This possibility, in combination with the exclusion of pathological and non-peer-specific outcomes, might have jointly contributed to the lack of heterogeneity in the sample.

**Summary of Findings from Study 3**

There was not enough heterogeneity in the sample of independent effects sizes to merit further analysis of study characteristics that potentially moderated differences between effect sizes. Accepting the lack of heterogeneity at face value, it is safe to conclude that attachment and IWMs do not significantly differ in their ability to predict non-pathological social outcomes with peers.

**Limitations of Study 3**

A potential weakness of the current meta-analysis was the failure to take into account factors like the specific measurement type (e.g., Strange Situation, Attachment Q-sort, Attachment Story Completion Task). Different types of attachment and IWM measures are likely to have different degrees of validity, and this could be accounted for meta-analytically by differentiating between them. Other factors that may prove useful are the interval of time between assessments and who is reporting on the social outcomes. Further analysis of this sample of effect sizes may find sufficient heterogeneity if factors like these were taken into account.

**Conclusion: Summary of Findings from Studies 1, 2, and 3**

The aim of these three studies was to test the validity of the proposed differential development and function of attachment and IWMs. The expectation was that findings would
indicate: (a) changeability of early attachment is accounted for by changes in caregiving, (b) the IWM in middle childhood and adolescence would be stable independent of changes in caregiving, and (c) IWMs are more predictive of social outcomes than attachment behaviors. Based on such findings, it would be reasonable to conclude that attachment and IWMs are independent constructs. The actual findings of these three studies confirmed some of these expectations but not others. These studies also contributed unexpected, but potentially valuable, information that may help to illuminate the relation between attachment, IWMs, and maternal behavior.

The changeability of early attachment does appear to be influenced by changes in caregiving, but not as a direct correlation. Instead, the likelihood of attachment outcomes at different ages is predicted by the experience of caregiving collectively over time. This supports the developmental view that outcomes are best understood in the context of a combined history of experiences. The IWM in middle childhood and adolescence is much more stable compared to attachment in infancy and early childhood, but is still changeable over intervals of many years. Maternal behavior does predict child IWM status, but does so differently depending on the quality of maternal behavior early in middle childhood. And finally, attachment and IWMs were not found to be significantly different in their power to predict social behaviors with peers.

Further speculations were proposed to explain the differences in the observed proportion of secure and insecure statuses depending on patterns of maternal sensitivity. The primary proposal was that very young children may be generally predisposed to be securely attached to the mother. Early insensitive maternal behavior can interfere with this predisposition, especially if the insensitive behavior remains consistent. There are a variety of possible likelihoods for a child becoming securely attached depending on the mother’s pattern of behavior over time, and
many of these likelihoods reflect typical population proportions. This supports the assertion of a sensitive or flexible period of attachment early in life, but does so in the context of a child’s natural tendency toward security. It refutes, however, the suggestion in Chapter 1 that this sensitive period may act as a grace period for caregivers, as even early maternal behavior does appear to have impact on long-term security outcomes.

Maternal influence on the young child’s attachment is somewhat different compared to maternal influence on the IWM during middle childhood and adolescence. The change in the influence of maternal behavior from early to later childhood is possibly attributable to changes in the children’s cognitive abilities. The cognitive abilities of older children may sustain the child’s inclination towards security independent of maternal behavior so long as the mother was initially sensitive. However, the cognitive abilities of older children who experience early insensitivity may increase the likelihood of insecure IWMs regardless of the mother’s later behavior.

The initial expectation was that this research would support the hypothesis that the IWM accounted for the stability and predictability that is traditionally attributed to attachment. Such findings would then support the assertion that attachment and IWMs were independent constructs. The proposal that attachment and IWMs are independent constructs was supported, but not in the expected way. While this research did not support the hypothesis of differential predictability, it did find greater stability of IWMs compared to attachment. This is in concordance with Pinquart et al.’s (2013) finding that representational measures were more stable beyond toddlerhood than behavioral measures in infancy. Also, while both attachment and IWM quality are influenced by maternal behavior, the individual’s cognitive processes may also influence IWM quality. This would support the assertion that IWMs are mental representations of the attachment relationship separate from the relationship itself.
Table 1

*Descriptive Statistics of Categorical Variables for Participants in Studies 1 and 2*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>N</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>519</td>
<td>51.7</td>
</tr>
<tr>
<td>Female</td>
<td>497</td>
<td>48.9</td>
</tr>
<tr>
<td>Temperament</td>
<td>6-months</td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>36</td>
<td>3.6</td>
</tr>
<tr>
<td>Average</td>
<td>337</td>
<td>33.6</td>
</tr>
<tr>
<td>Easy</td>
<td>627</td>
<td>62.8</td>
</tr>
<tr>
<td>IQ</td>
<td>15-months</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>162</td>
<td>16.2</td>
</tr>
<tr>
<td>Average</td>
<td>662</td>
<td>66.1</td>
</tr>
<tr>
<td>High</td>
<td>177</td>
<td>17.7</td>
</tr>
<tr>
<td>Attachment / IWM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>15-months</td>
<td></td>
</tr>
<tr>
<td>Secure</td>
<td>625</td>
<td>61.5</td>
</tr>
<tr>
<td>Insecure</td>
<td>391</td>
<td>38.5</td>
</tr>
<tr>
<td>Time 2</td>
<td>24-months</td>
<td></td>
</tr>
<tr>
<td>Secure</td>
<td>630</td>
<td>62.0</td>
</tr>
<tr>
<td>Insecure</td>
<td>386</td>
<td>38.0</td>
</tr>
<tr>
<td>Time 3</td>
<td>36-months</td>
<td></td>
</tr>
<tr>
<td>Secure</td>
<td>636</td>
<td>62.6</td>
</tr>
<tr>
<td>Insecure</td>
<td>380</td>
<td>37.4</td>
</tr>
<tr>
<td>Maternal Sensitivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>15-months</td>
<td></td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>129</td>
<td>12.7</td>
</tr>
<tr>
<td>Sensitive</td>
<td>887</td>
<td>87.3</td>
</tr>
<tr>
<td>Time 2</td>
<td>24-months</td>
<td></td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>146</td>
<td>14.4</td>
</tr>
<tr>
<td>Sensitive</td>
<td>870</td>
<td>85.6</td>
</tr>
<tr>
<td>Time 3</td>
<td>36-months</td>
<td></td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>135</td>
<td>13.3</td>
</tr>
<tr>
<td>Sensitive</td>
<td>881</td>
<td>86.7</td>
</tr>
</tbody>
</table>
Table 2

*Observed and Expected Counts, Chi-square Values and Effect Sizes for Child Characteristics and Maternal Sensitivity at 15-, 24- and 36-months*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sensitive</th>
<th>Low-sensitive</th>
<th>$\chi^2$</th>
<th>Phi / $V$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>E</td>
<td>O</td>
<td>E</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>456</td>
<td>453</td>
<td>63</td>
<td>66</td>
</tr>
<tr>
<td>Girls</td>
<td>431</td>
<td>434</td>
<td>66</td>
<td>63</td>
</tr>
<tr>
<td>24-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>426</td>
<td>444</td>
<td>93</td>
<td>75</td>
</tr>
<tr>
<td>Girls</td>
<td>444</td>
<td>426</td>
<td>53</td>
<td>71</td>
</tr>
<tr>
<td>36-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>436</td>
<td>450</td>
<td>83</td>
<td>69</td>
</tr>
<tr>
<td>Girls</td>
<td>445</td>
<td>431</td>
<td>52</td>
<td>66</td>
</tr>
<tr>
<td>Temperament (at 6 mo.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>27</td>
<td>32</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>282</td>
<td>295</td>
<td>55</td>
<td>42</td>
</tr>
<tr>
<td>Easy</td>
<td>567</td>
<td>550</td>
<td>62</td>
<td>80</td>
</tr>
<tr>
<td>24-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>28</td>
<td>31</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>269</td>
<td>290</td>
<td>68</td>
<td>47</td>
</tr>
<tr>
<td>Easy</td>
<td>565</td>
<td>541</td>
<td>64</td>
<td>88</td>
</tr>
<tr>
<td>36-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>26</td>
<td>31</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>267</td>
<td>292</td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>Easy</td>
<td>576</td>
<td>545</td>
<td>53</td>
<td>84</td>
</tr>
<tr>
<td>IQ (at 15 mo.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>143</td>
<td>155</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>Average</td>
<td>577</td>
<td>578</td>
<td>85</td>
<td>84</td>
</tr>
<tr>
<td>High</td>
<td>154</td>
<td>141</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>24-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>134</td>
<td>152</td>
<td>43</td>
<td>26</td>
</tr>
<tr>
<td>Average</td>
<td>569</td>
<td>567</td>
<td>93</td>
<td>95</td>
</tr>
<tr>
<td>High</td>
<td>154</td>
<td>139</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>36-months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>145</td>
<td>154</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>Average</td>
<td>579</td>
<td>575</td>
<td>83</td>
<td>87</td>
</tr>
<tr>
<td>High</td>
<td>146</td>
<td>141</td>
<td>16</td>
<td>21</td>
</tr>
</tbody>
</table>

*Note.* All gender $df = 1$, temperament $df = 2$, IQ $df = 2$; E = expected, O = observed; $V$ = Cramer’s $V$.

**$p < .01$, ***$p < .001$. 
Table 3

Percentages of Secure and Insecure Children within Maternal Sensitivity Groups at 24- and 36-months

<table>
<thead>
<tr>
<th>Group</th>
<th>24-months</th>
<th>36-months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Status</td>
</tr>
<tr>
<td>SS</td>
<td>787</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>SSL</td>
<td>58</td>
<td>Secure</td>
</tr>
<tr>
<td>SL</td>
<td>100</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>SL</td>
<td>66</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>LS</td>
<td>84</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>LSL</td>
<td>18</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>LLS</td>
<td>21</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>LL</td>
<td>47</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
<tr>
<td>LLL</td>
<td>25</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insecure</td>
</tr>
</tbody>
</table>

Note. Groups and their percentages are in bold when ≤ 50% secure.
Table 4

Chi-square Values, Effect Sizes, and Violation of Assumptions for Models at 24-months and 36-months Controlling for Child Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>24-months</th>
<th>36-months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\chi^2$</td>
<td>Phi / $V$</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total model</td>
<td>28.46***</td>
<td>.17</td>
</tr>
<tr>
<td>Male</td>
<td>13.57**</td>
<td>.16</td>
</tr>
<tr>
<td>Female</td>
<td>12.32**</td>
<td>.16</td>
</tr>
<tr>
<td>Temperament</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total model</td>
<td>27.15***</td>
<td>.17</td>
</tr>
<tr>
<td>Difficult</td>
<td>5.15</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>11.70**</td>
<td>.19</td>
</tr>
<tr>
<td>Easy</td>
<td>11.34**</td>
<td>.13</td>
</tr>
<tr>
<td>IQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total model</td>
<td>31.03***</td>
<td>.18</td>
</tr>
<tr>
<td>Low</td>
<td>5.13</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>14.80**</td>
<td>.15</td>
</tr>
<tr>
<td>High</td>
<td>5.62</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. $V = $ Cramer’s $V$.

* $p < .05$, ** $p < .01$, *** $p < .001$. 
Table 5

*Secure and Insecure Counts for 24- and 36-month Groups Controlling for Statistically Significant Child Characteristics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>24-mo.</th>
<th>36-mo.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SS</td>
<td>SL</td>
</tr>
<tr>
<td>Boys Secure</td>
<td>233</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>155</td>
<td>41</td>
</tr>
<tr>
<td>Girls Secure</td>
<td>386</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>113</td>
<td>18</td>
</tr>
<tr>
<td>Average</td>
<td>156</td>
<td>19</td>
</tr>
<tr>
<td>Temperament</td>
<td>80</td>
<td>27</td>
</tr>
<tr>
<td>Easy</td>
<td>346</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>26</td>
</tr>
<tr>
<td>Average IQ</td>
<td>343</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>168</td>
<td>37</td>
</tr>
</tbody>
</table>

*Note.* S = sensitive, L = low sensitivity; counts in bold when ≤ 50% secure, counts underlined when ≤ 25% secure.
Table 6

Percentages of Secure and Insecure Children within Maternal Sensitivity Groups at Third Grade, Fifth Grade, and 15-years

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade 3</th>
<th></th>
<th>Group</th>
<th>Grades 5</th>
<th></th>
<th>Group</th>
<th>15-years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Status</td>
<td>%</td>
<td></td>
<td>n</td>
<td>Status</td>
<td>%</td>
</tr>
<tr>
<td>SSS</td>
<td>360</td>
<td>Sec</td>
<td>80.8</td>
<td>Ins</td>
<td>19.2</td>
<td>SSL</td>
<td>38</td>
</tr>
<tr>
<td>SS</td>
<td>398</td>
<td>Sec</td>
<td>95.7</td>
<td>Ins</td>
<td>4.3</td>
<td>SLS</td>
<td>44</td>
</tr>
<tr>
<td>S</td>
<td>454</td>
<td>Sec</td>
<td>90.0</td>
<td>Ins</td>
<td>10.0</td>
<td>SLL</td>
<td>12</td>
</tr>
<tr>
<td>SL</td>
<td>56</td>
<td>Sec</td>
<td>80.4</td>
<td>Ins</td>
<td>19.6</td>
<td>SLS</td>
<td>12</td>
</tr>
<tr>
<td>LSS</td>
<td>34</td>
<td>Sec</td>
<td>79.4</td>
<td>Ins</td>
<td>20.6</td>
<td>LLL</td>
<td>13</td>
</tr>
<tr>
<td>LS</td>
<td>46</td>
<td>Sec</td>
<td>87.0</td>
<td>Ins</td>
<td>13.0</td>
<td>LLL</td>
<td>13</td>
</tr>
<tr>
<td>L</td>
<td>91</td>
<td>Sec</td>
<td>76.9</td>
<td>Ins</td>
<td>23.1</td>
<td>LLS</td>
<td>32</td>
</tr>
<tr>
<td>LL</td>
<td>45</td>
<td>Sec</td>
<td>84.4</td>
<td>Ins</td>
<td>15.6</td>
<td>LLL</td>
<td>13</td>
</tr>
</tbody>
</table>

Note. Sec = secure, Ins = insecure. Expected percentages of secure children in 3rd grade, 5th grade, and 15-years were 88%, 92%, and 76%, respectively. Groups and their percentages are in bold when the difference between expected and observed differs by ≥10 percentage points.
Table 7
Sample Size, $Q$ statistic, and Critical Chi-square Values for Each Group in the Meta-analysis

<table>
<thead>
<tr>
<th>Group</th>
<th>$n$</th>
<th>$Q$</th>
<th>$\chi^2$ critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before 1990</td>
<td>17</td>
<td>7.59</td>
<td>26.30</td>
</tr>
<tr>
<td>1990-1999</td>
<td>44</td>
<td>9.47</td>
<td>55.76</td>
</tr>
<tr>
<td>2000 and later</td>
<td>72</td>
<td>26.67</td>
<td>90.67</td>
</tr>
<tr>
<td><strong>Risk status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at risk</td>
<td>111</td>
<td>45.48</td>
<td>124.34</td>
</tr>
<tr>
<td>At risk</td>
<td>18</td>
<td>5.01</td>
<td>27.59</td>
</tr>
<tr>
<td>Both</td>
<td>4</td>
<td>1.53</td>
<td>7.82</td>
</tr>
<tr>
<td><strong>Country</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA / Canada</td>
<td>100</td>
<td>42.31</td>
<td>113.15</td>
</tr>
<tr>
<td>Israel</td>
<td>13</td>
<td>2.20</td>
<td>21.03</td>
</tr>
<tr>
<td>Sweden</td>
<td>7</td>
<td>6.19</td>
<td>12.59</td>
</tr>
<tr>
<td>Netherlands / Belgium / Germany</td>
<td>8</td>
<td>.64</td>
<td>14.07</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>.73</td>
<td>9.49</td>
</tr>
<tr>
<td><strong>Lab / Project</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NICHD SECCYD</td>
<td>8</td>
<td>3.43</td>
<td>14.07</td>
</tr>
<tr>
<td>Minnesota Project</td>
<td>14</td>
<td>5.42</td>
<td>22.36</td>
</tr>
<tr>
<td>Haifa Longitudinal Study</td>
<td>4</td>
<td>1.03</td>
<td>7.82</td>
</tr>
<tr>
<td>Uppsala Longitudinal Study</td>
<td>5</td>
<td>6.14</td>
<td>7.78</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>.88</td>
<td>11.07</td>
</tr>
<tr>
<td>Not specified</td>
<td>97</td>
<td>37.24</td>
<td>90.53</td>
</tr>
<tr>
<td><strong>Type of predictor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment</td>
<td>91</td>
<td>40.92</td>
<td>113.15</td>
</tr>
<tr>
<td>IWM</td>
<td>42</td>
<td>16.60</td>
<td>55.76</td>
</tr>
<tr>
<td><strong>Type of peer-related outcome</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative / hostile</td>
<td>35</td>
<td>11.35</td>
<td>43.77</td>
</tr>
<tr>
<td>Not negative / hostile</td>
<td>98</td>
<td>45.47</td>
<td>113.15</td>
</tr>
</tbody>
</table>

*Note.* All Chi-square critical values are to $p = .05$. All $df$s up to 30 are $n − 1$; for $n$s greater than 31, critical values are based on $df$s in increments of 10 up to 100.
Figure 1

*Stem and Leaf Display of Distribution of All Z Scores and Effect Sizes in the Meta-Analysis*

<table>
<thead>
<tr>
<th>Z scores</th>
<th>Independent effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>66666666666666665421100</td>
<td>-4</td>
</tr>
<tr>
<td>9887755443321110</td>
<td>-3</td>
</tr>
<tr>
<td>988765553310</td>
<td>-2</td>
</tr>
<tr>
<td>99887776655443333322221111000000</td>
<td>-1</td>
</tr>
<tr>
<td>99999888887776666655555555554444444333333332222222211111111000000</td>
<td>0</td>
</tr>
<tr>
<td>999999988888777666665555555555555444444443333333332222222211111111100000000</td>
<td>.1</td>
</tr>
<tr>
<td>988888888877777666665555555333333333322222222111111111110000000000</td>
<td>.2</td>
</tr>
<tr>
<td>9887777555555444444433333322222222222111111111110000000000000</td>
<td>.3</td>
</tr>
<tr>
<td>888776666665444442222221111111100000000000</td>
<td>.4</td>
</tr>
<tr>
<td>888665554221</td>
<td>.5</td>
</tr>
<tr>
<td>7777777772</td>
<td>.6</td>
</tr>
</tbody>
</table>

*Note.* Plotted numbers indicate the hundredth decimal point value of the z score or effect size.
References

References marked with an asterisk indicate studies included in the meta-analysis.


*Psychology, 44(5), 1298-1313.


Bretherton, I. (2005). In pursuit of the internal working models construct and its relevance to
attachment relationships. In K. E. Grossmann, K. Grossmann, & E. Waters (Eds.),
*Attachment from infancy to adulthood: The major longitudinal studies* (pp. 13-47). New
York, NY: Guilford Press.

relationships. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory,

story-completion task at thirty-seven and fifty-four months of age. *New Directions for

Bretherton, I., Ridgeway, D. & Cassidy, J. (1990). Assessing internal working models of the
attachment relationship: An attachment story completion task for 3-year-olds. In M. T.
Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years* (pp. 273-308). Chicago, IL: University of Chicago Press.

*Burns, S. R. (2002). Attachment security as a predictor of preschoolers’ prosocial responses to
mothers and peers. (Unpublished doctoral dissertation), Kansas City University,
Manhattan, Kansas.

*Pediatrics, 61*(5), 735-739.


care centres: Reliability and validity of the attachment Q-sort for mothers and
professional caregivers in Italy. *International Journal of Behavioral Development*, 24(2), 241-255.


Developmental Psychology, 36(2), 274-282.


Shaver, P. R., Collins, N., & Clark, C. L. (1996). Attachment styles and internal working models of self and relationship partners. In G. O. Fletcher, J. Fitness (Eds.), *Knowledge*


