Observational Assessment of Empathy in Parent-Child Verbal Exchanges and Their Influence on Child Behavior

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Observational Assessment of Empathy in Parent-Child Verbal Exchanges and Their Influence on Child Behavior

by

Patty E. Carambot

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

Observational Assessment of Empathy in Parent-Child Verbal Exchanges and Their Influence on Child Behavior

by

Patty E. Carambot

Advisor: William Gottdiener, PhD

Empathy, the ability to both experientially share in and understand others’ thoughts, behaviors, and feelings, is vital for human adaptation. Deficits in empathy development have implications across the lifespan for the development of prosocial behavior, social functioning, mental health disorders, and risk for antisocial behavior (e.g., Guajardo, Snyder, & Petersen, 2009; Moreno, Klute & Robinson, 2008). In light of these societal and individual burdens, it is imperative to foster and strengthen the development of this ability early in life to prevent or ameliorate such negative outcomes. This type of prevention can take a variety of forms, but parent and child verbal exchanges and modeling are often the most direct methods after two years of age (e.g., Moreno et al., 2008). The aim of this research was to inform the development of a system to naturalistically assess empathy development via home-based observation of mothers and their children’s verbal exchanges.

The proposed system, iEAR-Empathy in Parent-Child Interactions (iEAR-EPIC), is a verbal coding system to code for verbal behaviors empirically demonstrated to foster empathy development, as well as behaviors found to indicate empathy development. The development of the iEPIC was theoretically informed by Preston and de Waal’s (2002) Perception Action Mechanism (PAM) model of empathy, a neurocognitive-emotional model of empathy. This model demonstrates empathy as a maturing system in which emotional and cognitive understanding develop in tandem through brain-
environment interactions. However, the iEPIC also accounts for the interplay between parents and neurocognitive emotional processes, and thus captures the parallel, increasingly interactive, development of cognitive and emotional abilities from infancy onward in the context of a parent-child dyad.

To develop and test the iEPIC, an ethnically diverse subsample of 84 mothers and their 2 to 6-year-old children were recruited from a large, northeastern, urban, public university. After consenting, mother-child dyads were recorded for a 4-hour period during the dyad’s evening routine (5-9 p.m.), using a two-minutes on, 10 seconds off protocol, resulting in 28 2-minute clips (56 minutes total) per dyad. Recordings were transcribed and reviewed, and then 4 pairs of coders were trained in the iEPIC coding system, and then coded the dyad recordings for behaviors comprising the proposed iEPIC assessment system.

The iEPIC observational assessment system consists of 5 codes for each parent and child: Reflection (R), Exploring Emotion and State (EES), Emotion and State Description (ESD), and Empathic Understanding and Concern (EUC), as well as Neutral verbalizations (N; non-study-related verbalizations). The EES, ESD, and EUC each have levels of complexity, with higher levels expected to occur more frequently in older children (e.g., 4 years and older).

There were several purposes of the current study: 1) assess inter-rater reliability for the iEPIC coding system 2) determine if hypothesized factors, Parent and Child EES, ESD, and EUC exist (6 factors total; 3 for parent and 3 for child) such that levels 1-3 for EES and ESD, and levels 1-4 EUC load unto their respective Child and Parent factors and that these factors are sufficiently different from one another 3) examine whether higher level codes occur, on average, more frequently in older children, particularly EUC in children 4 years of age and older only 4) to determine whether iEPIC behavior frequency increase is associated with a decrease in child disruptive behavior as measured by the ECBI.
and observed and coded “Child Disruptive Behavior,” 4) to determine whether parent iEPIC behaviors are positively correlated with and concurrently predict child iEPIC behaviors and 5) whether parent engagement and parent affect, are moderators in the relationship between parent and child iEPIC behaviors, 6) assess the potential moderating influence of Child Disruptive Behavior on parent iEPIC behaviors predicting child iEPIC behaviors and 7) explore the mean differences between gender and different ethnicities in child iEPIC behavior frequencies.

Results showed that the iEPIC coding system exhibited good inter-rater reliability with almost all rater pairs having an intra-class correlation coefficient above .70, with the exception of 1 pair that had a mean coefficient close at .68. The median for all coefficients was .77. However, the child codes were found to be more reliable. Exploratory Factor Analyses (EFA) found a 15 variable, 5 factor solution that resulted in a factor structure different than expected, with the exception of the PEUC factor, which did have the 4 levels for that parent code load onto it. The RMSEA for the 5-factor solution demonstrated a good fit. The following factors were labeled: “Parent Empathic Understanding and Concern,” “Child Complex Explore, Describe, and Empathic Concern,” “Parent Complex Explore and Describe,” “Parent and Child Explore and High Child Empathic Concern,” and “Parent and Child Describe.”

Analyses also showed that only Child ESD2, Total Child ESDs, and Child EES1 codes were significantly more frequent for children 4 years and older. Interestingly, Parent ESD2 also occurred significantly more often and Parent EES1 significantly less often for those with children 4 years and older. The only significant relationship in the expected direction was that child iEPIC behavior frequency was negatively associated with coded Child Disruptive Behavior. The ECBI Intensity and Problem scores were, in contrast to hypotheses, positively correlated with Parent ESD3 and Child ESD1. The implications for this are discussed.
Total Parent iEPIC behavior (PTotal) frequency was found to concurrently predict Total Child iEPIC behavior (CTotal). Although Parent Engagement reduced the influence of PTotal on CTotal, it did not make the relationship insignificant. Parent Affect and Child Disruptive Behavior did not significantly influence the relationship between Parent Total mean iEPIC behaviors and Child Total mean iEPIC behaviors. There were no differences between genders and there was only one significant difference between ethnicities with Caucasian and Latino-Non-White children displaying EES2 behavior more frequently. Future analyses are required to further explore these relationships. Limitations and future directions are discussed. Overall, the iEPIC coding system was found to be a reliable assessment tool for empathy-related parent and child verbal behaviors and shows promise for further validation and development.
Acknowledgments

The last 6 years were longer and harder than I imagined. None of it would have been possible without the sacrifice, knowledge, love, and understanding of so many family, friends, colleagues, mentors, and clients. They have made it all worth it.

First, thank you to my sister, Nicole Carambot (aka “sis”). Our mirror neurons are more familiar to each other than those of any others. You have literally been by my side since our first moments of life. Thank you for always being enthused to converse with me about the brain, social cognition, and my many other scientific and clinical curiosities for hours on end. I was fortunate to have such a loving person to weather the storm with. I am so proud of and grateful for you every day. Thank you also to Ryan Clarke for encouraging me to apply to PhD programs (you probably slightly regret it now!). More importantly, thank you for being by my side, trying hard to keep everything together, and loving me, even when you could not stand to hear another thing about the brain, social cognition, and all my other scientific and clinical curiosities. Thank you to my family for teaching me perseverance, compassion, and how to love and/or care for others even when it is hard to do so.

In regards to mentors, I am grateful to have met so many intelligent and empathic people that have helped me get here, including my dissertation chair and committee members: thank you Dr. William Gottdiener, Dr. Miriam Ehrensaft, Dr. Philip Yanos, Dr. Ali Khadivi, and Dr. Valentina Nikulina. Also, a special thank you to Dr. Keith Markus who helped me improve the statistics for this project, and made it enjoyable. I would like to give specific thanks to my advisors. Miriam, thank you for encouraging me to strive for more and to believe I can do and be more than I believed possible. I grew so much, personally and professionally, from your mentorship. Also, thank you to Dr. Gottdiener for stepping in to guide me and being a constant source of support, wisdom, and understanding throughout my time in this program. Other mentors that deserve acknowledgment are: Dr. Peggilee
Wupperman, Dr. Angela Crossman, Dr. Maureen O’Connor, Dr. Cathy Widom, Dr. Jillian Grose-Fifer, Dr. Saul Kassin, Dr. Michele Galietta, Dr. Patricia Zapf, and Dr. Charles Stone. You all inspire me and fueled my passion and curiosity for this project and this field.

Thank you to my lab-mates: Thai, Kyle, and Heather, for being there for me throughout the years, both in research and life. Additionally, without devoted research assistants, this project would not have been possible. Particular thanks to Marcel, Jara, Ashley, Rakhel, and Robin for sticking with me and working hard, even when things were uncertain and the coding seemed never-ending.

Last, but not least, I have been blessed with extraordinary friends. First, my clinical cohort: Lindsay, Niki, Ginny, Kristen, Joanna, and Christina. We will always be “the best.” I could not have survived without these amazing women. They helped me both understand and better myself over the last 6 years. Also, thank you to: Evan, Tim, and Laure for their “experimental” perspectives and friendship. Thank you to my best friends, Jamie and Lindsay. I am grateful for your unconditional love and care for me. I could not have asked for better friends to share the craziness of this life with. Thank you to old supervisors and friends, Dr. Rikki Waterhouse and Dr. Hedy Kober, for sparking my love for, and teaching me more about, neuroscience/cognitive neuroscience than I could have learned from a book. Last, but not least, thank you to my community guardianship friends: Kelly, Steve, Cynthia, Corey, and Civaun, and all the clients I worked with there. You taught me early on to never give in to the weltschmerz.

“Empathy is like a universal solvent. Any problem immersed in empathy becomes soluble.”
-Simon Baron-Cohen (Professor of Developmental Psychopathology at the University of Cambridge).
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CHAPTER ONE: INTRODUCTION

What Is Empathy?

According to most records, the English word, “empathy,” was coined by Cornell psychologist, E. B. Titchener in 1909 (Pigman, 1995). Titchener translated this word from “Einfühlung” (“feeling into” or “feeling one’s way into”), which was used by German psychologists for over 140 years. The concept has even deeper roots in philosophy. The long and diverse history of this concept illustrates how much understanding what constitutes empathy has preoccupied human beings since it’s inception in language (e.g., Hume, 1955; Pigman, 1995; Wispe, 1986). While lay-people and researchers alike often confound empathy with “sympathy” or a sense of “emotional contagion,” it was never meant to be so simple. For example, although the word had not been introduced into the English language, Adam Smith struggled to define sympathy, but in turn explained something beyond “sympathy”–something he called a “fellow-feeling:”

As we have no immediate experience of what other men feel, we can form no idea of the manner in which they are affected, but by conceiving what we ourselves should feel in the like situation [. . . .] [I]t is by the imagination only that we can form any conception of what are his sensations [. . . .] By the imagination we place ourselves in his situation, we conceive ourselves enduring all the same torments, we enter as it were into his body, and become in some measure the same person with him, and thence form some idea of his sensation, and even feel something which, though weaker in degree, is not altogether unlike them (Smith, 1759, pp. 1)

This was more than 100 years before “empathy” entered the English language, yet there is acknowledgement that humans are capable of more than just feeling for other humans.

In the last 20-30 years psychological research, particularly in areas of social cognition and cognitive neuroscience, have investigated this ability to better explain it. In doing so, they increased the
awareness of empathy as a more complex understanding, both emotionally and cognitively, of another human being’s state. Similarly, this study investigates what may underlie or foster the early development of empathy by examining the interplay between cognition and emotion that culminates in the ability to empathize. The most accurate definition for empathy for the current study is: to be “affected by and share the emotional state of another, assess the reasons for the other’s state, and identify with the other” (Preston & de Waal, 2002). Thus, we highlight that empathy is the emotional reaction in the observer to another’s emotional state, and an understanding of their state on a cognitive level (i.e., perspective-taking ability), occurring simultaneously.

Because empathy has become acknowledged as a two-part ability (cognition and emotion), many researchers have labeled these parts separately as, cognitive empathy and emotional empathy. This separation has led to the misconception that empathy can exist with only one of these components (Baron-Cohen & Wheelwright, 2004). However, empirical research suggests that empathy is present only when both components are working in tandem (Decety & Jackson, 2004). Further, what was recently labeled as “cognitive empathy” has long been researched under the name Theory of Mind (ToM; e.g., de Waal, 2007; Shamay-Tsoory, Aharon-Peretz, & Perry, 2009; Baron-Cohen & Wheelwright, 2004). Theory of Mind is a cognitive ability which allows humans to attribute mental states, such as beliefs, intentions, desires and knowledge, to one’s self, and to understand that others have beliefs, desires, and intentions that may differ from one's own (e.g., Premack & Woodruff, 1978; Wimmer & Perner, 1983). This understanding of others’ minds begins to develop at around four years of age (Baron-Cohen, Leslie, & Frith, 1985; Wimmer & Perner, 1983) although earlier precursors have been suggested (Preston & de Waal, 2008). ToM research shows that the knowledge of one’s own mental processes eventually manifests in an ability to understand others’ mental processes (Wimmer & Perner, 1983). The individual serves as a blueprint for other individuals.
However, how does emotional processing and ToM culminate in empathy? Many researchers suggest early developmental changes involve growth in cognitive and emotional abilities with a *concurrent* strengthening of connections between emotional processing and ToM ability, both biologically and phenomenologically (Preston & de Waal, 2002; Shamay-Tsoory et al., 2009). Developmentally, again, emotional states are understood first in the self, and then in others. In fact, this is seen in the underlying neural correlates of empathy. Each subcomponent of empathy (ToM and emotional processes) are associated with areas of the brain independent of one another, but to create empathy many shared areas are involved, thereby simultaneously activating the cognitive and emotional processes required (Vollm et al., 2006). Further, the importance of ToM in empathy has been indicated in research on mental health disorders. Previously thought to be an entire absence of empathy, some mental health disorders, such as autism, have been found to be primarily a problem rooted in deficient ToM/perspective taking (Baron-Cohen, 2001; Oberman & Ramachandran, 2007).

These findings indicate that ToM is intricately connected to the emotional expression of empathy (Blair & Fowler, 2008; Schulte-Ruther, Markowitsch, Fink, & Piefke, 2007). Accordingly, having only one of these two components (ToM/cognitive *or* emotional) does not constitute true empathy (Blair & Fowler, 2008). Therefore, because children do not fully have ToM ability prior to four years of age, their reactions to others in that early period are limited to experiences such as emotional contagion (i.e., without cognitive understanding of the reaction) and expressing their own emotional experiences. This conceptual understanding of empathy informs the present investigation because it underscores the importance of examining the development of cognitive *and* emotional abilities as they develop and become intricately connected to one another.

**Why Is Empathy Important?**

Why is it important to understand one another both emotionally and cognitively? As social
beings, in constant contact with conspecifics, there may be no greater ability than to connect to others. Charles Darwin (1871) stated: “sympathy, which, as we shall see, forms an essential part of the social instinct, and is indeed its foundation-stone” (p. 158). In order to survive and thrive, we must avoid incurring the costs of frequent fights and misunderstandings. As will be discussed, we use the understanding of ourselves to build an understanding of conspecifics, both emotionally and cognitively (e.g., de Waal, 2008). This understanding serves as a social compass in our daily interactions, helping to keep misunderstandings and conflict to a minimum. Because of empathy’s role in inducing prosocial behavior and preserving social functioning and bonds, it is vital for human adaptation and survival (e.g., Batson, Lishner, Cook, & Sawyer, 2005; Decety & Jackson, 2004).

The importance of empathy is further highlighted by increasing numbers of studies demonstrating that empathy deficits are a major contributing factor to antisocial behavior across the lifespan and highly associated with criminality and risk for mental health disorders (Guajardo, Snyder, & Petersen, 2009; Moreno, Klute & Robinson, 2008; Psychogiou, Daley, Thompson, & Sonuga-Barke, 2008; Zahn-Waxler, 1991).

Developmental Trajectories of Empathy Deficits

Poor functioning associated with empathy deficits has been investigated in the psychopathology of individuals with high psychopathic traits (HPT; e.g., Blair, Monson, & Frederickson, 2001; Dadds, et al., 2009; Frick, Bodin, & Barry, 2000), high callous unemotional traits in children (HCT; e.g., Frick & White, 2008; Munoz & Frick, 2012), autism (e.g., Golan & Baron-Cohen, 2006; Travis, Sigman, & Ruskin, 2001), disruptive behavior disorders (e.g., conduct disorder and ADHD: Braaten & Rosen, 2000; Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012; Kaukiainen et al., 1999), borderline and other personality disorders (e.g., Chabrol, Valls, van Leeuwen, & Bui, 2012; Decety & Moriguchi, 2007; Dziobek et al., 2011; Latzman, Lilienfeld, Latzman, & Clark, 2012), Schizophrenia (e.g., Bora, Yucel, &
Allen, 2009; Derntl et al., 2009; Shamay-Tsoory, Shur, Hagai, Levkowitz, 2007) neurodevelopmental disorders, and depression (e.g., O’Connor, Berry, Weiss, & Gilbert, 2002). This list is not exhaustive, but conveys significant support for the vital role empathy has in healthy psychological functioning.

The deficits most relevant to the present study are those observed in individuals high in psychopathic traits and children with disruptive behavior disorders and/or high on callous unemotional traits. Studies on the construct of psychopathy remain controversial, and the stigma of such a label, particularly when referring to developing children, is far too costly (Chauhan, Reppucci, & Burnette, 2007). Therefore, this author prefers to refer to such adult individuals as “high on psychopathic traits” or “HPT.” A parallel constellation of traits (lack of empathy being central) has been called “Callous-Unemotional traits” in children. This author will refer to these children as “high on CU traits” or “HCT” (Frick et al., 2000).

Individuals high on psychopathic traits (HPT) lack the affective component of the “empathy system,” as evidenced by numerous experiments demonstrating amygdala dysfunction, decreased autonomic response to distress, fear, and threat, and an inability to understand and recognize emotions, particularly negative affect in others (e.g., Blair & Fowler, 2008). Blair (2007) proposed that, due in large part to amygdala dysfunction, individuals high in psychopathic traits have substantial deficits in aversive conditioning, which stimulates and guides the “moral compass” of healthy individuals as they develop.

Emotional experiences, particularly negative ones, are given significance by the amygdala’s response to these experiences and behavioral conditioning. These experiences are stored in memory and can be recalled with similar emotional valance in the future, and subsequently “guide” future behavior (Blair, 2001). Examples of the amygdala “tagging” memories with emotions are believed to exist in disorders such as specific phobias and Post Traumatic Stress Disorder (Etkin & Wager, 2007). The
Amygdala is also important for adaptive human learning processes, such as learned processes of avoidance behavior.

Blair (2001) described this learning process as the “Violence Inhibition Mechanism.” HPT individuals appear to not learn aversion to punishment or distress in others because they lack the affective component that the amygdala usually assigns to those experiences (e.g., Blair, Peschardt, Budhani, Mitchell, & Pine, 2006). Many behaviors, notably violent or aggressive behavior, are often “inhibited” in one person by the emotions of others. This inhibition is rooted in conditioning initially, but is increasingly associated with cognitive processes over time. This emotional “understanding” between two people is believed primarily responsible for feelings like sympathy, guilt and remorse (Maibom, 2012). Developing without an emotional connection to others, but with the ability to take others’ perspectives (ToM), can manifest in ruthless, but learned and well-calculated, patterns of manipulative behavior over time.

Research on “Psychopathy,” in the last 15-20 years strongly supports developmental trajectories and risk for high psychopathic traits (HPT) in adulthood. Although the importance of empathy development was originally central to the psychopathy construct, recent focus on the criminal justice relevance of HPT resulted in an emphasis on the antisocial behaviors of HPT individuals. However, to clarify what constitutes psychopathy, the construct has been split into two factors for many years now. Factor One involves the callous and unemotional traits characterized by lack of empathy and affective reactions to others, and Factor Two is comprised of antisocial and impulsive behavioral traits (Hare et al., 1990). Based on the original conceptualization, Factor Two traits do not appear to provide much discriminative information for “Psychopathy,” and are therefore less “diagnostically” important. This is due to their extensive overlap with Antisocial Personality Disorder (APSD) symptoms. Accordingly,
many researchers continue to investigate and propose empathy deficits and socio-emotional disabilities as central to psychopathy (Cooke, Michie, Hart, & Clark, 2004; Gregory et al., 2012; Hart, 1993).

Many traits in children high on Callous Unemotional traits (HCT) parallel adults high on psychopathic traits, and have been posited as signifying a precursor to adult psychopathy. HCT have been found in children with disruptive behavior disorders with elevated scores on measures of callous unemotional traits, such as the Inventory of Callous Unemotional Traits (ICU; Kimonis et al., 2008). Such parallels are: difficulties with recognizing negative emotions, deficits in aversive conditioning, fearlessness, intact perspective-taking ability or “Machiavellianism,” reward orientated behavior, and the accompanying neural substrates of these (Frick & White, 2008). These characteristics have evidenced predictive value for deficits in empathy and antisocial behavior in adulthood (e.g., Frick & Viding, 2009; Munoz & Frick, 2012) and were found to be relatively stable throughout the lifespan (Barry, Barry, Deming, & Lochman, 2008; Barry, Frick, Adler, & Grafeman, 2007; Dadds et al., 2009; Fontaine, McCrory, Boivin, Mofitt, & Viding, 2011; Frick, Kimonis, Dandreaux, & Farrel, 2003).

Frick (2009) has urged researchers and clinicians not to emphasize antisocial behavior, nor to subsume CU traits, under this behavior. This proposal is made in view of evidence that CU traits exert meaningful prospective influence on the children’s developmental trajectories, and of their prognostic value in predicting empathy deficiencies (Pardini, Lochman, & Frick, 2003). Due to the empathy deficiencies that are prominent in these children, children with CU traits are a prime population to investigate for prevention and/or intervention research for empathy deficits. Fontaine et al. (2011) investigated joint trajectories using teacher reports in a longitudinal twin study (ages 7-12), showing that HCT children and high levels of conduct problems are of particular treatment interest, because early onset of CU traits are associated with a more severe and pervasively destructive pattern throughout the lifespan, whereas adolescent antisocial behavior (AB) was more likely to be influenced by
environmental factors outside of the home (e.g., peer relations). Further research is needed to understand the extent to which CU traits interact with biological and environmental factors to predict the poor development of empathy (Blair, Monson, & Frederickson, 2001; Decety & Moriguchi, 2007; Hawes, Dadds, Frost & Hasking, 2011, Hawes, Price, & Dadds, 2014). Additionally, little is known about potential preventative measures at this time for children starting to present with these problems.

Alarmingly, research has suggested that the combination of CU traits and AB may be impermeable to effective parenting practices known to have a protective influence for other children with conduct problems (Hawes et al., 2014; Hawes et al., 2011; Larsson, Viding, & Plomin, 2008). For instance, Wootton et al. (1997) found that a sample of 6 to 13 year olds referred to a clinic for conduct problems only showed an effect of parenting if they did not have CU traits. Those with CU traits exhibited those problems regardless of the quality of parenting. These findings should be considered with caution because, as suggested by the aforementioned models of empathy development, early intervention and targeting empathy directly may be the key to preventing or treating a resistant combination of CU traits and AB. Yet, few studies have investigated specific parenting factors that might build and shape early empathic ability.

In fact, Wootton’s study, like many, did not specifically consider empathy as an influential factor. The recent influx of research on HCT children subsumes empathy under the CU construct. CU trait research has focused on psychopathology involving a constellation of deficits, only one of which is empathy. Convergent evidence is sorely needed via more direct measurement. Many researchers emphasize the need for a multi-method evaluation of empathy. Assessing the existence of empathy in a developmentally appropriate way requires an investigation into how children might actually learn empathy through developing biological, emotional, and social processes.
As discussed, despite the critical need for this ability, humans are not born with it fully intact. In fact, developmental researchers have long demonstrated that infants are quite selfish (albeit necessarily so). Although there is evidence that some humans may be predisposed at birth (“by nature”) to develop high levels of empathy (Zahn-Waxler, Robinson, & Emde, 1992), recent research has shown that being able to teach and strengthen empathy (even with those thought “incapable” of it) suggests that its development can be largely “nurtured.” However, there is insufficient empirical evidence on specific methods used to nurture this ability (Ornaghi, Brockmeier, Grazzani, 2014). Further, it is important to know whether nurturing it through such methods can help prevent or ameliorate the adverse outcomes previously discussed. Understanding the development of empathy lights the path for such research.
CHAPTER TWO: DEVELOPMENT OF EMPATHY ACROSS THE LIFESPAN

The development of empathy’s two components, the affective (emotional contagion, sympathy, or empathy) and the cognitive (ToM), appear to initially have different beginnings, as shown through neurobiological research. For example, the areas associated with the affective component of empathy (the limbic and para-limbic systems) develop earlier (Singer, 2006). This may explain the earlier expressions of concern and emotional mimicry or signs of distress from the cries of other infants. Areas in the prefrontal and temporal cortices, relevant to ToM (the cognitive component of empathy), develop later (Singer, 2006). Research has found that once children increase verbal ability around two years of age, and particularly when ToM ability is first demonstrated (around four years), both components have become increasingly connected and empathic ability develops rapidly, making this an ideal time for its study (Knafo, Zahn-Waxler, Hulle, Robinson, & Rhee, 2008; Robinson, Zahn-Waxler, & Emde, 1994; Singer, 2006; Young, Fox, & Zahn-Waxler, 1999).

Historically, limited infant verbal abilities have rendered it difficult to study early empathy development outside of inferences taken from facial and body behavior. However, there has been convincing research that from birth, infants appear to be predisposed to helping others. Tomasello and Werneken (2009) have argued that humans are born with a predisposition for prosocial behavior and that this predisposition interacts with socialization. They propose that experiences with caregivers or significant others serve to scaffold a child’s greater understanding of the needs, intentions, and feelings of others over time. In fact, infants under one year of age will help complete actions for adults without cues to do so, or comfort others when in distress (Tomasello & Werneken, 2009).

Additionally, early investigations of neonates have shown that there is already a potential sense of agency or awareness of self at birth in that neonates respond only to cries of distress of other neonates, and not to their own cry or a recorded artificial cry (Dondi, Simion, & Caltran 1999). These
findings suggest that humans are born with a “sense” of others, as well as the proclivity to help and care for others. Infants simply lack a concept of mind to understand, and verbal ability to explain, how or why others feel and behave as they do (Tomasello & Werneken, 2009). Below, we review existing empirical evidence supporting the development of this predisposition for prosocial behavior across the lifespan.

**Empathy: From womb to one year.** Some researchers propose that empathy development begins in the third trimester when rhythmically timed biological oscillators such as respiration, heartbeat, and sleep, create an ambiance for a fetus’ developed biological oscillators to synchronize with those of their mother’s (Feldman, 2007). Further, while in the womb and later, once the neonate begins to be held and fed from his/her mother/primary caregiver, hormonal release is also synchronized. Biochemical rewards such as oxytocin and vasopressin are received simultaneously by mother and neonate, promoting bonding and attachment (Beitchman, et al., 2012). These shared experiences early on can be considered the seed of empathy development. Further, synchrony and attunement with the mother at the biological, emotional, and behavioral levels is also the core mechanism involved in early self-regulation, which as will be discussed, is increasingly important as empathic ability develops (e.g., Eisenberg, 2000; Woltering, Lishak, Elliott, Ferraro, & Granic, 2015).

Once out of the controlled environment of the womb, the infant has to depend on his/her primary caregiver for environmental cues for biological and behavioral regulation. The proximity of the neonate’s mother and his/her reduced mobility creates a perfect scenario for external regulatory dependence (Feldman, 2007). This is achieved again by interactive, repetitive “routines” resulting in reward, such as crying and suckling. Additionally, numerous studies find that gaze between mother and infant synchronizes in the first two months of life, when infants may start to have more time out of their mother’s arms (Feldman & Greenbaum, 1997). Again, many postulate that this type of gazing continues
throughout the human’s lifetime, but initiates “primitive” empathy through the matching of facial expressions (Rochat & Striano, 1999). Predominant theories in empathy development posit a “perception-action” theory of this behavior, which initiates with infants and caregivers mimicking one another’s facial expressions (Batson, 2010; Decety & Meyer, 2008; Feldman, 2007; Preston & de Waal, 2002).

By 3-6 months, increased activity is seen in the “social brain” circuitry such as the superior temporal sulcus, fusiform gyrus, orbitofrontal cortex, and in neural networks consisting of mirror neurons (e.g., premotor cortex, inferior frontal gyrus, right superior parietal lobe, and cerebellum; Decety & Meyer, 2007). Importantly, the mirror neuron system begins to develop prior to 12 months of age. Mirror neurons are specific neurons that have been found able to neurally match action production with action perception. Neurons involved in a motoric behavior are activated when a person simply perceives that motoric behavior in another (Preston & de Waal, 2002). That is, there is an activation of the representation of that behavior in the observer’s brain (Preston, 2007). These neurons make behaviors such as speech repetition possible.

More recently, researchers are beginning to investigate these neurons with tasks that aim to elicit empathy, as they have also been found to activate emotion neural correlates in the observer to the emotion in the observed (Preston, 2007). In regards to mirror neuron involvement in empathy, Preston (2007) describes empathy as a:

“shared emotional experience occurring when one person (the subject) comes to feel a similar emotion to another (the object) as a result of perceiving the other’s state. This process results from the fact that the subject’s representations of the emotional state are automatically activated when the subject pays attention to the emotional state of the object.”
Accordingly, perceiving behavior and an associated emotional state causes “perception-action coupling” where the perception of, creates a representation of that emotion and associated behavior in the infant. Perception-action coupling results in what has been termed “coding” for emotional expression by leaving a “trace” association of sensory affects with motor behavioral patterns in the mirror neuron system (Decety & Meyer, 2008; Preston & de Waal, 2002).

During the first year, due to the aforementioned biological developments in tandem with mother and child interactions, infants and caregivers exhibit an increase in synchronization of numerous vocal, visual, affective, and touch behaviors. This is when social exchange becomes more meaningful in the mother-infant dyad by the onset of “mismatch-repair” behaviors (Feldman, 2007). “Mismatch-repair” is a co-regulatory function whereby the infant and mother are continuously gazing at one another and aiming to match one another’s responses with comparable responses. When this does not occur, there is an attempt to appropriately “repair” (i.e., match the other’s response).

During this early period, it is theorized that it becomes apparent to the infant that there will not always be an exact match in behavior or emotion, and that self-correction has to occur. Many of the interactions between infant and parent are mismatched at this point, but result quickly in repair in healthy parent-child dyads. Previous good synchrony should lead to better ability to repair immediately. Shared gaze shows a decrease from the period from 3 to 9 months and gives way to shared attention; behaviors/attention directed outside the dyad but shared between the infant and parent (Decety & Meyers, 2008; Feldman, 2007). This can be conceptualized as the initial stage of “intentionality,” understanding the distinction between self and other, and the time at which intersubjectivity (i.e., a psychological relationship between humans) is born in infants.

At this time, repetitive reciprocation of behavior occurs, which socializes the infant to social exchange, greater understanding of sharing, other’s and one’s own goal-directed behavior, and
“helping.” Feldman (2007) found a marked increase in motor behaviors and changes in exchanges in the 3-9 month period; a time when not only is the “social brain” greatly developing, but so are motor areas of the brain increasingly activated with the onset of crawling, grasping, and playing with objects. By 1 year of age, infants begin to use symbols and “symbolic” play, and there is a continued reciprocation between infant and parent, resulting in an “expectation” of these behaviors (Feldman, 2007; Leclere et al., 2014).

**Empathy at two to four years of age:** For appropriate social functioning, it is essential for the distinction to be made between the self and other. Empathy is not an *exact* representation of another, despite sharing some neural activation with another. Naturally, as the infant grows, the prefrontal cortex is also developing, asserting control over the automatic “sharing” and giving way to “metacognition” (i.e., ability to monitor one’s own mental processes). By two years, the human infant’s prefrontal cortex (PFC) cerebral blood flow has almost doubled since birth due most likely due to rapid synaptic development and myelination (i.e., increased neural connections). Mental representation tasks become much easier for children at this age and between 2-4 this ability continues to grow, as does self-regulation. The PFC starts taking over as the regulator, serving a role similar to the parent. The result is the ability to regulate one’s own reactions, coinciding with emotional responsiveness to the distress of others. Interactions with others have taught the child experientially and biologically the *meaning* of distress in others, which increases responding characterized as “*sympathy.*” This reaction is in stark contrast to the infant that seeks only alleviation (self-oriented) from the aversive emotional reactions/distress of others in that behaviors signaling a desire to help or soothe others (other-oriented) distress become more apparent (Decety & Meyer, 2008; de Waal, 2008; Preston & de Waal, 2002). As the understanding of mental and emotional states of others increases, along with regulatory ability, behaviors become increasingly other-directed (e.g., Maibom, 2012; Nichols et al., 2009).
Accordingly, primitive displays of empathic responding (e.g., expressing the urge to help or helping another child that fell) can signify this stage of empathy development. However, Decety and Meyers (2008) explain that empathy is an ability that can cause both distress in response to the distress of another (i.e., resulting in an urge to relieve it) or actual concern for the other. Both of these reactions are rooted in “empathy,” but have different end points and “intentions,” many times based on age and social experience. Therefore, although humans may be predisposed to be empathic, proper development and social experiences are vital in determining the degree to which this ability fully develops.

Increased “other-directed” empathic behavior during ages two to four may be supported by the growing distinction between self and others. This has been evidenced in the activation in areas of the brain, also implicated in greater ToM ability, particularly the temporoparietal junction (TPJ). The TPJ receives input from the lateral and posterior thalamus, visual, auditory, somesthetic, and limbic areas (such as the amygdala, often involved in empathic responding, and central to emotional responsiveness). Additionally, the TPJ gives and receives information from the PFC and the temporal lobes; these TPJ connections create a multi-system sensory network involved in the cognitive and emotional aspects of “self.” This “neural locus” of “self” has been found to be dysfunctional in disorders involving a lack of empathy with symptomatology involving self-dissociation, inexplicable reactions, and feelings of “unreality” such as schizophrenia (Decety & Meyers, 2008; Feder, Tully, Lincoln, & Hooker, 2014). In many ways, ToM ability can be conceptualized as “glue” holding together our empathy pieces and keeping our “self-social” structure stable.

**Four years and older: The journey to other minds.** Researchers have long known that at four years of age, children begin to be able to successfully perform ToM tasks (e.g., Premack & Woodruff, 1978; Knafo et al., 2008), because representing the mental states of others in their own mind becomes possible. Children also start to grasp the self and other distinction, understand the beliefs and intentions
of others, and make better predictions about the behaviors and feelings of others. This coincides with increased empathic responding and prosocial behaviors that are “other”-focus (e.g., Denham et al., 2003; Knafo et al., 2008; Singer, 2006; Strayer & Roberts, 1997; Zahn-Waxler, 1991). In fact, decreases in self-distress in reaction to others is seen immediately preceding increases in children’s expressions of caring for, or comforting others (Svetlova, Nichols, and Brownell, 2010; Zahn-Waxler, 1991). However, some individuals after this time continue to be more self-focused in regards to emotion and lack ToM, which prohibits them from understanding emotions in others beyond the distress it causes them (e.g., autism, schizophrenia; (Pinkham, Hopfinger, Pelphrey, Piven, & Penn, 2008). While others develop developmentally normal ToM, but have difficulties reacting emotionally and seem driven in any affective way by reward (e.g., “callous-unemotional” children, Dadds et al., 2009).

These specific deficits elucidate the complications that occur in the developmental scaffolding of emotional and cognitive understanding early in life. The connections between emotion and cognition grow more complex over time, and like all complex systems, a poor foundation or defect in any part can negatively impact the whole system or stunt further growth (Bora, Yucel, & Allen, 2009; Singer, 2006; Trevarthen & Aitken, 1994). Following, will be a review of research that has investigated the potential sources of these empathy deficits. The etiology of these deficits bears importance for intervention, and more importantly appropriate preventative factors.
Perception Action Mechanism (PAM) Model

As mentioned previously the development of mirror neurons have been posited as integral for empathy development (Preston, 2007). In fact, Preston and de Waal (de Waal, 2008) developed a model, the Perception Action Model (PAM), which depicts the process of empathy. This model was called the perception-action model because it was based off models of motor behavior positing the same mechanisms, albeit applying them to emotions. In this way, as previously mentioned, mirror neurons make the perception of another person’s state activates corresponding representations of that state (neural activity for that state) in the observer, which in turn activates somatic and autonomic responses similar to the other person’s state. Although the PAM utilizes neuroscientific processes to explain empathy, it is couched in an evolutionary framework. As such, the neural processes evolved such that there was a more intense emotional response (via activation of the amygdala) to direct live observations, giving rise to responses that encouraged survival of conspecifics (e.g., empathy-induced altruism).

However, Preston (2007) explained that imagined states of another can also elicit an empathic response, but to a lesser degree than perceiving them directly, because it is more difficult to attend to internal versus external stimuli.

In regards to development, Preston (2007) has pointed out that empathy becomes greater with more “past experience, similarity, and familiarity,” because more distressful past experiences make representations of similar distressing states of others readily available. She explains that this would be why having an experience similar to the other creates greater empathy in the observer. Therefore, this makes accuracy and state matching easier for some, which indicates empathy is importantly, on a continuum. PAM has been depicted as Russian “nesting dolls” where the center “doll” is the innate socio-affective foundation of empathy and the outer doll is our prefrontal cortex (PFC) regulating our
reactions and keeping our self and other distinction clear (see Figure 1 below). The middle doll is where our motor and emotional integration takes place, and all of the dolls are “figuratively” permeable (de Waal, 2008). Permeability here means that, for example, once sympathetic concern (the middle doll) occurs, emotional contagion (the innermost doll) can also still occur and is influenced by this emotional reaction and vice versa. Therefore, the PAM model is not step-wise in one direction. Instead, the PAM illustrates a bi-directional and interactive model of the motoric and emotional aspects of empathy.

![Figure 1](image.png)


Although this model does an impressive job connecting neural and socio-emotional development, it over-emphasizes behavior and under-emphasizes developing cognitive processes (particularly those potentially enhanced by learning). Further, PAM can be expanded to be a *developmental model* since it lends itself to such a framework. However, to do so, this study will also investigate more specifically how developing cognitive abilities may assist in making accurate and quick connections between emotion and social behaviors.
Therefore, PAM informed the creation of the coding system proposed in the present study, but the study attempts to examine how language development and cognition (e.g., use of inductive reasoning, verbal learning) can help individuals better make sense of the emotions of others at an earlier stage in life. Further, the system developed for the present study intends to use the PAM model in hypothesizing the development (i.e., progressive scaffolding) of increasingly complex cognitive and emotional interactions that manifest in empathy.

The model of empathy development investigated in the proposed system (described below) of this study intends to demonstrate the advancement of empathy from emotional contagion and self-oriented emotional reactivity to a mature system in which emotional and cognitive understanding work in tandem to understand others. As such, the proposed system will directly reflect the PAM model, but is specifically developmental and utilizes verbal behavior, to show how from ages 2 to 6 years old mimicry and emotional contagion scaffold sympathetic concern, consolation, and shared goals and coordination. Subsequently, these abilities further support a maturing system of empathy, characterized as other-oriented emotional understanding, perspective taking (ToM; post four years of age) and targeted helping accompanied by truly sharing in the state of others (de Waal, 2008).

The inner doll of the PAM signifies a “hard-wired” socio-affective basis of empathy (de Waa, 2008). Further investigation into the development of this socio-affective basis of empathy, and its increasing complexity over time, is required however. The strength of this socio-affective foundation will impact any future development of empathy, and through early social learning, perhaps it can be strengthened. Parenting and parent-child interactions, increased and varied social interactions as a child ages, and cultural context are important influences on this foundation and its growth. The present study intends to examine the early interplay between parent teaching and the developing socio-cognitive and emotional processes of their children. The study does not intend to discount the importance of
experience in empathy-building, but rather demonstrate how direct learning and describing emotional experiences may help strengthen or enhance empathic responding early-on.

**Parents as “Teachers” of Empathy**

Considering the vital role of parents in socializing their children, a few researchers have examined parental practices that might support the development of empathy. One study has shown that parents of 3- to 6-year-olds who encouraged their children to take the perspective of others, had children with higher scores on teacher and parent-reported measures of empathy and prosocial development (Farrant, Devine, Maybery, & Fletcher, 2012). Further, significant correlations were found between maternal empathy and child empathy, as well as maternal empathy and prosocial behavior (Farrant et al., 2012).

Other parenting variables found to be significantly related to empathy development in their children were: responsiveness (e.g., Fonagy, Redfern, & Charman, 1997; Moreno, Klute, & Robinson, 2007; Symons & Clark, 2000), validation and labeling of emotions (e.g., Gerdes, Jackson, Segal, & Mullins, 2011; Gavazzi & Ornaghi, 2011), focusing on similarities and differences of their children with others in emotionally-evoking situations (e.g., reminding children about when that happened to them and how they felt; Gerdes et al., 2011), encouraging role-taking (Dunn et al., 2001; Farrant, Devine, Maybery & Fletcher, 2012), discussing and attributing emotions to circumstances with their children and others (Dunn et al., 2001; Ramsden & Hubbard, 2002; Strayer & Roberts, 1997), reinforcing empathy or ToM accuracy (Maynard, Monk, & Booker, 2011), and parent emphasis on inductive discipline which explicitly provides explanations and moral consequences (Eisenberg & Morris, 2001; Krevins & Gibbs, 1996).

Parental affect and discipline has also significantly predicted children’s performance on ToM tasks even when controlling for sex, verbal IQ and socioeconomic status (Hughes, Deater-Deckard, &
Cutting, 1999). Further, maternal responsiveness to their children at age two has been positively associated with ToM tasks at age five (Symons & Clark, 2000). Therefore, there are a number of parenting behaviors that influence both components of empathy (emotion and cognitive), and strengthen empathic ability later in life.

Direct methods parents use to teach empathy, with some empirical support, are children’s books. Importantly, research has found that it is not the amount of reading that promotes empathy development, but the content of the book. Aram and Aviram (2009) found that kindergartners’ mothers’ choice of books with empathy-related content such as: perspective-taking with characters, displays of empathy and expressing emotions between characters, and books that offer opportunities to explain the emotions of the characters and draw similarities between the child and the characters, were significantly associated with better scores on teacher reports of empathy and socio-emotional adjustment. The authors emphasize the importance of seeking books that allow for perspective-taking, focus on self-other similarities, and understanding and labeling one’s own and others’ emotions (Aram & Aviram, 2009).

Other research has focused on parent verbal modeling and labeling thinking and emotions during book sharing in mother-child dyads with children as young as 6-months old (Kleeck, Alexander, Vigil, & Teamleton, 1996). Dyads were observed over a 6-month period in videotaped sessions. Although the study was observational and qualitative, it importantly revealed that scaffolding of cognitive demand appeared to foster social cognitive understanding as the child aged to one-year (Kleeck et al., 1996).

Several studies have also investigated paraphrasing empathy (Seehausen, Kazzer, Bajbouj, & Prehn, 2012) for young children, as well as family discussions about how people think or feel, as promotive of emotion regulation and understanding during social conflicts (Dunn et al., 2011; Ramsden & Hubbard, 2002). Direct training in emotional understanding has also evidenced improved social cognition in primary school children (Ornaghi, Brockmeier, Grazzani, 2014). The above studies find that
that social, verbal, and direct interaction may be essential when teaching empathy, as opposed to passive observation of behaviors.

Alternatively, parent psychopathology such as depression and stress has been linked to mother’s decreased empathic understanding, which increased risk for behavioral problems in their children (Coyne et al., 2007; Guajardo, Snyder, & Petersen, 2009; Moreno, Klute, & Robinson, 2008; Psychogiou et al., 2008). Coyne et al. (2007) found that maternal depression was significantly negatively related to observer-rated empathic understanding of their children, and that higher empathic understanding was significantly positively related with responsiveness and parent sensitivity to children’s needs.

Moreno, Klute, and Robinson (2008) assessed the relationship between child empathy toward mother and an unfamiliar examiner at two and four years of age with an early measurement (when the child was 15 months old) of mother’s emotional availability and measures of child’s cognitive and language development. Results suggested that children’s social engagement with their mother and mother’s emotional availability were both significant in predicting child empathy at later time points (Moreno, Klute, & Robinson, 2008).

Another key facet of parenting that bears on empathy development is attachment. Insecure attachment has evidenced numerous negative outcomes for children. Recent research finds that close, social interaction with a parent, increases oxytocin levels in both parent and child (e.g., Feldman, Gordon, Influs, Gutbir, & Ebstein, 2013). Increased oxytocin has been associated with increased empathy-inducing altruistic behavior (e.g., Declarck, Boone, & Kiyonari, 2010; De Dreu et al., 2010) and better recognition and responding to emotion in others (e.g., Domes et al., 2006; Fischer-Shofty, Shamay-Tsoory, Harari, & Lekovitz, 2010). Attachment security predicts better performance also on ToM tasks after controlling for age (Fonagy, Redfern, & Charman, 1997). Several studies have shown
that children of responsive parents who form more secure attachments early on, later demonstrate
greater empathy, strong emotional regulation ability, and a better developed sense of morality
(Easterbrooks, Biesecker, Lyons-Ruth, 2000; Kerns, Abraham, Schlegelmilch, & Morgan, 2007;
Kochanska & Murray, 2000).

Further, insecure attachment has shown to negatively impact empathy development and increase
risk for children’s bullying behavior (Eliot & Cornell, 2009; Smith & Myron-Wilson, 1998). Both
attachment and empathy have predicted children’s roles in bullying situations such that those with
secure attachment and higher empathy are more likely to be defenders as opposed to outsiders (who do
not defend peers) in bullying scenarios (Nickerson, Mele, Princiotto, 2008).

Much of the research on the role of parents in fostering empathy in their children has been
conducted with children around four years of age and older, the age at which ToM emerges. However,
the above review provides substantial evidence that empathy begins to develop from the very start of life
and can be built and shaped prior to the preschool years through modeling, frequent social interactions,
verbal and physical synchrony, and self and other emotion labeling.

Further, many longitudinal studies have cited two to seven years as a time of immense and
continuous development for empathy, and this is made easier to study by the rapid increase in verbal
ability between two and three years of age (e.g., Knafo et al., 2008; Robinson et al., 1994; Young et al.,
1999). Unfortunately, most research interested in early empathy dates back to the 1980-90s. Certainly, a
major concern in studying empathy prior to four years of age is the use of developmentally appropriate
measures. With the aforementioned research outlining the biological and parallel socio-emotional and
cognitive processes that underlie empathy, there is guidance for investigating indicators and promoters
of early empathy development. Technological advances also permit researchers to directly observe
child-parent interactions in a naturalistic manner to corroborate the proposed developmentally informed
assessment system for early empathy. Following is a review of existing observational assessment systems developed to measure empathy in young children. These existing assessments have also informed the naturalistic empathy observational assessment study detailed subsequently.
CHAPTER FOUR: OBSERVATIONAL ASSESSMENT SYSTEMS FOR EMPATHY IN CHILDREN

To this author’s knowledge, only two empathy measurement systems for the assessment of empathy in young children have been tested in more than one empirical study. Both use pseudo-naturalistic procedures involving tasks and simulations. These measurement systems are the Empathy Coding System (ECS; Zahn-Waxler et al., 1992) and the Empathy Continuum: Integrated Emotional-Cognitive (EC) Scoring System (EC; Strayer, 1993). The ECS has been utilized in samples as young as 14-months old (1.2 years) to approximately five-years old, and the EC has been used in samples as young as 60-months old (5 years) into adolescence.

**Empathy Coding System (ECS; Zahn-Waxler et al., 1992).** The Empathy Coding System (ECS) has been further developed and adapted several times since 1992 to suit the purposes of specific research agendas. However, the constructs for the coded behaviors have remained consistent. In 1992, Zahn-Waxler et al. initially developed this system to assess early indicators of empathy development (concern for and prosocial behavior directed at others), particularly during times of distress. The system was originally used with children from one to two years of age (Zahn-Waxler et al., 1992). In this study, there were three focal assessment points of mother and child interactions when their child was 13-15 months old, 18-20 months, and 23-25 months of age. These assessment periods were chosen due to empirical work supporting them as significant transition stages from distress focused on one’s own state to empathic engagement with others (e.g., Hoffman, 1975).

Mothers were asked to make observational reports of emotional incidents that the child either witnessed or initiated, and to also simulate emotions and record (via tape recorder) their child’s responses to these simulations. Once a month, trained staff made a visit to the home to interview the mother and review the observation reports. During the home visit in the 18-20 month period, the mother was asked to perform a distress simulation, for which she had been trained. Lab staff videotaped the
simulation and interaction between mother and child. Self-recognition tasks were also administered in the home for all three time-periods. Once the study child turned two, simulations were performed in the laboratory and responses were videotaped. A playmate of the child was also brought into the lab to assess their responses to simulations.

Mothers were trained on observational methods and coding with a training manual, which elaborated on observational procedures with examples of events. Mothers practiced the observational procedures for several weeks, and then sent in audiotapes that were transcribed and reviewed with lab staff at the home visit. Confusions were resolved and clarifications made, so that thereafter the mothers could provide accurate observations for the study. The simulation training consisted of guided instruction by lab staff utilizing a training manual with the following simulation situations: respiratory distress (e.g., coughing or choking), pain (e.g., bumping one’s foot or head, saying “ouch” and rubbing the spot), listlessness (e.g., apathetic, fatigued behavior-sighing and sitting), and sadness (e.g., audible sobbing). At 18 and 21 months at home and at 2-years of age in the lab, lab staff videotaped the children’s responses to additional distress simulations to corroborate mother’s observations at the same developmental time points.

Therefore, observations were reported for a variety of emotional incidents both naturally occurring and simulated by both mothers and lab staff. Child-witnessed distress (e.g., parent or sibling arguments/conflict) and child-perpetrated distress (“victims” could be family, friend or stranger) were recorded and transcribed. Mothers were instructed to do at least one simulation per week, integrating them naturally into home activities. Two trained research assistants coded audiotaped or transcribed recordings of half the mother’s observations from each time period for inter-coder reliability. Reliabilities ranged from 81% to 98% with the exception of aggressive behavior, which was 64% at one
time period. Further, observer-coder reliability was assessed via videotaped simulations; mother and laboratory staff reliability averaged approximately .80.

The ECS codes are as follows: (A) “Prosocial Behavior,” was coded for the child’s attempts to alleviate distress, intervene on behalf of the victim, or change the situation, (B) “Empathic Concern” was coded for verbal and physical behavior expressing emotional arousal in the form of sympathetic concern (e.g., “I’m sorry”), (C) “Hypothesis Testing” was coded for verbal behavior, which indicated the child trying to understand why the distress was occurring (e.g., “what happened?” “you hurt foot?”), (D) “Self-Referential” was coded when the child made verbal or physical imitations or enactments of distress in the other. This was referred to as “trying on” the experience of the individual in distress, (E) “Self-Distress” was coded for emotional expressions evoked by the child’s own (i.e., self-oriented) distress such as sobbing, whining, crying, (F) “Aggressive Behavior” was coded when children verbally or physically demonstrated aggressive or angry responses, and (G) “Positive Affect” was also coded for demonstrations of amusement, laughing, or smiling during the distressful experience.

The use of the ECS in the MacArthur Longitudinal Twin Study (MALTS) allowed for investigation of a genetic predisposition for empathy and ToM ability, as well as other major influences on their development (e.g., parenting; parent psychopathology) (e.g., Emde et al., 1992; Robinson et al., 1994; Zahn-Waxler, Schiro, Robinson, Emde, & Schmitz, 2001). The ECS coding system was adapted to include a code for “Mother Behavior to Child” meant to reflect the degree of responsiveness and reinforcement exhibited by the mother. These codes use Likert scales to indicate the degree/intensity to which the behavior is exhibited. However, mother’s behavioral coding is limited to one item on a 4-point scale, 0 being least involved and 3 indicating reinforcement or acknowledgement of the child’s behavior.
Additionally, the distress simulation procedures of the ECS have evolved into standardized empathy probes performed by both mother and a researcher. Each distress simulation (e.g., catching a finger in a clipboard or bumping a toe) is approximately 30 seconds long followed by a 30 second recovery period (Robinson et al., 1994). Child responses are videotaped and coded at home and in the lab. Observer reliabilities are high across studies and the codes have been correlated with emotion understanding and expressiveness instruments such as the Bayley Scales of Infant Development (BSID), Differential Emotions Scale (DES), Mental Development Index (MDI), as well as numerous other assessment measures of dyad adjustment, parenting practices, family environment, and temperament.

Two of the more recent studies conducted utilizing the ECS and the simulation procedures, come from Young et al. (1999) and Knafo et al. (2008). Young et al. (1999) investigated the relationship between temperament, specifically inhibited disposition, and empathy in two year-olds. Temperament measures were taken at 4-months old. At two years of age, the children were observed while they engaged in a variety of activities in the lab, during which their mother and a researcher did a pain simulation at separate periods of time for approximately 1 minute. Child responses were videotaped and coded using the ECS’ Hypothesis Testing, Prosocial Behavior, Concerned Expression (originally “Empathic Concern”), and “Victim” Behavior codes, as well as other codes to assess for Arousal, Distress, and a Global Rating of Empathy.

Reliability between two independent coders ranged from .87 to .98 for all codes. Most of the correlations between empathy codes were moderately significantly correlated, particularly Concerned Expression, Hypothesis Testing, and Global Empathy ratings both for child with the experimenter and child with mother, although children were, as expected, more responsive to their mother’s distress than the experimenter overall. Prosocial Behavior was only significantly correlated with the Global Rating of...
Empathy and Concerned Expression with mothers. Moreover, arousal and facial/vocal/gestural concern were highly significantly inter-correlated.

These findings suggest that there are meaningful independent constructs measured by these codes, but their significant relationship with one another also indicates that the abilities they measure may combine to reflect an overarching empathy construct in young children (Young et al., 1999). Finally, the experimenters found that inhibition toward the experimenter (but not the mother) at two years of age was negatively related to empathy, and that unreactive children with less affect at four months old demonstrated significantly less empathy toward the experimenter (“the unfamiliar other”) at two years old.

Knafo et al. (2008) also conducted a longitudinal study investigating a genetic predisposition toward both components of empathy as well as environmental contributions to its development in twin children one to three years of age. Knafo et al. used the ECS to specifically investigate the cognitive and affective components of empathy by coding for Hypothesis Testing and Empathic Concern respectively. They examined the relationship between these two codes and the Prosocial Behavior code (i.e., general prosocial acts). Preliminary analysis showed that MZ and DZ twins did not differ in Hypothesis Testing or Empathic Concern. Importantly, the cognitive (Hypothesis Testing) and affective (Empathic Concern) components were significantly positively correlated. Knafo et al. found relative stability across ages in empathic ability with both the mother and experimenter. Empathy was significantly associated with prosocial behavior, due mostly to environmental influences. Increases in affective ability (empathic concern) occurred between 14 and 20 months, whereas cognitive ability (hypothesis testing) increased through 36 months, as would be developmentally expected.

Limitations of the ECS. Although the ECS has proven useful in studying the cognitive and affective developmental aspects of empathy in much younger children, it has several limitations. First,
the age range used to study the ECS has been below four years of age. This may limit the amount of complexity in behaviors seen as they are prior to ToM age developmentally. Also, in light of how vital parents are in the socialization of their children, the ECS has limited codes for parent behavior and does not sufficiently capture the complexity of empathy development rooted in parent-child interactions. Further, the ECS relies heavily on the coding of physical behaviors. However, research literature on the development of the ECS calls attention to the fact that two years of age is an opportunistic age to investigate verbal expressions of understanding mental states and emotions (Knafo et al., 2008). More direct examination of this understanding stands to clear up the subjectivity that comes with coding physical behaviors, particularly in younger children who are still practicing, adapting, and calibrating their social expressiveness. Also, the inclusion of more diffuse constructs such as “Prosocial Behavior” does not add much to the specific construct of empathy. It has also evidenced less correlation with the other codes in the ECS, which focus more on self-other expressions of emotional and mental understanding (Young et al., 1999).

Another limitation of the ECS is its use of standardized procedures to elicit empathic responding. These “empathy probes” introduce the typical threats to external validity that are commonly associated with “artificial” lab tasks. Empathy involves developmentally complex and interactive processes. Limiting the context for its expression limits one’s ability to see the organic unfolding of these processes. For example, procedures used with the ECS instruct mothers not to make eye contact with their child to avoid demand characteristics during simulations, but this is not ordinary or natural to interactions between children and mothers. Further, scripting, training, and doing simulations in a laboratory all add to the artificiality in these interactions, thereby jeopardizing generalizability.

Finally, more research on empathy development in children older than three years of age is needed in more diverse samples. Research developing and implementing the ECS have used fairly
homogenous samples (approximately 90% Caucasian) of children under four, despite being easily adaptable for older children. A more realistic coding system should investigate a larger range of developmental ability with more diverse samples. Such a system is necessary to study developmental processes that influence empathic responding and social behavior as children experience increased numbers and different types of social contexts and socialization influences.

**Empathy Continuum (EC; Strayer, 1993).** The Empathy Continuum (EC) was developed, and is more appropriate, for the assessment of empathy post-ToM development (i.e., post 4-years-old). Strayer (1993) indicates that the intention was to develop a system to assess children who are capable of verbalizing their experiences through interview. Additionally, she wanted to capture both cognitive and affective components of empathy through observation of emotional responses and inquiry about cognitive attributions for those responses over a significant amount of developmental time. Strayer (1993) conducted two studies simultaneously with samples of children separated into three groups: 5 year-olds, 7-8 year-olds, and 13 year-olds. These children were observed while they watched emotionally evocative vignettes meant to elicit empathic responses. Two sets of six vignettes were chosen from 15 research-panel-selected vignettes that were piloted with 5-14 year-olds and adults.

Strayer’s EC involves the administration of a structured interview after children observe the vignettes which inquire about their cognitive attributions for emotions displayed in the scenarios and self-other feelings while watching. Essentially, children are asked what happened, how they felt, why they felt that way, how the person in the vignette felt, and why. Scoring for these questions is on a 4-point scale assessing degree of “affect match” with the stimulus person’s emotion, as well as a 7-point cognitive level scale assessing absence and presence of affect match (0-1) along with the complexity and accuracy of attributions (2-7, with 7 indicating explicit role-taking; Strayer, 1993). EC scores were
calculated by matching the Cognitive Level (0-7) and Affect Match (0-4). As expected, concordant emotional responses and number and type of cognitive attributions increased with age (Strayer, 1993).

Further, the use of Cognitive Levels confirmed that developmentally, children were in fact operating within the same or adjacent cognitive levels of attributions for emotions (Strayer, 1993). Hypothesized shifts with age were confirmed: external event focus attributions at level 3, to person-in-event focus at level 4, to greater emphasis on the person’s experience as associated with one’s own experience at level 5, then attention to others’ emotions and internal states at level 6, and finally role-taking ability at level 7. A substantial number of 5-year-olds were at level four, but nearly all attributions at age 13 years were at level 4 or higher. The study also confirmed their hypothesis that emotional arousal intensity made a difference. Although the stimulus person’s emotional intensity correlated with children’s emotional intensity and affect match, empathy was lower when the intensity of the child’s emotional response was significantly higher than the stimulus person in the vignette. A more extensive explanation of the EC scoring system, as well as example verbalizations for each cognitive level are in the EC manual, and displayed/reviewed succinctly in several papers (e.g., Robinson et al., 2007; Strayer, 1993).

The EC is a valuable tool offering a developmentally appropriate assessment of empathic ability in children older than four. Further, the EC has been validated by a number of empathy questionnaires with healthy and disruptive behavior disordered populations. For example, Cohen (1992) has shown that children with Conduct Disorder (CD) have significantly lower EC scores than average children. EC scores are also validated with other frequently used empathy questionnaires such as the Interpersonal Reactivity Index (IRI; Davis, 1983), Bryant Empathy Index (BEI; Bryant, 1982), as well as physical measures (e.g., facial expressions) of emotional convergence (Strayer & Roberts, 1997), antisocial attitudes and aggression (e.g., Jessness Inventory; Jessness, 1969) (Robinson, Roberts, Strayer, &
Koopman, 2007). Additionally, children were asked to use The Emotional Response Questionnaire (ERQ; Toi & Batson, 1982) in several studies in order to get a sympathy intensity and negative emotion report right after each vignette (e.g., Robinson et al., 2007).

Finally, the EC methods and scoring have been used with healthy children (Strayer, 1993; Strayer & Roberts, 1997), angry and aggressive 5-year-olds (Strayer & Roberts, 2004), and delinquent adolescents (Robinson et al., 2007) to investigate both the affective and cognitive development of empathy. Two coders have typically been used to independently score affect match and cognitive level for approximately one-third of the data with inter-rater reliabilities of .86 to 1.00 (e.g., Strayer, 1993).

**Limitations of the EC.** Despite the usefulness and intelligent design of the EC, it has several limitations similar to those of the ECS. One such limitation is that the methods for assessment are done in a laboratory setting and mostly retrospectively, making it difficult to control for impression management and other biasing factors. Moreover, watching vignettes is artificial and context-limited in comparison to real-time personal interactions. The EC, due to its reliance on an interview format, may be most appropriate for assessing ability and developmental phases as opposed to ongoing developmental processes. Interviews and observation can only capture a narrow view of the factors influencing empathic ability and its expression.

The EC is also limited in its lack of focus on socialization and parenting behavior. Parenting and socialization play a major role in how empathy is expressed in earlier years (e.g., Leclere et al., 2014; Martin & Olson, 2013; Ornaghi et al., 2014). Perhaps 5-year olds are capable of cognitive levels higher than 4 (as indicated by ECS research), but contextual elements are prohibiting the natural expression of this level of understanding. Reflexive in-the-moment social reactions with others may be more informative regarding how empathic processes unfold, compared to observing videos and structured interviews. Asking a mother to watch and rate videos alone in a lab may not be the optimal means for
assessing a construct that is rooted in social connection. Nonetheless, both the ECS and the EC are solid conceptual foundations for the coding system being proposed.

**Overview of Empathy in Parent-Child Interactions Assessment System (iEPIC)**

The above review of extant observational assessment systems for empathy in children suggests that a naturalistic observational methodology, with a relatively long assessment time frame may be particularly informative for understanding how parent-child interactions shape the growth of this important developmental construct. Considering this naturalistically depends on verbal exchanges, several key verbal behaviors were extrapolated as meaningful in fostering and expressing empathic ability in parents and young children.

The iEPIC Coding Manual was created with the following codes in order of complexity (see Appendix A; iEPIC Manual for further details). The first code is **Reflections (Child-R and Parent-R)**. This code is derived from Dyadic Parent-Child Interaction Coding System (Eyberg & Robinson, 2000). This is coded when the parent or child repeat one another immediately and conceptually reflects the aforementioned early stage of shared attention through verbal mimicry. There are no levels of complexity for this code. The individual that repeats the other (parent or child) gets the tally for the code.

The second code is **Exploring Emotion & States (Child-EES [C-EES] and Parent-EES [P-EES])**. This code has 3 levels of complexity that can be coded for. Conceptually, this is coded for *queries about emotions and states* occurring when verbal ability increases along with inquisitiveness at age two. An increase in level is based on how complex the attempt to understand an emotion or state is made (see Appendix A). Starting around age two, the child is able to confirm their hypotheses or ask directly about emotions and states for the first time through verbal means, and parents are similarly able to directly ask their children about these.
The third code is **Emotion State and Description (C-ESD and P-ESD)**. This code has 3 levels of complexity and each verbal ESD behavior is assigned a level based on the degree of understanding demonstrated regarding *one’s own* emotion or state. Labeling an emotion or state is the most basic, whereas attributing a state or an emotion to something (i.e., cause-effect relationships) would be coded as slightly more complex. Because this behavior is expected to begin occurring prior to age 4 (i.e., prior to ToM), it is expected that children will more likely be *self-orientated* when describing emotions or states. Therefore, only at the highest level would the child be expected to connect their emotion or state to another. Even then, the child’s statements are still expected to be expressing their *own reaction* as opposed to the others’ (e.g., mother’s) state or emotion (see Appendix A for more details).

The fourth code is **Empathic Understanding and Concern (C-EUC and P-EUC)**. This code has 4 levels of complexity. Levels are assigned based on the degree of *understanding of another’s emotional state and the expression of connection to that state* (e.g., acknowledging another’s state versus reflecting understanding and/or reaction to that person’s state). The highest level of complexity is expected to include altruistic responses indicating motivation or intention to help or alleviate the emotion/state of another. This level of this code therefore intends to reflect the increase in helping and sharing behaviors after four years of age due to empathy-induced altruism (de Waal, 2008, Eisenberg, 2000; Lamm, Batson, & Decety, 2007).

The final code is simply **Neutral Talk (C-NT or P-NT)** code. This is frequency count for all other non-iEPIC verbal statements by parent and child.

In summary, the specific aims of iEPIC coding system development are to: (1) develop a verbal behavior coding system that can reliably assess naturally occurring empathic parental and child verbal behavior, (2) identify and measure the use of these behaviors to examine whether parent use of these behaviors is positively associated with child empathic verbal behavior in a sample of young mothers.
(i.e., early adulthood) and children, (3) examine whether the use of these empathic behaviors is associated with less externalizing and antisocial behavior in children, (4) explore the influence of age as well as parenting and child behaviors (i.e., Engagement, Affect, Child Disruptive Behaviors) on the frequency and complexity of the observationally assessed empathy behaviors, and (5) explore the potential influences of gender and ethnicity. The specific hypotheses follow.
CHAPTER FIVE: GAPS IN CURRENT RESEARCH AND IEPIC HYPOTHESES

The above review illustrates that EAR technology appears to be a strong choice for the collection and coding of natural verbal exchanges in mother-child dyads. However, there is currently no observational assessment system available for empathic verbal behavior in young children and their parents, particularly one that accounts for the significant developmental progression of children from two to six years old. As reviewed, substantial evidence suggests that two years of age is ideal for beginning study of the developmental processes of empathy, due specifically to increased verbal ability (e.g., Denham, 1986; Emde et al., 1992; Knafo et al., 2008; Young, Fox & Zahn-Waxler, 1999; Zahn-Waxler et al., 2008). The assessment of natural parent-child interactions in the home may provide an externally valid glimpse into how the parental frequency and complexity of empathic verbal behavior may foster greater empathic verbal and social behavior in children.

Therefore, based on the empirical and methodological evidence reviewed, we propose a study to develop an observational empathy assessment system for use with acoustic data. This system is to be based on previously validated empathy coding systems (ECS and EC), which have been adapted and successfully utilized to assess child behavior in present day empathy development research (e.g., Roth-Hanania, Davidov & Zahn-Waxler, 2011).

The above research however suggests a paucity of empathy research and lack of appropriate measurement of the developmental processes of empathy in children during their early years of social-cognitive growth. Many reports on the development of empathy and empathy disorders, such as “psychopathy”, focus on the adolescent years, are limited by cross sectional designs, or cover narrow age ranges. Further, empathy research with young children has been limited by small, unrepresentative samples, absence of parent behavioral assessment, and inadequately validated measures. A critical gap in the literature is that existing observational empathy assessment systems have been studied almost
exclusively with Caucasian populations. In view of the growing proportion of ethnic minority families in the U.S. (U.S. Census, 2010), instruments validated with ethnic minority samples is a priority.

In regards to methodology, current studies demonstrate an over-reliance on indirect methods such as facial emotion recognition or physical modeling for training empathy (e.g., Golan & Baron-Cohen, 2006; Shrandt, Townsend, Poulson, 2014), rather than examining the influence of overt verbal behavior and parent teaching on the development of empathy. In line with this, observational assessment studies of empathy development have been limited by their almost exclusive utilization of highly structured laboratory tasks or simulations that place a significant burden on participants. To date, no naturalistic parent-child interactive studies have been conducted outside of a laboratory or without artificial laboratory-created tasks or probes. In contrast, the primary aim of the present study is to observe and assess empathy behaviors as they occur naturally in the interactions between children ages two to six years old and their mothers.

As discussed, parent behavior is a major factor in the development of empathy in their children, and thus measurement of empathy development should include parental behavior. However, few studies include parents. Parents of vulnerable children, such as those who experience interpersonal trauma and mental health problems, may have particular difficulty supporting appropriate development of empathy in their children (Brien, Margolin, John, & Krueger, 1991, Coyne, Low, Miller, Seifer, & Dickstein, 2007; Lotze, Ravindran, & Myers, 2010; Psychogiou et al., 2008). Therefore, research designed with consideration to measure the role of parents in the development of empathy in young children is warranted.

Conceptually, existing research often continues to focus on a single component of empathy or treat the emotional and cognitive components of empathy as separate in their studies, rather than examining empathy development as a systemic and multilevel construct. In contrast, the review of
Empathy development and literature provided herein supports the conceptualization of empathy proposed by the iEPIC as a “system” consisting of both emotional processes and understanding of another’s mental state (i.e., ToM), developing in parallel, and strengthening connections with one another over time (e.g., Decety & Jackson, 2004; Sebastian et al., 2012; Vollm et al., 2006). This interactive relationship between emotion and cognition also takes into account genetic research that has demonstrated the “inseparable” nature of the emotional and cognitive components of empathy (Knafo, et al., 2008). Therefore, the iEPIC stands to create a more realistic picture of the developmental processes involved in the maturation of empathy.

Current research also suggests that assessment of empathic behavior at different levels of complexity is warranted, for several reasons. First, younger children become increasingly other-directed after two years of age (e.g., Decety, 2010; Emde et al., 1992; Strayer, 1993; Waxler, 2002; Waxler et al., 1992; Young et al., 1999). Language development facilitates the development of emotional understanding after age two. Language provides labels to previously misunderstood reactions observed in others, such as self-distress when observing the distress of another (Kopp 1989). Second, the processes of thinking about emotions, recognizing them in one’s self, and then attributing them to others, requires increasing cognitive skill for children (e.g., Decety, 2010). Relatedly, understanding an emotion and the reasons for its occurrence requires the pairing of emotional stimuli and behavior or events repeatedly (Blair & Fowler, 2008). Researchers have found that accuracy in emotion recognition increases with age in children (Eisenberg, Murphy, & Shepard, 1997; Strayer, 1993). Direct sensory experiences of emotional behaviors and events of others also become increasingly linked with internal emotional states in the self (Baron-Cohen, Tager-Flusberg, & Lombardo, 2013; Bretherton & Beegley, 1982; Brooks & Meltzof, 2002; Brown & Dunn, 1991). The ability to further explore and understand cause-effect relationships in the emotional behavior of others may emerge later however.
All of these findings suggest that there is a gradual increase in the complexity of empathic processes children are capable of over time. The iEPIC intends to demonstrate this gradient of complexity within each coded behavior, such that children at different ages are expected capable of different levels of complexity of that behavior.

Connecting internal states to external events, beginning at around 3 to 4 years, is more requires more cognitive maturity than making efforts to connect external physical events or behaviors alone (Baron-Cohen, 2001). This process may be largely due to direct teaching and indirect modeling by adults (Baron-Cohen, 2001). As the PAM model indicates, mimicry is amongst the most primitive forms of empathy, involving the simple sharing of an emotional behavior and early mirror neuron activation (Preston & deWaal, 2002).

Accordingly, in order to assess for empathy development, a logical behavior to place at the origin for verbal children is the sharing of attention with another through verbal mimicry (e.g., iEPIC Reflection code). Following from the above conceptualization, thereafter one can expect a progression in ability from: (a) exploring causes/reasons of emotions and states (e.g., incessant “whys?” of two year olds), (b) the use of emotion words to label experiences in the self, and then others, (c) and finally the expression of empathic concern, indicating both a cognitive understanding and emotional experience congruent with others. The iEPIC takes on the aforementioned logical structure.

Studies have demonstrated that a clinically significant identifier of ADHD, ODD, Callous Unemotional traits (CU traits) and conduct disorder, is decreased empathy (Braaten & Rosen, 2000; Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012; Kaukiainen et al., 1999; Frick & White, 2008; Munoz & Frick, 2012). Therefore, the early assessment of empathy with a developmental multi-level system may prove useful in determining the degree of risk for clinically significant disruptive or antisocial behavior. Research has largely focused on maternal responsiveness, engagement, or maternal
affect as factors, which predict negative outcomes in children’s prosocial and empathic behavior (e.g., Coyne et al., 2007; Fonagy, Redfern, & Charman, 1997; Jones, Fields, & Davalos, 2000). However, some have also indicated child variables that may contribute to poor relationship functioning, and in turn, hinder their own empathy development.

For example, Moreno, Klute, and Robinson (2008) demonstrated that children’s engagement and prosocial behavior toward their mother, as well as their mother’s emotional availability, were both significant in predicting subsequent child empathy (Moreno, et al., 2008). The researchers emphasized that certain child internal resources significantly influenced interactions that assisted in their own empathy development. The child variables examined were: social engagement (responsiveness to mother during play), cognitive, and language skills (as measured on standardized tests of mental and language development) at two years of age. Results demonstrated children’s social and cognitive resources mediated the relationship between maternal emotional availability and their child’s empathy development.

Additionally, researchers have found that children’s degree of inhibitory control and executive functioning, as well as positive temperament and prosocial behavior are associated with children’s empathy development (Maibom, 2012; Nichols, Svetlova, & Brownell, 2009). Studies find that these abilities facilitate warmth and responsiveness in the parent-child relationship (Miller & Jansen op de Haar, 1997; Valiente et al., 2004; Van der Mark et al., 2002). This research, in conjunction with studies finding elevated CU traits in conduct disordered children, suggests that child antisocial behavior and a lack of behavioral control may damage parent-child relationship functioning, thereby decreasing the likelihood of parental empathic behavior being transmitted to their children. Alternatively, some of these children may naturally have trouble inhibiting self-serving responses. This would put them at a
disadvantage regarding their ability to function in the reciprocal/prosocial fashion that would enable an empathic relationship to develop with caregivers.

Similarly, research on maternal depression suggests that negative mood may lead to reduced maternal engagement and greater hostility towards children, as well as reduced child engagement and negative child affect during mother-child interactions (Coyne et al., 2007; Weissman et al., 2006). These findings suggest that affect and engagement by both mother and child may have significant moderating influence on the links between mother and child empathic behavior. This study incorporates and further investigates the aforementioned findings by examining moderation effects of child disruptive behavior and parent affect and engagement,

Research on empathy development has also evidenced gender differences. The expression of emotions has been found to be more frequent in girls than boys, and is thought to be the product of early gender socialization (Auyeung, Wheelwright, Allison, Atkinson, Samarawickrema, & Baron-Cohen, 2009; Brody, 1985; Edelbrock & Achenbach, 1980; Maccoby, 1980). On the other hand, reviews of empirical studies have suggested that sex differences may be a function of the methods used to assess empathy in children (Eisenberg & Lennon, 1983). Although girls tend to score higher on measures of overall verbal and facial empathy (Strayer and Roberts, 1997), studies using other methodologies yield no such differences (Strayer, 1993).

Studies have also highlighted that gender differences may interact with age, in that girls may show some empathic behaviors earlier than boys, but these gender differences are no longer evident at later time points (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Others have argued that family environment and temperament may be more important than gender, in that these differentially affect boys versus girls, and lead to different expressions of emotions and empathic behaviors (Robinson & Zahn-Waxler, 1994). However, due to the robust findings supporting the early socialization of greater
emotional expressivity in girls versus boys (Auyeung, et al., 2009; Strayer & Roberts, 1997), it is reasonable to hypothesize that child gender may influence children’s verbal expression of empathic behaviors and their parents’ reinforcement of empathy. The iEPIC project will analyze gender differences overall and by age in order to further explore potential important differences in children in expression of empathic behaviors.

Finally, the possible influence of ethnicity on the relationship between parent and child empathic behavior given the homogeneity in samples used to develop existent observational assessment systems of empathy. Based on the above review of the research and literature on the social and neurobiological development of empathy, PAM model of empathy, existent empathy coding systems, and with consideration of the current gaps in the research, the Empathy in Parent-Child Interactions (iEPIC) observational assessment system was born. The following hypotheses for the iEPIC were investigated in this study.

**iEPIC Hypotheses:**

(1) The iEAR-EPIC, will reliably assess parenting and child empathic verbal behavior, as evidenced by inter-rater reliability assessment via intra-class correlation coefficients of .70 and above for each of the 10 parent and 10 child iEPIC codes. The average ICC for each coder pair across all codes is expected to be .70 and above.

(2) The iEAR-EPIC is expected to generate six factors in an exploratory factor analysis. The Reflections code is not included in the factor analysis because it has only one variable and is a factor in and of itself. It is expected that for each hypothesized iEPIC factor, Exploring Emption and State (EES), Emotion and State Description (ESD), and Empathic Understanding and Concern (EUC) will load onto the 3 variables/”levels” (or 4 for the EUC) expected for each. For example, the expected Parent EES variables (i.e., “levels;” EES1, EES2, or EES3) will all load onto one factor, “Parent-EES.” Because this is a
preliminary psychometric study, without prior verbal assessments of empathy, the loadings are expected to have coefficients of .40 and above, which is usual value considered for practical significance.

(3) Due to the developmental nature of the observational assessment system proposed here, we expect all iEAR-EPIC codes, particularly more complex behaviors (i.e., level “3” and higher) to be greater in number in children older than 4 (post-Theory of Mind development). Specifically, we expect that child EUC code will be observed only in children aged at least four years (post-Theory of Mind development).

(4) Behavioral coding of “Child Disruptive Behavior” (a sum of Backtalk, and Cry/Whine/Yell coded for previously), as well as the Eyberg Child Behavior Inventory (well-validated measure of child disruptive behavior) total scores, will be significantly negatively correlated with frequency of all iEAR-EPIC parent and child behaviors via partial correlations when controlling for socioeconomic status and gender.

(5) Parent iEPIC behavior use will be positively associated with child use of iEPIC behaviors.

(6) Parental Engagement and Positive Affect will moderate the influence of parental empathy behaviors (parent iEPIC scores) on child empathy behaviors (child iEPIC scores). Further, Child Disruptive Behavior (CDB) as measured by a sum of the iPARENT codes, Child Backtalk and Child Cry/Whine/Yell, will decrease the influence of parental empathy behaviors on child empathy behaviors, above and beyond the influence of Parent Engagement and Positive Affect.

(7) Due to inconsistency and paucity in findings regarding the influence of gender and ethnicity on the development of empathy, these influences will also be explored.
CHAPTER SIX: METHODS

Participants

For this study, a subsample of 84 mothers and their 2 to 6 year-old children were examined from an original total sample of 103 mothers that were recruited from a large urban public university undergraduate student population. This subsample was determined by a) excluding a small number of dyads from the original sample with missing data files and b) exclusion of dyads that did not meet a strict criteria of 2 years and older for age of children. The importance of the developmental period, particularly in regards to verbal ability, for this study (as children are coded as often as parents) precluded the use of any children under 2 years of age.

To obtain the total sample, the first phase of the project recruited 52 undergraduate mothers (Group I) to test the feasibility of the smartphone application version of the Electronically Activated Recorder (iEAR; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001), as well as a web-deployed self-report assessments battery. Group I participants were recruited during the spring and summer of 2012. The remaining participants of the total sample were 51 undergraduate mothers (Group II) recruited as part of a pilot study to examine the feasibility and effectiveness of an eight-week web-based parenting intervention. Group II mothers were recruited between the fall of 2012 and the summer of 2013. This sample of undergraduate mothers is highly diverse, of lower socio-economic status, and urban. The sample was comprised of 97.6% ethnic minorities. The mean age of mothers was 24.3 (SD = 2.9, range = 19-38). Sixty-one (61%) of the mothers reported being at least part-time employed and 39% were unemployed currently.

For both phases of the research project, mothers from the John Jay College Children’s Center (JJCCC) received information on the study via a letter sent home with their child and by internal emails distributed by the Children’s Center Staff. Mothers from the entire John Jay College undergraduate
student population were also invited to participate. These mothers were informed of the study through the following means: (1) a campus wide email; (2) flyers posted on campus billboards, administrative offices (i.e., Office of Student Affairs, Academic Advising, Registrar, etc.), and college centers (i.e., Women’s Center, Counseling Center, etc.); and (3) in-person recruitment at locations throughout the college by trained undergraduate and graduate lab members.

To be eligible, mothers had to: (1) be currently enrolled as an undergraduate student at John Jay College; (2) have been 24-years-old or younger at the time of their first child’s birth; (3) have had a child between age two and six years at the time of the study; and (4) lived with their child at least 50% of the time. An additional eligibility requirement was stipulated for mothers in Group II (parenting intervention). Only mothers receiving a total stress score of 70 or above on a measure of parenting stress, the Parenting Stress Index-Short Form (PSI-SF; Abidin, 1986), were invited to participate in the second part of the study. The rationale for selection was that the intervention was expected to be most beneficial and sufficiently motivating for mothers experiencing above average levels of parenting stress. Of note, these criteria were created for the intervention study, which used the same participants as the present study.

Materials and Procedures

Observational data collection: The Electronically Activated Recorder (EAR). In order to collect verbal data to develop and investigate the iEPIC, the electronically activated recorder (EAR) was used. The EAR is a platform designed for acoustic behavioral data in naturalistic settings (Mehl & Pennebaker, 2003). The EAR can be programmed to record periods of sound at a variety of intervals up to four days (Mehl, 2006). The EAR can therefore obtain naturalistic acoustic accounts of a participant’s daily life. Acoustic sampling of brief periods of sound (instead of a continuous recording) makes the EAR ideal for naturalistic observational studies (Mehl, Vazire, Ramirez-Esparza, Slatcher &
Pennebaker, 2007). Participants are instructed to wear the device by attaching it to their belt or pants, or putting it in a bag they regularly carry throughout their daily routine (Mehl & Holleran, 2007). Psychometric findings have shown that the EAR accurately and reliably reflects individuals’ natural social linguistic and psychological lives (Mehl, Pennebaker, Crow, Dabbs, & Price, 2001).

There have been several generations of the EAR device. Most recently, in 2005, a third software-based system was developed that now runs on commercial PDAs (i.e., iPod). There is a free EAR application for smartphones called the “iEAR,” which can be directly downloaded onto any iPod or iPhone. Participants are instructed to wear the lightweight portable recording device for a certain number of predetermined hours (Mehl, Gosling, & Pennebaker, 2006).

The iEAR has been extensively tested and several studies have demonstrated the reliability and efficiency of the EAR for observational studies. For example, Mehl and Pennebaker (2003) conducted a study with 52 undergraduate students to test the degree of stability across time and situations in EAR data. Their objective was to track participants unobtrusively as they went about their social lives and determine the degree of stability across time and situations. Participants were tracked for two, two-day periods at the beginning and end of a four-week period. The EAR was programmed to record 30-second periods of ambient sounds every 12 minutes of the participants’ waking hours. Degree of cross-context consistency and between-speakers’ synchrony of language use was assessed. Results indicated that participants’ everyday language was highly consistent across time and context.

The implications of these findings were that observations conducted over shorter periods of time are likely to yield information that is representative of participants’ true behaviors. Additionally, participants reported that the EAR was not distracting and did not have a significant impact on their social behaviors. This further supports the relative unobtrusiveness of the EAR (e.g., in comparison to the presence of a research assistant). All participants reported a high degree of commitment to wearing
the EAR. Findings concluded that the EAR demonstrates good convergent validity with traditional methods used for studying naturalistic social life and offers unique potential in assessing subtle aspects of people’s social interactions.

In another study, Mehl and Pennebaker (2003) specifically investigated EAR obtrusiveness and compliance in participants’ daily lives. Analyses were based on two archival data sets collected between 2001 and 2002. Their aim was to examine how EAR obtrusiveness and compliance changed over the course of a short-term (48 hour) versus long-term (10–11 days) monitoring. Results showed that participants in the short-term group habituated quickly to wearing the EAR. They spent 8% of the first hour talking about the EAR, but this number dropped and remained below 2% for the remainder of short term monitoring. For participants in the longer-term group, the method was mentioned in about 5% of their daily interactions, but this also dropped below 2% during the second half of monitoring. The data revealed that immediately after receiving the EAR, participants went through a brief period of heightened self-awareness about the EAR in that conversations about the device were frequent. However, most participants habituated and rarely mentioned the EAR after two hours of wearing it. This habituation was found for both the short-term (48 hour) and the long-term (10–11-day) monitoring.

Language and ambient sounds obtained by the EAR can be transcribed and reliably coded using a variety of analyses (Mehl et al., 2001). One of these is the Linguistic Inquiry and Word Count (LIWC); a computer text analysis program that can calculate the percentage of words within each text sample and classify them along more than 70 linguistic dimensions (e.g., positive/negative emotion words, self-references, etc.) (Pennebaker, Francis, & Booth, 2001).

Other methods developed for naturalistic assessment of behavior are Ambulatory Assessment Methods (AAM). These instruct participants to answer items throughout the day, thereby addressing the methodological limitations of traditional self-report (Mehl & Holleran, 2007). Although AAMs can
assess a range of data in an individual’s daily interactions, they are still subject to desirability bias and other biases associated with self-report. Both retrospective and momentary self-reports are problematic due to subjective construal of recalled events and the ability to recall only what is in conscious awareness (Mehl, 2006). The EAR addresses these concerns through moment-to-moment objective recordings of participants’ verbal behavior and interactions (Mehl & Holleran, 2007). The EAR has been particularly useful for researchers in the field of communication and language. Recently, researchers are beginning to adapt the EAR for use in several research areas in psychology. Some of these are described below.

Mehl (2006) investigated laypersons’ ability to assess subclinical depression with data obtained from the EAR. Ninety-six undergraduate participants wore the EAR for two consecutive days and completed the Beck Depression Inventory. Another group of 18 research assistants served as judges of the first group’s levels of depression. Each of the first group participants was rated by an average of six research assistants. Research assistants listened to EAR recordings and rated the first group on several characteristics, including depression.

Results of this study indicated that laypersons were accurate at discriminating among moderately and severely depressed participants just by listening to their EAR acoustic data. Participants reported using cues present at high levels of subclinical depression (time alone, not socializing, not laughing, and use of anger words) to inform their assessments. If laypersons could make such distinctions with the EAR recordings, the EAR has clear utility for researchers and clinicians in examining not only the subtle aspects of depression, but also other psychological constructs and problem behaviors across disorders and individuals.

Relevant to the proposed study, the recent development of the EAR for use with iPhones, the iEAR, has provided a reliable and fairly unobtrusive opportunity for obtaining naturalistic observations.
of parent and child behaviors. In fact, in a study of parents and their preschool-aged children, the iEAR was utilized to obtain data that was later coded with a version of the Social Environment Coding of Sound Inventory (SECSI) adapted for problem child behaviors (Mehl & Pennebaker, 2003). Inter-coder reliabilities were found to be very good (ICC = .92) across behaviors (Slatcher & Trentacosta, 2011). This is the only parent and child study employing the EAR as a measure to date, and no published studies have used the EAR to assess parent and child verbal interactions, no less as they pertain to the social, emotional, and cognitive development of empathy.

For this study, the EAR presented an ideal opportunity for examining nuances of social and emotional development in the interactions between parent and their child. While some facets may not be possible to assess due to the acoustic nature of the data derived from the EAR, a reduction of obtrusiveness and opportunity to take the device home is expected to increase convenience for parents, thereby increasing the likelihood of research participation for difficult to reach and at-risk populations.

Developing assessment methods that facilitate participation of hard-to-reach and high-risk families is essential. This population is necessary to ensure external validity when investigating appropriate target factors for effective interventions. Therefore, iEAR technology also makes research methodologically more convenient for a target intervention population (i.e., one with higher prevalence of children’s externalizing behavior, neglect, and developmental concerns).

**Research project part I:** Group I participants \( n = 52 \) completed a single assessment which required a four-hour at-home audio recording, obtained by the electronically activated recorder (EAR) application developed for the ipod (iEAR). As previously described, the iEAR is designed for acoustic behavioral data in naturalistic settings (Mehl & Pennebaker, 2003). The iEAR application can be programmed to record periods of sound at a variety of intervals up to four days (Mehl, 2006). Participants were given carriers to attach this iPod, pre-programmed with the iEAR application, to their
belt or arm on a specific evening that they selected to reflect a typical routine for them. Further, they completed an online survey that assessed educational attainment and aspirations, self-reported parenting practices, parenting stress, child behavior problems, relationship quality, and maternal distress.

The iEAR application was pre-programmed by lab staff to record at a set time in the evening (usually starting at 5p.m.) for intervals of two-minutes of recording and 10 seconds with the recording off, for the duration of four hours. In previous studies conducted by the creator of the EAR technology, using the default setting of 30 seconds of recording every approximately 12 minutes, they obtained a mean of 102 and 113 recorded clips over two separate 2-day recording periods when participants were awake (Mehl & Pennebaker, 2003). This results in approximately 56 minutes of total recording for transcription. Additionally, Pennebaker, Mehl, & Niederhoffer (2003) cite that language monitoring studies have found good internal consistency in language in two-minute intervals (e.g., Gleser, Gottschalk, & John, 1959). We informed mothers that we would pre-program the recording for four hours of their “evening-bedtime routine” with their children and inquired about approximate hours this occurred accordingly. This was done to maximize potential for interaction between mother and child, as well as the likelihood for conflict and problem solving incidences that often occur with children during these transitional times of day.

In the present study, consistent with methodological approaches validated in previous research (Mehl & Pennebaker, 2003), it was impractical to transcribe all 111 clips recorded (222 minutes) in the four-hour period during which mothers wore the iEAR. Therefore, we matched the approach used in prior psychometric studies for the iEAR, sampling 25% of clips, using every 4th clip. This procedure yielded 28 2-minute recording clips per participant. This resulted in 56 minutes of total recording time for transcription and representative, linguistically stable sampling across the four-hour evening routine period. These clips are to be transcribed, and coded in the present study.
A chronological description of the procedure follows presently. First, mothers were scheduled for a consent and assent meeting to determine eligibility, obtain consent and assent, and the iEAR recording was scheduled to begin remotely at an agreed upon date and time. All iEARs were scheduled to record during dinnertime until the child’s bedtime (e.g., usually between 5 p.m. to 9 p.m.). iEAR recordings were programmed to record for an alternating two minutes on and 10 seconds off. At the time of the consent, research assistants provided each mother with the iEAR device and a link to the online measures they were to complete. Mothers were permitted to complete the survey in the lab, but most elected to complete the measures online at home. Prior to the scheduled recording, mothers received a reminder to wear the device. Mothers were encouraged to tell others present in the home during the recording about the presence and function of the device, for confidentiality purposes.

Each mother received a follow-up call from a research assistant at the end of the recording period, to obtain additional information from participants regarding the mother and child’s activities and the presence of any other individuals during the recording period. This was intended to corroborate identification of relationships of individuals in the home to the mother and child and other information in the iEAR file, to assist research assistants with identification of distinct speakers when transcribing and coding audio files. However, data of other speakers was not transcribed or coded. All mothers received $50 for their participation after completion of the iEAR recording and the online survey.

All mothers were randomly assigned an identifying number within the database (used to identify participants thereafter). The files containing the names of mothers and their identifying number was kept separate from the database, in locked filing cabinets, and was only available to members of the research team. Additionally, to ensure privacy and confidentiality, all participants were allowed 30 days to review and delete any audio samples obtained by the iEAR they did not feel comfortable sharing with the research team. The research team explicitly discussed this with participants during consent.
procedures to assure them that we did not want to have any recordings they did not want us to listen to. Therefore, the recorded iEAR files were not accessed by anyone on the research team for the first 30 days. Only two Group I participants elected to delete portions of their recordings; one participant deleted one two-minute audio sample and the other deleted two two-minute samples.

Data for three Group I participants were not usable. One recording was lost due to a research assistant error. A second recording was inaudible (participant wore the iEAR under her coat). The third unusable recording was blank and the participant did not wish to repeat the assessment. All other Group I iEAR recordings were transcribed. Transcriptions were then reviewed for errors by a second set of research assistants.

**Research project part II:** Group II participants \( n = 51 \) were randomly assigned to either an eight-week web-based parenting intervention or a waitlist control group (Triple P Online). Triple P emphasizes positive parenting techniques, and enhances parents’ knowledge, skills, and confidence (Sanders, 1999). Triple P has also been shown to be effective for reducing child conduct problems by numerous randomized controlled treatment (RCT) studies (Sanders, Markie-Dadds, Tully, & Bor, 2000; Bor, Sanders, & Markie-Dadds, 2002; Markie-Dadds & Sanders, 2006; Sanders, Bor, & Morawska, 2007; Sanders, Markie-Dadds, Tully, & Bor, 2000).

Both intervention and wait-list groups completed three assessments: a baseline, post-test, and eight-week follow-up consisting of the same four-hour home iEAR recording, and the same online survey as Group I. Consent and iEAR procedures for Group II were identical to the procedures used for Group I. Group II mothers picked up and dropped off the iEAR an additional two times to complete all three assessments (at baseline, 8 weeks and 16 weeks). Mothers were compensated $50 for each assessment after completion of the iEAR recording and web-deployed survey; Group II mothers received a total of a total of $150. Research assistants traveled to homes of mothers who were unable to
travel to campus to either pick up or return the iEAR device. The present study includes only the baseline assessments for Group II mothers, so as to prevent potential intervention effects that could confound results.

All mothers ($N = 103$) completed their iEAR recordings. Each mother’s completed iEAR recording was systematically sampled for 25% of the entire recording (i.e. 28 samples per 4-hour recording). All iEAR files for Group I ($n = 52$), and Group II mothers ($n = 51$), have been transcribed and reviewed by a second, independent team of transcribers, and several parenting and child behaviors were coded for a previous study (i.e., parent affect and engagement and child disruptive behaviors; coded for the iPARENT coding system described below, see Alonso & Ehrensaft, 2014).

**Transcription Procedures.** Every fourth two-minute audio file has been transcribed for Group I and Group II mothers to ensure the content and coding unit that is to be coded is clear. This also allows coders to know the boundaries of the coding unit, to be consistently guided by the same structure (Margolin et al., 1998).

All transcriptions were conducted according to the protocol developed by the iEAR creators, as this is the protocol that has been used for iEAR transcriptions in all reviewed iEAR studies. According to this protocol, transcriptions will be verbatim with a few minor exceptions. Words in the iEAR transcript must be present in the Linguistic Inquiry Word Count (LIWC) data dictionary, which contains 2,300 words (Pennebaker & Francis, 1999). The LIWC is a computer text analysis program that calculates the percentage of words within text samples and classifies them along more than 70 linguistic dimensions (e.g., positive and negative emotion words, self-references, etc.). If a word is not in the dictionary, it was changed to a word that carries a similar meaning, if possible, and the change was noted in the appendix of the transcript (e.g., dada, daddy, and papa are changed to dad) (Pennebaker &
Francis, 1999). ‘Filler’ words (e.g., like, well, you know) and non-fluencies (e.g., uh, uh huh, um) are also noted in the transcript (Pennebaker & Francis, 1999).

The LIWC dictionary has been validated in psychometric studies, and used to assess naturalistic verbal behavior in a wide range of psychological studies, including health behavior (Mehl, Robbins & Deters, 2012), couples research, (Robbins, Focella, Kasle, Weihs, Lopez, & Mehl, 2011; Welker, Baker, Padilla, Holmes, Aron & Slatcher, in press), and family interactions (Tobin, Kane, Saleh, Narr-King, Poowuttikul, Secord, Periantoni, Simon & Slatcher, in press).

Margolin et al. (1998) recommends the review of transcriptions by a different research assistant than the one originally transcribing the data. This ensures quality transcriptions and helps determine which transcribers are careful, dependable, and attentive to detail for the purposes of choosing coders. In this study, the audio-recorded data has already been transcribed and reviewed by separate research assistants. Recorded files, or parts of files with non-English speaking are translated and transcribed by a fluent speaker of that language (e.g., Spanish, Urdu, Mandarin). More specific information on transcription procedures can be found in Appendix C.

**Coding Procedures.** Training of research assistants for coding included initial didactic training. The doctoral student supervised all coding procedures as the Master Coder (MC). Prior to beginning coding study assignments, practice and revision was conducted to help coders meet a predetermined level of competence (Margolin et al., 1998). This involved initial training on the codes, after which coders were asked to review the iEAR-EPIC coding system so that distinctions between codes could be made and ambiguities clarified. Coders were encouraged throughout to inquire about and point out any sources of confusion with the system. Based on this feedback, the iEAR-EPIC coding system and procedures were iteratively refined (Margolin et al., 1998). The final iEPIC system was created through this process and available for review in Appendix A. To ensure sufficient understanding of the coding
system, coders were then given three short practice assignments to code, with randomly chosen clips not included in the study. Inter-coder agreement was assessed across all coders along with the (MC for all iEAR codes. During this practice period, clarifications on the coding system were made based on the MC’s review of the coders’ practice assignment and coder feedback. Inter-coder agreement was at .80 and higher prior to coding actual files for the study.

The coding team overall consisted of eight graduate and undergraduate research assistants (four pairs), who were trained to code the audio samples using the proposed iEAR-EPIC coding system. Several of these coders were already trained to code for the iPARENT, a parenting and child behavioral coding system used in a separate study. The iPARENT also utilizes the iEAR recordings of naturalistic interactions between mother and child, and was built upon an existing well-established behavioral coding system for parent-child interactions, the Dyadic Parent Child Interaction Coding System (DPICS). For additional information on iPARENT or DPICS, beyond the scope of this proposal, please see Alonso and Ehrensaft (2014) or Eyberg & Robinson (2000) respectively.

Each of the 28 two-minute audio samples was coded for both the parent and child (on separate coding sheets) with an appropriate complexity score assigned for each occurrence of the empathy behaviors described below. The coders used the physical transcripts (already transcribed and reviewed files) to do the majority of the coding, but they were also provided with, and instructed to use, the iEAR audio files to follow along with the transcripts as they coded. Coders also had follow-up sheets for the participant (see page 5), which listed the identity of the individuals at home during the recording, as well as the activities of the mother and the child during the recording period. Coders were given a coding key for guidance during coding. Please see Appendix B for the iEPIC coding sheet.

After these practice assignments, accuracy and reliability of the coding system was assessed by “blind-pairing” coders to work on the same participant file assignments. Inter-rater reliabilities were
calculated with intraclass correlation coefficients. In order to track coder progress and provide feedback on any coding concerns, as well as identify potentially problematic codes, general problems with coding were discussed in weekly meetings. Additionally, the MC did several reliability checks to assess for problematic codes or overall coding problems (e.g., severe lack of agreement on particular codes).

Individual corrective feedback was given when necessary throughout the training process (Margolin et al., 1998), particularly if inquiries were made to the MC. However, each coder’s pair was never revealed to one another. The MC did not assess for coder agreement across all assignments until all assignments were completed.

**Measures**

The study involved 5 web-deployed self-assessment measures, collected with the REDCap electronic data capture. These measures were included to test hypotheses regarding validity, as well as those regarding age-based changes in children’s empathy behavior.

**Web-Deployed Assessments: REDCap.** Online self-report data was obtained using REDCap electronic data capture tools hosted at John Jay College. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources (Harris et al., 2009). The REDCap software is readily available at http://project-redcap.org, and is free of charge to institutional partners, but requires a valid end-user license agreement.

**Demographic Variables.** The following was asked of mothers: age, country of origin, time since migration to US, primary language spoken at home, number of children living at home, single parent status, living arrangements, receipt of welfare, family income, college status (full versus part time; year
in program), employment, receipt of financial aid, health conditions, age at birth of their eldest child,
and pregnancy and birth history. The following was asked about the child: age, sex, childcare
arrangements, and health conditions.

**Eyberg Child Behavior Index (ECBI).** The ECBI (Robinson, Eyberg, & Ross, 1980) is a
widely used parent rating scale measuring externalizing behaviors in children ages two to 16. The scale
consists of 36-items. Each item represents a separate disruptive behavior problem (e.g., refusing to obey,
stealing, fighting, etc.). Parents indicate on a 7-point scale the frequency of each behavior occurs and
whether they perceive that behavior as being problematic. This results in two summary scores: Intensity
Score (IS; frequency of occurrence) and Problem Score (PS; number of behaviors the parent endorses as
problematic). The ECBI scales have evidenced reliability coefficients that range from 0.86 (test-retest)
to 0.98 (internal consistency). This study examined the total frequency or IS total score to test for the
hypothesized inverse relationship between frequency of iEAR-EPIC behavior and ECBI IS scores.
Please see Appendix D for a copy of the ECBI measure.

**iEAR-iEPIC Adaptations to Other Assessment Systems.** The iEAR-EPIC is intended to be an
observational verbal coding system to naturalistically assess for parent behavior that has been
empirically demonstrated to foster empathy development in children, as well as child verbal behavior
found to indicate empathy development. Here, codes for less mature verbal empathy behavior, such as
exploring emotions and states, are placed earlier in the coding system. As discussed, using the Preston
and de Waal’s (2008) PAM model of empathy as a blueprint for a developmental empathy model, the
iEPIC assessment intends to reflect the capacity for increasingly complex empathic behavior. Likewise,
each behavioral code is also comprised of “complexity levels” from 0 (nonexistent) to 3 or 4 (for the
most complex behavior: EUC) to assess the range of complexity within each behavior.
The specific verbal behavior codes that comprise the iEPIC were also developed by adapting behavioral codes from the two aforementioned existent observational assessment systems, the Empathy Coding System, and the Empathy Continuum, as described previously in detail, and more briefly in the context of their adaptation to the iEPIC below.

(1) As explained, the *Empathy Coding System* (ECS; Robinson et al., 1994; Zahn-Waxler, Radke-Yarrow & Wagner, 1992) was initially developed to assess early (ages 13-24 months) indicators of empathy development (concern for and prosocial behavior directed at others), particularly during times of distress. The procedure for the ECS included assessment points chosen to reflect transition stages from children’s distress focused on one’s own state to empathic engagement with others (e.g., Hoffman, 1975). Several ECS codes that inspired iEPIC codes were ‘Hypothesis Testing’, ‘Empathic Concern’, ‘Self-Referential Behavior’, and ‘Maternal Behavior’ (see Table 1 below). The ECS behavior codes are on scales of variable ranges (e.g., mostly 0 to 3 and 1 to 4) in order to examine extent for which that behavior is exhibited or changes in complexity of “empathic” behaviors. For several codes, such as those adapted for the current system (mentioned above), the ECS’ numerical assignment signifies increases in cognitive and emotional understanding of one’s own, and eventually another person’s mental and emotional states. In doing so, these ECS codes examine ToM and emotional understanding together, which was an aim of the iEPIC study.

The ECS has one code that measures the extent to which the mother is engaged in the interactions. The iEPIC codes intend to expand on this in order to capture the empirically founded importance of parents, parenting and their socialization of their children in the development of empathy, by including child and parent coding for each of the behaviors.

(2) The *Empathy Continuum (EC)* is a well-validated empathy-probing lab task and structured interview (Strayer, 1993) for children four years of age and older, that also has influenced the
development of the iEPIC. The coding of ‘child emotion attribution’ and ‘emotional concordance’ in the EC serves as the conceptual foundation for coding cognitive in conjunction with affective understanding. For example, the EC scores the developmental complexity of empathy by “matching up” children’s cognitive understanding with their affective reaction to others. This “matching” is done in order to capture both the extent of development for the emotional and cognitive (ToM) component of empathy in conjunction. The score for each child response determines how much the child is feeling a sympathetic or similar emotional response to the other, and the degree of cognitive understanding they are able to express about the other’s mental and emotional state.

The developmental structure of the iEPIC, and complexity coding for each of the behaviors, similarly intends to capture the concurrent degree of affective and cognitive development respectively for each behavior. Further, in view of parents’ documented role in the development of child empathy (e.g., Farrant, Devine, Maybery, & Fletcher, 2012; Guajardo, et al., 2009; Moreno et. al., 2008; Symons & Clark, 2000; Vinik, Almas, & Grusec, 2011) the present iEPIC system simultaneously assesses for parents’ cognitive and emotional understanding. This is done to examine the associations among of the frequency and complexity levels of parent’ and children’s empathic verbal behavior. In contrast, the EC only includes an assessment of child cognitive and emotional complexity.

The following table summarizes the empirical sources/inspiration for iEPIC codes.

Table 1.

*iEAR-EPIC Codes: Theoretical Sources in Other Observational Systems*

<table>
<thead>
<tr>
<th>iEAR-EPIC Code</th>
<th>Source</th>
</tr>
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<tbody>
<tr>
<td>Reflection</td>
<td>• DPICS-R (Dyadic Parent Child Interaction Coding System Revised; Eyberg &amp; Robinson, 2000): “Reflection” code.</td>
</tr>
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</table>
Following are descriptions and the rationale behind each iEPIC code. To obtain specific examples of the individual codes, as well as more information on the levels of complexity, please see the iEPIC Manual in Appendix A.

**Rationale and Description for iEPIC Codes**

**DPICS Reflections (R).** The Reflections code that was used in the study is borrowed from the DPICS-R coding system (Eyberg & Robinson, 2000) and involves the direct reflection of what the other (child or parent) verbalizes. As explained in the introduction, mimicry is at the origin of empathic development as depicted in the PAM model. Activation of the mirror neuron system at 3-6 months of age has shown that, during interactions, even infants’ motor neuron correlates can “cause” the same correlates to be activated in another human and vice versa (Decety & Meyer, 2008). Therefore, mimicry
is one of the earliest behaviors allowing humans to share in another’s experience, both physically and mentally. Accordingly, verbal mimicry is the iEPIC’s most basic empathic behavior code.

Further, Reflections are indications of responsiveness through validation and acknowledgement of attention to what the child (or parent) is saying (Eyberg & Robinson, 2000). Reflections are used to help build warmth through shared experience and clear engagement with what the child is saying (Eyberg & Robinson, 2000). This code was assessed with a frequency count only, as the code simply records instances of verbal mimicking between parent and child. The early development of mimicry between parents and children has been described as a starting point for empathy development, as explained by de Waal’s (2008) PAM model.

**Exploring Emotion and State (Parent-EES and Child-EES).** This code is given when the mother or child is inquiring about emotions, emotion states, and mental states/intentions (e.g., feeling tired, feeling sick, understanding) with three levels of complexity that can be coded for. It is coded only when there is a question about emotions or states and their existence or cause are not confirmed. The main construct behind this score is that it pertains to behaviors that are not directly perceivable. The lowest level of this code is assigned when the child or parent is asking about what the other is feeling or what state the other(s) are in, or a brief “what hypothesis” about what the others’ emotion or mental state is (“You Scared?”). At the lowest level (1) a “what hypothesis” is an attempt at labeling an emotion or state rather than understanding why or how it occurs. This is likened to Hypothesis Testing in the Empathy Coding System such as: “Are you sad?” “Is he sad?” or “Are you sad/ok?” or asking “why” someone is sad (“Why is that boy sad?”). The developmental age associated with this code starts at about 2 years and older (e.g., Zahn-Waxler et al., 1992).

Complexity for this code is determined by the degree of exploration. Inquiries about how or why the other is feeling or experiencing the state they are in infers a greater degree of mental effort to
understand the emotion or state, and are therefore scored as a mid-level EES (2). Finally, *inquiry* about *how* or *why*, which *includes a hypothesis* regarding *why* or *how* the emotion or state is occurring obtains the highest-level EES score (3). This is because this type of inquiry demonstrates an attempt at confirming an already developed understanding of reasons for the emotion or mental state. The highest EES level (3) can also be assigned to verbal behavior that indicates an attempt to figure out the *cause* and *effect* or *reason* and *result* (e.g., “are you happy because you got a present?”). As long as it is an *inquiry*, it is functionally similar to a hypothesis. The essential differences between the levels can be determined by the following basic guideline:

The EES code, like the ECS’ Hypothesis Testing code, reflects children’s early efforts to identify emotions and figure out emotions by making initial connections to events or behaviors. In de Waal’s (2008) PAM model, this would be reflected as efforts to understand and attribute emotions to events, thus demonstrating emerging abilities to draw connections between emotional reactions and cognitive understanding of why an emotion occurs.

**Emotion and State Description (P-ESD and C-ESD).** Parents or children receive this code when they label, identify or explain emotions or mental states *of their own* with three levels of complexity that can be coded for. This is a self-focused code. Simpler scores are attributed to the use of general emotion words or labeling words. This code involves the parent or child expressing the label for an emotion or state to each other. Most importantly, this behavior is a declarative statement, which includes the use of emotion or mental state words in reference to the self only. The lowest level (1) would be coded for declarative statements expressing one’s own emotion or state such as: “I am happy!” The mid-level code (2) is assigned for simple *how* or *why* explanations of one’s own behavior(s). The highest complexity level (3) is assigned for more descriptive explanations of *how* or *why* these emotions or states came about. This level can also be given for describing *how or why others* have caused an
emotion or state in the self. For these codes, there is no question regarding the states and emotions in the verbalization, but they may frequently be coded following an EES. Therefore, these descriptions can be both in response to an inquiry or spontaneous in nature.

The ESD behavior code is based on the rationale that these types of behaviors reflect younger children’s early attempts to express their emotional states, but with limited understanding regarding these emotions and states in others. Statements coded as ESD are declarative statements. They are exclamations and simple attributions of one’s own emotion to others’ behavior or events at the more complex level. Based on the PAM model, and a neurodevelopmental point of view, this describes the more reflexively emotional-limbic system origin of empathy. As children become increasingly other-directed with age, their empathic ability would expand outside self-distress to greater acknowledgement of others and their distress (indicated by higher complexity level coding in the proposed iEPIC system).

Cognitive understanding of emotions is only minimally developed when, for example, emotional contagion (innermost “doll” of PAM; self-distress) is present, but there can be acknowledgement of an emotion in one’s self in reaction to another’s behavior or an event. This greater ability would reflect the highest level (3) of ESD in the iEPIC. A connection between the emotion and state of one person to another would be more complex and coded as EUC (below). This code also draws from the EC’s self-attributions and affect recognition coding, as well at the ECS’ Self-Referential code. These codes likewise make a distinction between recognition of affect in the self and attributing emotions in the self to others’ behaviors, in contrast to the eventual understanding of emotions and states in others as separate than one’s own.

**Empathic Understanding and Concern (EUC).** Four levels of complexity may be coded for this more complex ability. This is coded for verbalizations that express an understanding of another’s emotion or state and a response to that other’s emotion or state. The parent or child’s expression of
emotion and/or acknowledgement of the emotion in each other or another character are examples of lower level EUC behaviors. At the lowest level (1) of complexity the child or parent is simply describing the emotion state in another. At the second-level of complexity, the parent or child is explaining/expressing an understanding of the how or why the emotion came about in another (including each other). At the third level of complexity, there is an indication of one’s own emotional reaction to the emotion in another or a parent or child’s attempt to connect the other’s emotional state to another. At the highest level (4) of complexity, there is an additional expression of wanting to help or soothe the other (i.e., altruism) because of their emotional state or one’s own reaction to their emotional state. Therefore, verbalizations expressing shared-affect, as well as self-other differentiation involving emotion, are coded as higher level EUC.

This code is “other-oriented” in that there is greater Theory of Mind development displayed by the understanding that others have emotions and minds, and a cognitive understanding of events, behaviors, or emotions that may cause a reaction in another similar to the self. At the highest levels affect matching and expressions of sympathy occur, and/or attempts to soothe, calm, or help another are made. This level is congruent with the PAM model’s concept of true empathy. Because a EUC complexity level 4 requires sophisticated “reflective” thinking, it requires greater Theory of Mind ability, and is therefore not expected to be present in children under the age of four.

With age comes greater ToM and an understanding of one’s self that starts to extend to others. Neuro-developmentally, the blueprints for other’s emotions or states and the reasons for their emotions and states are created through our own experiences with these emotions and states. As the creators of the PAM model have explained, this development of empathy explains the stronger empathic responses or empathic accuracy that occurs when two people have experienced similar things or when a human has had more experiences to reference from (e.g., Preston & Hofelich, 2012).
These EUC levels demonstrated an increase in cognitive understanding of other’s emotions and states, and are importantly other-directed, reaching a level of empathy such that the other person’s emotional state spurs the urge to alleviate and/or sharing in this state. According to the PAM model, this code represents a transition between the middle “doll” of “sympathy” to the outer doll of “perspective-taking.”

As the PAM model also illustrates, when true empathy becomes possible, self-other distinctions begin to be defined and motoric behaviors indicate greater understanding and intentionality to help, or share with others (Preston, 2007; Preston and de Waal, 2002). Increasing self-other distinction is an important developmental stage in that being able to appropriately separate one’s own reaction from another’s makes helping behavior possible (Eisenberg, 2010; Preston and Hofelich, 2012). Without this distinction, self-distress in reaction to the other person’s state/emotion is too high to help. This has been found to occur in disorders such as autism. Therefore, lack of cognitive understanding of the emotions and state of others (ToM), labeled “mind-blindedness” by Baron-Cohen (1995), is an important factor to assess for.

The EUC also drew from the coding for attributions of emotions to self and other, as well as degree of self-other differentiation that is coded for in the ECS. The EUC code was also inspired by the similar, Empathic Concern coding in the ECS, for which the observer codes for the degree of self versus other directed emotional response as well as the intensity of the response. The ECS’ Empathic Concern is rated from 1 to 3, but is a global rating of intensity of concern for another. At the highest level of the ECS’ Empathic Concern, potential altruistic behavior that coincides with a strong affective reaction is suggested. This parallels the highest level of the EUC.

Additionally, the EUC code levels were inspired by the EC’s coding system, which involves an Affect and Cognitive “level-matching” system. Strayer’s (1993) EC is scored by matching the child’s
cognitive level of understanding for others’ emotions (higher scores indicating greater understanding of the reasons behind the emotions and events occurring), with the affect and how closely it matches the character’s (i.e., emotional accuracy).

**Neutral Verbalizations.** Neutral talk was coded for all verbalizations that were not an iEPIC behavior. One whole statement was counted as 1 Neutral Talk (NT). We created a 3 second interval between verbalizations to assist with counting separate verbalizations. This code was required to allow for the calculation of proportions of iEPIC codes out of all verbalizations during statistical analyses.

**Code Sources: From Other Assessments**

Following are descriptions of other assessments utilized in the present study. These codes were used in the present study for establishing construct validity and investigating the relationship between the iEPIC verbal behaviors and what are hypothesized to be important child and parent behaviors based on research relating these constructs to empathy development.

First, parenting and child verbal behavior codes from a recently developed parenting coding system for use with iEAR, the iPARENT (described above) were used. This coding system was adapted from an empirically well-established parenting and child behavior coding system. As explained, one code from the Dyadic Parent-Child Interaction Coding System-Revised (DPICS-R) that was not utilized in the iPARENT was used for the purposes of this study: “Reflections.”

**Dyadic Parent-Child Interaction Coding System-Revised.** The DPICS-R is a comprehensive coding system developed by Robinson and Eyberg (1981) (and DPRICS-Revised: Eyberg & Robinson, 2000) for the observational assessment of parents and young children with conduct problems. The parenting behavioral codes in the original DPICS were adapted from previous coding systems, and most of the child behaviors were based on the empirically–based literature (Robinson & Eyberg, 1981). The revised DPICS, the DPICS-II, is comprised of 28 parent and child behavior categories.
The DPICS is used clinically with parents and children in observed interactive sessions. Both child and parent are each instructed to lead five-minutes of laboratory play tasks and then eventually to collaborate on a tidy up task. The DPICS has demonstrated high levels of inter-observer reliability (over 90%) for both parent and child behaviors (Robinson & Eyberg, 1981). Both home and clinic observations of several randomized controlled trials, have demonstrated that the DPICS is sensitive to changes following parent training interventions and discriminates between normal and clinical populations (Bessmer, Brestan, & Eyberg, 2009; Webster-Stratton, 1990; Webster-Stratton & Lindsay, 1999). Additionally, the DPICS and DPICS II have been well validated against self-report measures of parenting behaviors and parenting stress (e.g., Bessmer, et al., 2009; Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993) and are reliably sensitive to change in intervention studies (e.g., Bessmer, et al., 2009; Eisenstadt, et al., 1993; Eyberg, et al., 2001).

The iEPIC code “Reflections” (described later) was inspired by the DPICS “Reflections” code. Additionally, the DPICS behavioral coding system informed the development of the iPARENT, a parent and child behavior coding system previously developed for use with the iEAR (Alonso & Ehrensaft, 2014). Behavior codes from the iPARENT (Alonso & Ehrensaft, 2014) were utilized in this study. Additionally, as an observational assessment of child disruptive behavior to supplement parent-reports on the ECBI, “Backtalk,” and “Cry, Whine, Yell” iPARENT codes were summed for a total score of “Child Disruptive Behavior” for the iEPIC study (see iPARENT manual for details in Appendix E).

iPARENT Codes

**Parent Engagement (PE).** This code is taken from the iPARENT Engagement code for parent or child. Higher levels of engagement and responsiveness have been prospectively associated with conscience development, including empathy, and other positive social and cognitive child outcomes (Kochanska, 2002; Landry Smith, Swank, Assel, & Vellet, 2001). Responsive parenting has evidenced a
role in the development of both the emotional and cognitive processes involved in empathy (Guajardo et al., 2009; Symons & Clark, 2000). Engagement is expected to moderate the association of parent empathy with child empathy.

(1) **Parent Engagement** is the degree of parent involvement with the child. This code assesses the amount (not quality) of overall parent-child interaction(s) and accounts for parental responsiveness to the child’s demands for attention. Negative, neutral, and positive involvement, all qualify as forms of Engagement. Low levels of this code would be indicative of a disengaged parent. A high score would suggest that a parent is not only available to the child but is also immersed in activity or conversation with the child and displays an interest in the child’s activities and/or verbalizations. Higher levels of responsiveness are associated with better social and cognitive child outcomes (Barnard, 1997; Landry Smith, Swank, Assel, & Vellet, 2001).

“**Child Disruptive Behavior:**” Sum of iParent Backtalk, and Cry/whine/yell codes. (1) 

*Backtalk* – impudent or disrespectful speech including arguing, refusing, counter commanding, criticizing, threatening, and swearing; (2) *Cry/Whine/Yell* are coded when the child cries, whines, or yells (negatively). As indicated in the hypotheses, we expected that there would be an inverse relationship between child’s disruptive behavior and iEPIC verbal behaviors.

**Parent Affect.** This code assesses for the emotional quality of the parent’s audible behaviors and is coded on the basis of tone of voice and/or inflections. The *Parent Positive Affect* code is meant to assess the parent’s display of warmth, interest, and pleasure in their child. The *Parent Negative Affect* code is meant to assess the parent’s displays of disapproval, irritability, and anger towards their child. Higher levels of irritability and anger are associated with harsher and more over reactive parenting practices (Shay & Knutson, 2008). Assessing parental affect is key to assist coders with discrimination among more ambiguous positive and negative statements (e.g., “You are *sooo* smart, aren’t you?”). It is
also expected that parent affect will moderate associations among parent and child iEPIC empathic verbal behavior (see Hypotheses for details). More details on the specific coding of the iPARENT codes can be found in the iPARENT coding manual (Alonso & Ehrensaft, 2014).

**Data Analytic Plan**

**Power Analysis.** Using G* Power version 3.1.9, a power analysis was performed to assess whether the sample size obtained was sufficient to detect large enough effects. The power analysis indicated that to detect moderate to large effects with 95% power, with alpha at .05, a total of 74 participants would be required. The present sample of 84 is sufficient to test for effects of up to eight variables in a linear regression.

**Preliminary Analyses.** Preliminary analyses examined the demographics of the sample and descriptive statistics for the audio recordings and iEPIC behavior codes. Each iEPIC behavior code frequency count in every case had to be made into a proportion out of all coded behaviors for that parent or child in order to control for variability in the amount of mother-child interactions across participants (i.e., some dyads speak much more than others).

**Hypothesis One.** Inter-rater reliability was assessed by computing a reliability coefficient with intra-class correlation coefficients for each pair of raters and on each code. Because the same two raters coded the same cases (i.e., dyads), two-way random absolute agreement intra-class correlation coefficients were computed, where the effects (i.e., error) of raters and ratees are both modeled. Both single measures and average measure values were examined to identify codes that were suboptimal (<.70). The average ICC for each pair of raters, ICCs for the means of each code for rater pairs, as well as the individual ICCs for each code across all cases for each rater pair were computed and reported.

**Hypothesis Two.** To perform an exploratory factor analysis, CEFA 3.04 (Comprehensive Exploratory Factor Analysis; Browne, Cudeck, Tateneni & Mels, 2010) was used. CEFA is a software
program that provides several fit indices for factor solutions, which are not available on SPSS. The program allows users to construct a target matrix for their hypothesized factors. CEFA computes a root mean square error of approximate statistic (RMSEA) in order to evaluate goodness of fit. RMSEA values less than .05 are considered a “good fit.” Whereas, .05-.08 values are considered “acceptable fit,” and values greater than .08 reflect poor fit (Browne & Cudek, 1993). CEFA initially performs an inter-correlation matrix, which was examined for significant correlations between all variables (i.e., iEPIC codes). Eigenvalues were also examined to evaluate variance accounted for by each factor. Eigenvalues greater than 1 indicate significant variance to constitute individual factors.

It was hypothesized that 6 factors, 3 for Parent codes, Exploring Emotion and State (EES), Emotion and State Descriptions (ESD), and Empathic Understanding and Concern (EUC), and 3 for Child (also EES, ESD, and EUC) would load onto the 20 variables (10 for Parent-EES 1-3, ESD 1-3, EUC 1-4, and the same 10 for Child). Specifically, the EES factor was expected to load onto the three EES variables (i.e., “levels” 1-3), the ESD factor was expected to load onto the three EES variables (i.e., “levels” 1-3), and the EUC factor was expected to load onto the four EUC variables (i.e., “levels” 1-4). The Reflections code was included because it is its own factor. CEFA enables users to create a target matrix to simulate the expected loadings. A target matrix was made according to hypotheses. Communalities, factor loadings, residuals, and standard errors were assessed to determine ill-fitting codes. Low factor loading variables (< .20), as well as variables that added no unique variance to the model were evaluated (communalities of > .75) for removal. Factor loading variables at .4 were examined to see whether they fall within the 95% confidence interval. The model was revised in several steps based on these aforementioned evaluations of fit.

**Hypothesis Three.** The expected association between age and increases in number of iEPIC behaviors, particularly, “higher complexity” iEPIC behaviors (i.e., more ratings of 3 level behavior and
above) was explored. Independent Samples T-tests were performed to compare mean frequencies of iEPIC behaviors in children 4 years and old and under four years of age. Particularly important was assessing whether Child EUC behaviors occurred solely in children older than 4 as expected.

**Hypothesis Four.** To examine whether the behavioral coding of “Child Disruptive Behavior” (CDB; Backtalk, and Cry/Whine/Yell codes drawn from the iPARENT), as well as the Eyberg Child Behavior Inventory (ECBI; a measure of child disruptive behavior) total scores (both Problem and Intensity total scores) are significantly negatively correlated to the frequency of all iEPIC parent and child behaviors, bivariate partial correlations controlling for socioeconomic status and age were conducted.

**Hypothesis Five.** To examine whether parent iEPIC behavior concurrently predicts children’s iEPIC behaviors, bivariate correlations were computed to see whether parent iEPIC behaviors were significantly positively correlated with child iEPIC behaviors, and then a linear regression analysis was conducted. Parent iEPIC Total behaviors as the independent variable and Child iEPIC Total behaviors as the dependent variable.

**Hypothesis Six.** Next, the influence of parental engagement and affect was assessed as moderators of the influence of parental empathy behaviors (Parent iEPIC behavior total) on the child iEPIC behavior total, regression analyses were performed by entering parent iEPIC behavior mean total, and then parent engagement and affect mean scores, with child iEPIC behavior mean total as the dependent variable.

To examine whether Child Disruptive Behavior (CDB), as measured by a sum of the iPARENT codes Child Backtalk and Child Cry/Whine/Yells, moderates the influence of parental empathy behaviors on child empathy behaviors, regression analyses were conducted in a similar fashion to the aforementioned analyses, but with CDB as a separate step after parent engagement and affect scores,
and again with each child iEPIC behavior as the dependent variable. Interaction terms of Parent iEPIC behavior with Parent Engagement, Affect, and CDB were created to assess for moderation.

**Hypothesis Seven.** Exploratory analyses were then done to see if there was a difference between male and female children on total number and individual iEPIC behaviors with independent samples T-tests. The potential differences on mean frequency of iEPIC behaviors for both parents and children between ethnicities was finally examined by conducting a between-groups ANOVA.
CHAPTER SEVEN: RESULTS

Sample Demographics

The sample for this study consisted of 84 mother and child dyads. Ages of mothers ranged from 19 to 38 years old, with a mean age of 24 years ($SD = 2.92$). Children’s ages at the time of study ranged from 2 to 6.5 years, with a mean age of 3.8 years ($SD = 1.39$). There were approximately 43% female children and 57% male children in the study. The mother’s mean age at the time of their study child’s birth was 20.59 ($SD = 2.57$). The majority of the sample self-identified as Latina (63%) and African American (23.2%), and 79% of the sample was born in the United States. All mothers were undergraduate students (81% enrolled full-time and 15.7% part-time), and 50% of mothers were in their senior year. The employment status of 30.5% mothers was full-time, and 30.5% are working part-time. Approximately 20% of mothers were receiving public assistance, approximately 84% were receiving financial aid, and the mean household income was $24,290. Finally, the majority of mothers reported being “in a steady relationship” (38%). See Table 2 for more demographic details.

Table 2.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s Current Age (years) a</td>
<td>24.34 ± 2.92</td>
</tr>
<tr>
<td>Mother’s Age at Child’s Birth</td>
<td>20.59 ± 2.57</td>
</tr>
<tr>
<td>Child’s Age</td>
<td>3.86 ± 1.39</td>
</tr>
<tr>
<td>Child Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>42.9%</td>
</tr>
<tr>
<td>Male</td>
<td>57.1%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>2.4%</td>
</tr>
<tr>
<td>Latino Non-White</td>
<td>39%</td>
</tr>
<tr>
<td>Latino White</td>
<td>24.4%</td>
</tr>
<tr>
<td>Black/African American</td>
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</tr>
<tr>
<td>Other/Mixed (2+)</td>
<td>6.1%</td>
</tr>
<tr>
<td>Preferred Not to Answer</td>
<td>4.9%</td>
</tr>
<tr>
<td>Student Status</td>
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</tr>
<tr>
<td>Full-Time</td>
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</tr>
<tr>
<td>Part-Time</td>
<td>15.7%</td>
</tr>
<tr>
<td>Preferred Not to Answer</td>
<td>3.6%</td>
</tr>
<tr>
<td>Year in College</td>
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</tr>
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</table>
iEPIC Summary Statistics

The sum of each iEPIC code frequency count was calculated across the 28, two-minute audio clips sampled (using the iEAR) from each dyad. Proportions were created to account for variability in mother-child interactions, such that the sum (i.e., frequency count) for each iEPIC behavior, across each 28-clip dyad data sample, for each coder, was divided by the total number of behaviors (including Neutral Talk) that coder coded for that dyad data sample for each of the parent and the child. For example, if Coder 1 coded 3 EES1s for the parent in the first dyad data sample, and coded a total of 35 verbal behaviors occurring across the 28 clips (including Neutral Talk), then the proportion for the parent’s EES1 count for this dyad data, would be 3/35 = .09.

Because proportions were low, and their range was low, logit transformations were calculated in order to make proportions continuous and stabilize the variance for the data. However, there were a number of 0 counts in the data and logit transformations are undefined for values of 0. A solution that has been recommended to eliminate 0s is to add small constant to all raw data points prior to analyses (McDowell and Cox, 2001). Thus, .1 was added to each raw frequency count prior to calculating the

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>2.5%</td>
</tr>
<tr>
<td>Sophomore</td>
<td>17.5%</td>
</tr>
<tr>
<td>Junior</td>
<td>30.0%</td>
</tr>
<tr>
<td>Senior</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationship Status</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not in a relationship</td>
<td>26.2%</td>
</tr>
<tr>
<td>Casual dating</td>
<td>6.0%</td>
</tr>
<tr>
<td>Steady relationship</td>
<td>38.1%</td>
</tr>
<tr>
<td>Engaged</td>
<td>9.5%</td>
</tr>
<tr>
<td>Married</td>
<td>17.9%</td>
</tr>
<tr>
<td>Prefer Not to Answer</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Note. a Mean ± standard deviation
proportions. As explained, the logit transformation was then done on each proportion. The resulting proportion values for each iEPIC behavior represented the data for each coder and for the means between coders for all analyses going forward. Both raw mean frequencies, mean proportions, range and standard deviations are reported in Table 3 for parent iEPIC codes and Table 3 for child iEPIC codes.

Table 3.
**Summary Statistics for Parent iEPIC Codes**

<table>
<thead>
<tr>
<th>Codea</th>
<th>Frequency</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)b</td>
<td>Range</td>
</tr>
<tr>
<td>Exploring Emotion and State-1 (EES-1)</td>
<td>6.14 (5.44)</td>
<td>26.50</td>
</tr>
<tr>
<td>EES-2</td>
<td>.73 (1.25)</td>
<td>5.50</td>
</tr>
<tr>
<td>EES-3</td>
<td>.09 (.27)</td>
<td>1.00</td>
</tr>
<tr>
<td>Emotion and State Description-1 (ESD-1)</td>
<td>3.58 (3.30)</td>
<td>17.00</td>
</tr>
<tr>
<td>ESD-2</td>
<td>.70 (1.16)</td>
<td>6.50</td>
</tr>
<tr>
<td>ESD-3</td>
<td>.65 (1.57)</td>
<td>10.00</td>
</tr>
<tr>
<td>Empathic Understanding and Concern-1 (EUC-1)</td>
<td>1.51 (2.10)</td>
<td>12.50</td>
</tr>
<tr>
<td>EUC-2</td>
<td>.23 (.50)</td>
<td>2.50</td>
</tr>
<tr>
<td>EUC-3</td>
<td>.08 (.26)</td>
<td>1.00</td>
</tr>
<tr>
<td>EUC-4</td>
<td>.03 (.16)</td>
<td>1.00</td>
</tr>
<tr>
<td>Reflection</td>
<td>4.34 (4.97)</td>
<td>23.00</td>
</tr>
<tr>
<td>Neutral Talk</td>
<td>152.94 (93.86)</td>
<td>389.50</td>
</tr>
</tbody>
</table>

Note. a All iEPIC codes are frequency counts; b Means for frequency counts; c for proportions, the frequency count for each parent iEPIC behavior were divided by total number of behaviors coded for each parent. EES = Exploring Emotion and State; ESD = Emotion and State Description; EUC = Empathic Understanding and Concern.
Table 4.
*Summary Statistics for Child iEPIC Codes*

<table>
<thead>
<tr>
<th>Codea</th>
<th>Frequency</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)b</td>
<td>Range</td>
</tr>
<tr>
<td>Exploring Emotion and State-1 (EES-1)</td>
<td>.94 (1.52)</td>
<td>8.50</td>
</tr>
<tr>
<td>EES-2</td>
<td>.10 (.40)</td>
<td>3.00</td>
</tr>
<tr>
<td>EES-3</td>
<td>.02 (.09)</td>
<td>.50</td>
</tr>
<tr>
<td>Emotion and State Description-1 (ESD-1)</td>
<td>6.08 (5.43)</td>
<td>27.00</td>
</tr>
<tr>
<td>ESD-2</td>
<td>.57 (1.01)</td>
<td>4.50</td>
</tr>
<tr>
<td>ESD-3</td>
<td>.16 (.41)</td>
<td>2.00</td>
</tr>
<tr>
<td>Empathic Understanding and Concern-1 (EUC-1)</td>
<td>.55 (.89)</td>
<td>5.00</td>
</tr>
<tr>
<td>EUC-2</td>
<td>.09 (.32)</td>
<td>2.00</td>
</tr>
<tr>
<td>EUC-3</td>
<td>.04 (.15)</td>
<td>1.00</td>
</tr>
<tr>
<td>EUC-4</td>
<td>.04 (.19)</td>
<td>1.00</td>
</tr>
<tr>
<td>Reflection</td>
<td>4.10 (4.58)</td>
<td>23.00</td>
</tr>
<tr>
<td>Neutral Talk</td>
<td>115.44 (71.55)</td>
<td>307.00</td>
</tr>
</tbody>
</table>

Note. a All iEPIC codes are frequency counts; b Means for frequency counts; c for proportions, the frequency count for each child iEPIC behavior were divided by total number of behaviors coded for each child.

As the means indicate, many of the iEPIC behaviors had low base-rates. On average, a majority of both mother (89%) and child (90%) verbalizations were classified as “Neutral Talk.” Additionally, it should be mentioned that, a mean of 7 and median of 6 clips per dyad had no interactions per dyad data sample. In fact, 11% of dyads spent 50% or more of the total recording time without interacting. In a previous study, the number of audio clips without interactions was significantly correlated with ECBI Problem (measure of child disruptive behavior) scores at or above the clinical range (Alonso & Ehrensaft, 2014).

Regarding the iEPIC behaviors, the most prevalent was parent Exploring Emotion and State-Level 1 (EES-1), which mothers engaged in, on average, 4% of the time. Whereas, children most engaged in Emotion and State Descriptions-Level 1 (ESD-1) 5% of the time. As the data suggest (see
Table 3 and Table 4), overall, emotions and mental states were discussed infrequently. The range for Parent iEPIC behaviors was largest, in descending order for EES1 (17%), Reflections (15%), ESD3 (9%), EUC1 (8%), and ESD1 (6%). For children, the range for the following iEPIC codes was greatest on average: ESD1 (20%), ESD (14%), and Reflection (13%).

As might be expected, Reflections (the simplest of the iEPIC codes), which represents the verbal mimicking of one another, was exhibited at roughly the same rate in mothers (3%) and children (3%). Levels 2-4 of the Empathic Understanding and Concern (EUC) code, hypothesized as most developmentally advanced, was rarely exhibited in both mothers and children. Other higher level codes also rarely occurred, such as EES2, EES3, ESD2 and ESD3 for both mothers and children. This indicates that simpler verbalizations about emotions and states such as labeling or questioning “what” they are occurred more often in these dyads on average. Please see Table 3 and Table 4 for more details.

Correlations between the iEPIC codes were next examined to further explore the relationships between these codes. This correlation matrix is exhibited in Table 5 (below). Many of the iEPIC codes were significantly positively correlated with one another, including parent and child codes. However, it was found that Parent EES1, Parent ESD1, Parent EUC1, Parent Reflection, Child ESD1, and Child Reflection were all least correlated with the other codes. For example, PEES1 was only significantly correlated with PEES2 ($r = .23, p < .05$). Parent ESD1 was significantly positively correlated with only PESD2 ($r = .311, p < .01$) and significantly negatively correlated with Child Reflection ($r = -.26, p < .05$). Parent EUC1 was not significantly correlated with any of the other iEPIC codes. Parent Reflection was significantly negatively correlated with Child ESD2 ($r =-.25, p < .05$) and also with Parent ESD2 ($r =-.22, p < .05$). However, it was significantly positively correlated with Child Reflections ($r = .50, p < .01$). The only other code Child Reflection was correlated with (significantly negatively) was Child ESD1 ($r = -.30, p < .01$).
The remainder of the iEPIC codes had several significantly positive correlations with other iEPIC codes. Some of the significant positive relationships were between Parent EES2 (PEES2) and PEES1 (above), PEES3 ($r = .25, p < .05$), Child EES2 (CEES2) ($r = .27, p < .05$), CESD2 ($r = .28, p < .05$), CEUC2 ($r = .26, p < .05$), and CEUC4 ($r = .31, p < .01$) (see Table 4 for more details). Parent EES3 (PEES3) was significantly positively correlated ($p < .01$), with most parent and child iEPIC codes (13 out of 20 of them), with the exception of PESD1, PEUC1, PReflection, CEES1, CESD1, CEUC1, and CReflection. Parent ESD2 (PESD2) was highly positively correlated with most of the iEPIC parent and child codes with the exception of the Child EUC Levels 1-4 and the Child Reflection codes, as well as PEUC1 and CESD1 (see Table 5). All of the child iEPIC codes were highly positively correlated with one another, particularly the EUC codes. Of note, Parent EUC 2-4 codes were highly positively correlated with Child EUC 2-4 codes as well. Parent ESD3 was significantly positively correlated with Child EUC 2 ($r = .22, p < .05$) and Child EUC3 ($r = .33, p < .01$), whereas Parent ESD1 and ESD2 were not. Otherwise, parent ESD2 and ESD3 are positively correlated with most of the child iEPIC codes (see Table 5 for more details), with the exception of all Level 1 child iEPIC and Reflection codes.

Reliability

**Hypothesis 1:** The observational coding system, iEAR-EPIC, was expected to reliably assess parenting and child empathic verbal behavior, as evidenced by an inter-rater reliability assessment using intra-class correlation computations for each rater pair for each code. The intra-class correlation coefficients will be .70 and above for each of the parent and child iEPIC codes. The average ICC for each coder pair across all codes was also expected to be .70 and above.

The iEPIC observational coding system was found to be a reliable measure of verbal empathy-related behavior in naturalistic mother-child interactions. All pairs with the exception of rater 3 and 4 had an ICC value of .70 and above. For rater 3 and 4, they achieved an ICC of .68. Rater 3 and 4
appeared to disagree most on Parent iEPIC codes, but were reliable with an ICC of .79 for child codes (see Table 5). On all codes, the following mean coefficients were computed for each pair: .78, .68, .76, and .89 with a median of .77 (see Table 6 for more details).

Table 6. Intraclass Correlation Coefficients of iEPIC Parent Codes by Rater Pairs

<table>
<thead>
<tr>
<th>Codes</th>
<th>Raters 1 &amp; 2</th>
<th>Raters 3 &amp; 4</th>
<th>Raters 5 &amp; 6</th>
<th>Raters 7 &amp; 8</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES1</td>
<td>.86</td>
<td>.78</td>
<td>.77</td>
<td>.93</td>
<td>.82</td>
</tr>
<tr>
<td>EES2</td>
<td>.68</td>
<td>.45</td>
<td>.61</td>
<td>.84</td>
<td>.65</td>
</tr>
<tr>
<td>EES3</td>
<td>.43</td>
<td>.58</td>
<td>.98</td>
<td>.99</td>
<td>.78</td>
</tr>
<tr>
<td>ESD1</td>
<td>.65</td>
<td>.27</td>
<td>.72</td>
<td>.91</td>
<td>.69</td>
</tr>
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<td>.49</td>
<td>.11</td>
<td>.93</td>
<td>.93</td>
<td>.71</td>
</tr>
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<td>.42</td>
<td>.58</td>
<td>.61</td>
<td>.79</td>
<td>.60</td>
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<tr>
<td>EUC1</td>
<td>.90</td>
<td>.71</td>
<td>.49</td>
<td>.89</td>
<td>.80</td>
</tr>
<tr>
<td>EUC2</td>
<td>.99</td>
<td>.80</td>
<td>.31</td>
<td>.98</td>
<td>.89</td>
</tr>
<tr>
<td>EUC3</td>
<td>.99</td>
<td>.58</td>
<td>.74</td>
<td>.99</td>
<td>.87</td>
</tr>
<tr>
<td>EUC4</td>
<td>.99</td>
<td>.72</td>
<td>.98</td>
<td>.82</td>
<td>.90</td>
</tr>
<tr>
<td>Reflection</td>
<td>.92</td>
<td>.60</td>
<td>.34</td>
<td>.76</td>
<td>.70</td>
</tr>
<tr>
<td>Neutral Talk</td>
<td>.85</td>
<td>.75</td>
<td>.64</td>
<td>.92</td>
<td>.80</td>
</tr>
</tbody>
</table>

EES= Exploring Emotion and State, 1=Level 1, 2= Level 2; 3= Level 3
ESD= Emotion and State Description; 1= Level 1; 2= Level 2; 3= Level 3;
EUC= Empathic Understanding and Concern; 1= Level 1; 2= Level 2; 3= Level 3; 4= Level 4

Intra-class correlation coefficients were also calculated to assess the mean reliability of raters for each code. Of the 24 codes (includes 10 Parent and 10 Child iEPIC-specific codes, as well as Parent and Child Reflection and Neutral Talk), 18 codes exhibited good agreement with a coefficient .70 and above (75%), 11 mean ICCs were over .80 (46%), and only 5 (21%) were under .70. Of those 5, no mean coefficient was below .60 (see Table 7 for more details).
Table 7.
Intraclass Correlation Coefficients of iEPIC Child Codes by Rater Pairs

<table>
<thead>
<tr>
<th>Codes</th>
<th>Raters 1 &amp; 2</th>
<th>Raters 3 &amp; 4</th>
<th>Raters 5 &amp; 6</th>
<th>Raters 7 &amp; 8</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES1</td>
<td>.47</td>
<td>.74</td>
<td>.28</td>
<td>.90</td>
<td>.61</td>
</tr>
<tr>
<td>EES2</td>
<td>.86</td>
<td>.99</td>
<td>.85</td>
<td>.99</td>
<td>.93</td>
</tr>
<tr>
<td>EES3</td>
<td>.87</td>
<td>.86</td>
<td>.98</td>
<td>.98</td>
<td>.93</td>
</tr>
<tr>
<td>ESD1</td>
<td>.84</td>
<td>.70</td>
<td>.91</td>
<td>.99</td>
<td>.88</td>
</tr>
<tr>
<td>ESD2</td>
<td>.66</td>
<td>.65</td>
<td>.98</td>
<td>.82</td>
<td>.74</td>
</tr>
<tr>
<td>ESD3</td>
<td>.84</td>
<td>.78</td>
<td>.90</td>
<td>.87</td>
<td>.86</td>
</tr>
<tr>
<td>EUC1</td>
<td>.67</td>
<td>.48</td>
<td>.87</td>
<td>.81</td>
<td>.74</td>
</tr>
<tr>
<td>EUC2</td>
<td>.82</td>
<td>.84</td>
<td>.96</td>
<td>.98</td>
<td>.90</td>
</tr>
<tr>
<td>EUC3</td>
<td>.98</td>
<td>.81</td>
<td>.91</td>
<td>.75</td>
<td>.86</td>
</tr>
<tr>
<td>EUC4</td>
<td>.97</td>
<td>.99</td>
<td>.98</td>
<td>.99</td>
<td>.99</td>
</tr>
<tr>
<td>Reflection</td>
<td>.86</td>
<td>.88</td>
<td>.62</td>
<td>.73</td>
<td>.80</td>
</tr>
<tr>
<td>Neutral Talk</td>
<td>.84</td>
<td>.78</td>
<td>.73</td>
<td>.95</td>
<td>.81</td>
</tr>
</tbody>
</table>

EES= Exploring Emotion and State, 1=Level 1, 2= Level 2; 3= Level 3
ESD= Emotion and State Description; 1= Level 1; 2= Level 2; 3= Level 3;
EUC= Empathic Understanding and Concern; 1= Level 1; 2= Level 2; 3= Level 3;
4= Level 4

Finally, Tables 8 and 9 show the intra-class correlation coefficients that were calculated for each pair, each code, for Parent and Child respectively. Most codes demonstrated good agreement between raters (ICC >.70). However, for Parent codes, EES2, EES3, ESD1, ESD2, and ESD3 had sub-par agreement between the first and second rater pairs. Raters 7 and 8 achieved good agreement across all codes. As suggested by previous analyses on mean ICCs for each rater pair, rater 3 and 4 had the least agreement and had the lowest ICC values for Parent ESD1 (.27) and ESD2 (.11) out of all codes. Raters 5 and 6 also obtained sub-par agreement for Parent Reflection and EUC2 with ICCs of .31 and .34 respectively.

The median coefficients for all parent iEPIC codes was above .70 with the exception of EES2 (.65), ESD1 (.69), and ESD3 (.60). These codes appeared to have garnered the least agreement across the parent iEPIC codes. However, because agreement was around .70 (.69 and above for 3 out of 5 pairs) and above .70 for most raters for ESD1 and ESD2 respectively, they were retained. Likewise, because
EUC2 and Reflection ICCs were above .70 for all rater pairs, with the exception of the third pair, they were also retained for further analyses. For more details, see Table 8.

Table 8.  
*Mean ICCs for Each iEPIC Code Across Raters*

<table>
<thead>
<tr>
<th>Parent Code</th>
<th>ICC M</th>
<th>Child Code</th>
<th>ICC M</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEES1</td>
<td>.84</td>
<td>CEES1</td>
<td>.60</td>
</tr>
<tr>
<td>PEES2</td>
<td>.65</td>
<td>CEES2</td>
<td>.92</td>
</tr>
<tr>
<td>PEES3</td>
<td>.75</td>
<td>CEES3</td>
<td>.92</td>
</tr>
<tr>
<td>PESD1</td>
<td>.64</td>
<td>CESD1</td>
<td>.86</td>
</tr>
<tr>
<td>PESD2</td>
<td>.62</td>
<td>CESD2</td>
<td>.78</td>
</tr>
<tr>
<td>PESD3</td>
<td>.60</td>
<td>CESD3</td>
<td>.85</td>
</tr>
<tr>
<td>PEUC1</td>
<td>.75</td>
<td>CEUC1</td>
<td>.71</td>
</tr>
<tr>
<td>PEUC2</td>
<td>.77</td>
<td>CEUC2</td>
<td>.90</td>
</tr>
<tr>
<td>PEUC3</td>
<td>.83</td>
<td>CEUC3</td>
<td>.86</td>
</tr>
<tr>
<td>PEUC4</td>
<td>.88</td>
<td>CEUC4</td>
<td>.98</td>
</tr>
<tr>
<td>P-Reflect</td>
<td>.66</td>
<td>C-Reflect</td>
<td>.77</td>
</tr>
<tr>
<td>P-NT</td>
<td>.79</td>
<td>C-NT</td>
<td>.83</td>
</tr>
</tbody>
</table>

P= Parent; C= Child;  
EES= Exploring Emotion and State, Level 1-3;  
ESD= Emotion and State Description, Level 1-3;  
EUC= Empathic Understanding and Concern, Level 1-4; P-Reflect= Parent Reflection;  
P-NT/C-NT= Parent/Child Neutral Talk

The intra-class correlation coefficients for the iEPIC child codes are shown by pair for each code in Table 8. Overall, intra-class correlation coefficients were larger for child iEPIC codes. The ESD2 and EUC1 code appear to have the most disagreement with two pairs of raters’ coefficients (1 & 2: .66 and .67 respectively, and 3 & 4, .65 and .48 respectively) below .70. However, in contrast to parent codes, only 3 codes have sub-par agreement in more than 1 pair of raters. These codes were, as mentioned, ESD2 and EUC1, as well as EES1, which had an ICC of .47 for the first rater pair (“1 & 2”) and .28 for the third rater pair (“5 & 6”). The lowest and only median value below .70 was calculated for EES1. The majority of child codes had ICC coefficients larger than .80 across rater pairs. For more specific details, please see Table 9. In summation, Hypothesis 1 was not fully supported because not all rater pairs, nor
all iEPIC codes, had an interrater reliability coefficient of .70 and higher. One rater pair did not (rater 3 & 4); they had fair agreement at .68. As indicated, a majority of codes did obtain .70.

Table 9.

<table>
<thead>
<tr>
<th>Raters</th>
<th>1 &amp; 2</th>
<th>3 &amp; 4</th>
<th>5 &amp; 6</th>
<th>7 &amp; 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Codes</td>
<td>.78</td>
<td>.68</td>
<td>.76</td>
<td>.89</td>
</tr>
<tr>
<td>Parent Codes</td>
<td>.76</td>
<td>.58</td>
<td>.71</td>
<td>.90</td>
</tr>
<tr>
<td>Child Codes</td>
<td>.81</td>
<td>.79</td>
<td>.83</td>
<td>.90</td>
</tr>
</tbody>
</table>

iEPIC Factor Structure

Hypothesis 2. The iEAR-EPIC, was expected to generate six factors in an exploratory factor analysis. It was expected that for each hypothesized iEPIC factor, Exploring Emotion and State (Parent and Child EES), Emotion and State Description (Parent and Child ESD), and Empathic Understanding and Concern (Parent and Child EUC) will have 3 variables (“levels”) for EES and ESD and 4 variables for EUC. Specifically, the hypothesized “Parent EES” and “Child EES” factors were expected to load onto the 3 EES variables (i.e., “levels;” EES1, EES2, or EES3) for parent and child respectively. Likewise, “Parent ESD” and “Child ESD” factors were expected to load onto the 3 variables (ESD1, ESD2, ESD3) for parent and child respectively. Finally, the “Parent EUC” and “Child EUC” factors were expected to load onto the 4 variables (EUC1, EUC2, EUC3, EUC4) for parent and child respectively. Because this is a preliminary psychometric study, and no verbal assessment of empathy currently exists, the loadings were expected to have coefficients of .40 and above. This value is typically considered a cut-off for practical significance.

First, as mentioned, the Reflections code was not included in the factor analysis because it consists of only one variable as it only codes for the verbal mimicking of the one another (parent or child). There are 10 variables for children and 10 variables for parents. The ratio for items to participants recommended by Gorsuch (1983) is 5 to 10 participants per item. Given the sample size for
each parent and child codes is 84, and each are coded for 10 variables, the ratio is at approximately 1:8 items to participants, which meets these guidelines.

Comprehensive Exploratory Factor Analysis 3.04 (Browne, Cudeck, Tateneni, & Mels, 2008) software program was used to create an oblique target matrix rotation to test the hypothesized factor structure. This matrix was initially constructed with all iEPIC codes: 10 variables for each parent and child (20 variables total) and 6 factors (3 for Parent and 3 for Child). However, the target was constructed such that the same codes for parent and child were left unspecified due to their hypothesized coding of the same behaviors (e.g., PEES1 and CEES1). The output was examined for communalities, residuals, standard errors, and factor loadings before and after the target rotation. Several variables (i.e., codes) were removed and the model modified accordingly. First, codes that did had low loadings on all factors or did not contribute any unique variance were removed, such as PEES1, CESD1, and CEUC1. Next, two variables that had high cross-loadings, and also did not contribute enough unique variance were removed, CEUC2, and CEES1. Upon examination of the eigenvalues and root mean square error of approximation statistics (RMSEAs) of each modified model, it was determined that a 5 factor solution (i.e., eigenvalues over 1) with 15 variables (i.e., with the five aforementioned variables removed) was the best fit. Due to the high positive correlations between parent and child variables, loadings with both parent and child variables on the same factor were expected (e.g., PEES2 and CEES2), particularly since they code theoretically for the same behaviors. The RMSEA of 0.00 for the final five-factor model indicated a “good” fit (Browne & Cudek, 1993; RMSEA < 0.05 indicate a “good fit”). Additionally, most factor loadings were above .50, which indicates better loadings than the .40 that was expected, and more reliable loadings for the sample size (see Table 10).
Table 10.  
*Factor Loadings and Factor Correlations for iEPIC Codes*

<table>
<thead>
<tr>
<th>Codes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>P^a^EE^b^S2</td>
<td></td>
<td>.42 (.15)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEES3</td>
<td>.79 (.11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESD1</td>
<td></td>
<td></td>
<td>.46 (.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESD2</td>
<td></td>
<td></td>
<td></td>
<td>.88 (.08)</td>
<td></td>
</tr>
<tr>
<td>PESD3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.72 (.10)</td>
</tr>
<tr>
<td>PEUC1</td>
<td>.53 (.15)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>PEUC2</td>
<td>.91 (.10)</td>
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<td></td>
</tr>
<tr>
<td>PEUC3</td>
<td>.70 (.11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEUC4</td>
<td>.69 (.10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C^c^EE^d^S2</td>
<td></td>
<td></td>
<td></td>
<td>.60 (.11)</td>
<td></td>
</tr>
<tr>
<td>CEES3</td>
<td>.66 (.06)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CESD2</td>
<td></td>
<td></td>
<td></td>
<td>.47 (.09)</td>
<td></td>
</tr>
<tr>
<td>CESD3</td>
<td>.50 (.09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEUC3</td>
<td>.58 (.06)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEUC4</td>
<td></td>
<td></td>
<td></td>
<td>.78 (.08)</td>
<td></td>
</tr>
</tbody>
</table>

| Factor 1 | 1          | 2          | 3          | 4          | 5          |
| Factor 2 | .48 (.13)  |            |            |            |            |
| Factor 3 | .67 (.09)  | .36 (.11)  |            |            |            |
| Factor 4 | .45 (.17)  | .12 (.11)  | .50 (.12)  |            |            |
| Factor 5 | .23 (.23)  | .27 (.12)  | .15 (.11)  | -.24 (.11) |            |

RMSEA = 0.00 (0.00; 0.05)

^a^P= Parent; ^b^Number indicates Level of Code; ^c^C= Child; EES= Exploring Emotion and State; 
ESD= Emotion and State Description; EUC= Empathic Understanding and Concern

Based on the factor loadings of this model, Factor 1 consists of PEU1, PEUC2, PEUC3, and PEUC4. Factor 2 consists of CEES3, CESD3, CEUC3. Factor 3 consists of PEES3 and PESD3. Factor 4 consists of PEES2, CEES2, and CEUC4. Finally, Factor 5 consists of PESD1, PESD2, CESD2. These results suggest that Factor 1 represents “Parent Empathic Understanding and Concern.” Factor 2 consists of all Level 3 child behaviors (CEES3, CESD3, CEUC3) and was labeled “Child Complex Explore, Describe, Empathic Concern.” Factor 3 consists of PEES3 and PESD3, and was labeled “Parent Complex Explore and Describe.” Factor 4 consists of PEES2, CEES2, and CEUC4 or “Parent and Child Explore and High Child Empathic Concern.” Finally, Factor 5 was “Parent and Child Describe”
consisting of lower level parent and child describe behaviors: PESD1, PESD2, and CESD2. See Table 10 for more details.

The factor correlation revealed that Factor 1 and 2 were correlated at a value of \( r = .48 \), Factor 1 and 3 were correlated at a value of \( r = .67 \). Factor 2 and 3 are correlated at a value of \( r = .36 \). Factor 1 and 4 are correlated at a value of .45, and the largest factor correlation is between Factor 3 and Factor 4 at .50. Factor 4 and Factor 5 have a negative correlation with a value of -.24. The standard errors are generally low for both loadings and factor correlations with a median and mean value of 0.11. For more details, please see Table 10. In summary, the factor structure of the iEPIC coding system was not as hypothesized. However, factor loadings in the 5 factor, 15 variable solution were above .40 as hypothesized.

**iEPIC and Age**

**Hypothesis 3.** The iEAR-EPIC codes, particularly more complex behaviors (i.e., level “3” and higher) were expected to be more frequent in children older than 4 (post-Theory of Mind development). Specifically, it was expected that the child EUC code would be observed only in children aged at least four years (post-Theory of Mind development).

Simple linear regressions were performed to predict the mean frequency of Level 3 and higher Child iEPIC behaviors (EES3, ESD3, and EUC3 and EUC4) based on age. No regressions were significant. An independent samples T-test was also conducted to compare means for EUC codes for children under and over four year of age. No significant differences were found between the means for all EUC (Levels 1-4) codes between children under and over 4 years of age. Finally, in order to assess differences between the mean occurrences of all codes under and over the age of 4, another independent samples T-test analysis was conducted. The analysis revealed that there was a significant difference between groups for Child ESD2 (\( t = 1.66, \text{df} = 72, p = .05 \)) and Child ESD total mean (ESD1, 2, and 3)
(t = 1.95, df = 82, p = .05) in that ESD2s, and all ESDs, occurred more frequently, on average, in children over 4 years of age. The Cohen’s $d$ effect size calculated for Child ESD2 was 0.4 indicating a small to medium effect size. The Cohen’s $d$ effect size calculated for Child ESD total was also 0.4 indicating a small to medium effect size. Additionally, a significant difference was found for Child EES1 mean frequency in children under and over 4 years of age. The Child EES1 code occurred, on average, more frequently in children over 4 years old (t = 1.97, df = 82, p = .05). The effect size calculated for this difference in means was .44, indicating a small to medium effect size.

For exploratory purposes (considering the high positive correlations between most parent iEPIC codes and child iEPIC codes) an independent samples T-test was performed on parent iEPIC code mean frequencies for children under and over 4 years of age. Similar to the analysis for children, parent ESD2 was significant (t = 2.06, df = 82, p = .04). Additionally, the parent EES1 code mean was significantly less (.68) for parents of children over 4 years of age (t = 3.50, df = 82, p = .001). Finally, to examine whether there was a positive linear relationship overall between child age and total mean for Child ESD2 and ESD3 codes (i.e., higher level ESD codes that remained in the factor analysis), an OLS regression was conducted. The results of the regression indicated that age explained only 5% of the variance ($R^2 = .05$, $F = 4.31$, $p < .05$), but did significantly predict an increase in Child ESD2 and ESD3 frequency ($\beta = .224$, $p < .05$).

### Hypothesis 4. Behavioral coding of “Child Disruptive Behavior”

Hypothesis 4. Behavioral coding of “Child Disruptive Behavior” (a sum of Backtalk, and Cry/Whine/Yell coded for previously), as well as the Eyberg Child Behavior Inventory (well-validated measure of child disruptive behavior) Problem and Intensity total scores, were expected to be significantly negatively correlated with the mean frequency of all iEAR-EPIC parent
and child behaviors (CTotal) via partial correlations when controlling for socioeconomic status and age.

Bivariate partial correlations, controlling for child age and socioeconomic status, were calculated for ECBI Problem scores, ECBI Intensity scores, and all parent and child iEPIC codes. The following correlations were significantly positively correlated, PEES1 with ECBI Intensity scores \(r = .195, p < .05\) and Child ESD1 \(r = .23, p < .05\) and Child EUC1 \(r = .21, p < .05\) also with ECBI Intensity scores. These findings are not consistent with the hypothesized relationship. Correlations between PTotal and CTotal iEPIC behaviors and ECBI Problem and Intensity scores were also evaluated, but none were significant. Bivariate partial correlations were also calculated for “Child Disruptive Behavior” (i.e., CDB: mean sums of child proportion frequencies of “Backtalk” and “Cry/Whine/Yell” verbal behaviors) and total mean iEPIC behaviors for both parents (PTotal) and children (CTotal). CTotal was significantly negatively correlated with CDB \(r = -.20, p < .05\), and PTotal was significantly positively correlated with CTotal \(r = .55, p < .01\). Therefore, the only finding consistent with the hypothesis was the significant negative correlation between CTotal iEPIC behaviors and CDB.

iEPIC Parent and Child Behavior

Hypothesis 5. Total Parent iEPIC behavior (PTotal) was expected to be positively associated with child use of iEPIC behaviors (CTotal).

As indicated in the iEPIC Summary Statistics (see above), many of the iEPIC Parent codes were significantly positively correlated with one another (see Table 5). For this hypothesis a linear regression was done between the mean total iEPIC Parent behaviors (PTotal) and mean total iEPIC Child behaviors (CTotal) to assess the relationship between parent’s mean frequency of all iEPIC behaviors and child’s mean frequency of all iEPIC behaviors. As expected, a strong significant positive correlation was found between parent and child total means \(r = .62, p < .01\).
The results of the regression indicated that parent mean frequency of all iEPIC behaviors accounted for 39% of the variance of child mean frequency of all iEPIC behaviors ($R^2 = .39, F(1,82) = 52.25, p < .01$). Therefore, parent’s use of iEPIC behaviors significantly concurrently predicts child use of iEPIC behaviors ($\beta = .62, p < .01$).

Figure 2. Linear Regression of Child iEPIC Behavior on Parent iEPIC Behavior

Moderation of Parent Engagement, Parent Affect, and Child Disruptive Behavior

Hypothesis 6. Parental Engagement (PE) and Positive Affect (PA) was expected to moderate the influence of total parental empathy behaviors (PTotal: parent iEPIC mean total behaviors) on child empathy behaviors (CTotal: child iEPIC mean total behaviors). Further, Child Disruptive Behavior (CDB) as measured by a sum of the iPARENT codes, Child Backtalk and Child Cry/Whine/Yell, was expected to decrease the influence of PTotal on CTotal, beyond the influence of PE and PA.
Multiple regression analyses were performed. Bivariate correlations between Parent Engagement (PE), Parent Positive Affect (PA), Child Disruptive Behavior (CDB), Total Parent iEPIC Behaviors (PTotal) and Total Child iEPIC Behaviors (CTotal) were assessed. PTotal was significantly negatively correlated with PE (r = -.60, p < .01) and PA (r = -.37, p < .01). CTotal was also significantly negatively associated with PE (r = -.70, p < .01), PA (r = -.34, p < .01), and CDB (r = -.21, p < .05). PTotal and CTotal were significantly positively associated (r = .67, p < .01), as were PE and PA (r = .32, p < .01).

Regression models were then created to test hypothesized moderation effects.

For the first model, PTotal was entered first, then PE, and last, the PE moderator term (PE X PTotal) as independent variables with CTotal as the dependent variable. PTotal significantly concurrently predicted CTotal (β = .67, F (1, 82) = 66.73, p < 0.01) and accounted for 45% of variance in CTotal. PE was then entered into the model, and found to be significant (β = -.47, p < .01). The resulting model accounted for 59% (i.e., R Square change of 14%) of the variance of CTotal (F (2,81) = 58.07, p < .01). PTotal remained significant, but the effect of PTotal on CTotal was reduced by PE (PTotal β = .39, p < .01). Finally, the interaction of PTotal x PE (i.e., moderator) was entered. The final model remained significant (F (3, 80) = 43.08, p < .01), and the moderator term added 3% more variance to the model. Although PTotal continued to significantly concurrently predict CTotal, the moderator reduced the influence of PTotal (final β = .35) on CTotal. See Table 11 and 12 for details.

Table 11.  
**Model Summary: Parent Engagement Moderation of Parent Influence on Child iEPIC Behaviors**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.45</td>
<td>.44</td>
<td>3.56</td>
<td>.45</td>
<td>66.72</td>
<td>1</td>
<td>82</td>
<td>.00</td>
</tr>
<tr>
<td>2</td>
<td>.77&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.59</td>
<td>.59</td>
<td>3.09</td>
<td>.14</td>
<td>27.70</td>
<td>1</td>
<td>81</td>
<td>.00</td>
</tr>
<tr>
<td>3</td>
<td>.79&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.618</td>
<td>.60</td>
<td>3.00</td>
<td>.03</td>
<td>5.97</td>
<td>1</td>
<td>80</td>
<td>.02</td>
</tr>
</tbody>
</table>

a. Predictor: Parent iEPIC Behaviors (PTotal)
b. Parent iEPIC Behaviors and Parent Engagement
c. Parent iEPIC Behaviors, Parent Engagement and Parent Engagement X Parent iEPIC
Table 12. **Coefficients: Parent Engagement Moderation of iEPIC Parent Influence on Child iEPIC Behaviors**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized B</th>
<th>Coefficients Std. Error</th>
<th>Standardized Coefficients Beta</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.63</td>
<td>.08</td>
<td>.67</td>
<td>8.17</td>
<td>.00</td>
</tr>
<tr>
<td>2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.36</td>
<td>.08</td>
<td>.39</td>
<td>4.35</td>
<td>.00</td>
</tr>
<tr>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-3.95</td>
<td>.75</td>
<td>-.47</td>
<td>-5.26</td>
<td>.00</td>
</tr>
<tr>
<td>3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.326</td>
<td>.08</td>
<td>.35</td>
<td>3.97</td>
<td>.00</td>
</tr>
<tr>
<td>3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-4.05</td>
<td>.73</td>
<td>-.48</td>
<td>-5.55</td>
<td>.00</td>
</tr>
<tr>
<td>3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-.79</td>
<td>.32</td>
<td>-.17</td>
<td>-2.44</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Note. There are 3 models displayed. The letters indicate the predictor (below) entered into the model.*

a. Parent iEPIC Behaviors (PTotal)
b. Parent Engagement
c. Parent Engagement X Parent iEPIC

Next, a model was created to assess for the potential moderation effects of PA. However, upon evaluation of the regression, PA had no significant effect on the model and did not significantly moderate the effect of PTotal on CTotal ($R^2 = .45, \beta = .63$).

First, it was found that CDB did have a significant negative correlation with CTotal ($r = -.21, p < .05$), indicating that children exhibiting more iEPIC behaviors on average, exhibited less disruptive behavior (i.e., CDB) on average. Regression analyses were then performed by entering PTotal and CDB as independent variables and CTotal as the dependent variable. These analyses showed that CDB did not significantly influence CTotal, nor did it influence PTotal’s effect on CTotal. In the final model PTotal ($\beta = .65, p < .01$) was significant in concurrently predicting CTotal ($F(2,81) = 34.26$), and accounted for 45% of the variance. See Table 13.

Table 13. **Model Summary: Child Disruptive Behavior and Parent Influence on Child iEPIC Behaviors**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.67</td>
<td>.45</td>
<td>.44</td>
<td>3.56</td>
<td>.45</td>
<td>66.72</td>
<td>1</td>
<td>82</td>
<td>.00</td>
</tr>
<tr>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.68</td>
<td>.46</td>
<td>.45</td>
<td>3.55</td>
<td>.01</td>
<td>1.44</td>
<td>1</td>
<td>81</td>
<td>.23</td>
</tr>
</tbody>
</table>

*Note. Dependent variable is Child iEPIC Behavior (CTotal)*

a. Predictor: Parent iEPIC Behaviors (PTotal)
b. Parent iEPIC Behaviors and Child Disruptive Behavior
Regression analyses were run on a final model with PTotal, PE, PA, and CDB as independent variables and CTotal as the dependent variable. As expected, the only variables significant in influencing CTotal were PTotal and PE. CDB and PA added almost no variance to the model, were not significant in independently influencing CTotal, and did not play a moderating role in the model. In summary, moderation effects were found for only Parent Engagement (as seen previously). Results showed that Parent’s use of iEPIC behaviors concurrently predicts child use of iEPIC behaviors, but that Parent Engagement decreases the strength of this relationship.

**Gender and Ethnicity**

**Hypothesis 7. Gender, ethnicity, and iEPIC behaviors explored.**

An independent samples T-test was conducted to assess for differences in the use of iEPIC behaviors based on gender. The only significant difference between means was found for the EUC3 code. Male children exhibited this behavior more than female children ($t = -1.94$, df = 82, $p = .05$) with a mean difference of .37. The Cohen’s $d$ effect size calculated for this difference was 0.4 indicating a small to medium effect size.

A One-Way Between-Groups ANOVA was performed to determine differences in mean frequency of iEPIC codes for both parents and children. Of all codes, there was statistically significant effect of ethnicity for Child EES2 ($F(5,76) = 4.29$, $p < .01$). Parent EES2 approached significance ($p = .09$). Of note, there was an $N$ of only 2 for Caucasian participants. Of the participants that disclosed their ethnicity, White children ($N = 2, M = -5.27$), Mixed-Race ($N = 5, M = -6.44$), and Latino Non-White children ($N = 32, M = -6.71$) displayed this behavior relatively more than Latino-White ($N = 20, M = -7.05$) and Black ($N = 19, M = -6.90$) participant children.
CHAPTER EIGHT: DISCUSSION

The purpose of this study was to develop, and perform an initial evaluation of a naturalistic observational assessment system for verbal behaviors that facilitate and reflect the development of empathy. These behaviors were extrapolated from existent socio-neurocognitive theory and empirical research (e.g., Baron-Cohen, 2001; Batson, Lishner, Cook, & Sawyer, 2005; Blair & Fowler, 2008; Decety & Jackson, 2004; Oberman & Ramachandran, 2007; Preston & de Waal, 2002; Schulte-Ruther, Markowitsch, Fink, & Piefke, 2007; Shamay-Tsoory et al., 2009). We aimed to do this in the context of parent-child dyads and during a developmental time period (2-6 years of age) that is significant for verbal, socio-emotional, and cognitive ability growth (Knafo, Zahn-Waxler, Hulle, Robinson, & Rhee, 2008; Robinson, Zahn-Waxler, & Emde, 1994; Singer, 2006; Young, Fox, & Zahn-Waxler, 1999). The coding for this system was created specifically for categorizing auditory information, which makes raters dependent on verbal information alone, including tone, inflection of voice, and cadence for accurate coding of events. Although this method has its limitations (to be discussed), the iEAR provided an excellent method of collecting the natural occurrence of verbal behaviors without the introduction of artificial elements (e.g., simulations) that are required for the existent assessment systems for empathic behavior.

More importantly, there have been no studies to date naturally observing empathy in daily parent-child interactions over this period of time. This project sought to determine how and how often parents were engaging in teaching and discussions about emotions in real-time with their children during a critical period of child development. Additionally, most of what is known about such interactions has been obtained from middle-class Caucasian samples, engaged in structured laboratory tasks that attempt to elicit empathy. In contrast, the sample in this study represents a group of highly stressed disadvantaged young minority women unobtrusively recorded while interacting with their child. Given
the greater level of stress and fewer resources, as well as paucity of research on empathy development in this population, the investigation of factors that may help reduce risk for their children made this study especially valuable and informative.

Further, the evening routine at home was chosen as the recording time because interactions between caregivers and children are greatest during this time due to the number of transitions that occur (e.g., dinner, bath, and bed). However, recording times were adjusted for each dyad to ensure that the time they interacted most would be captured. As with any natural observational study, there were factors that could not be controlled. For example, after some time, a review of the recordings revealed that some parents were not in fact home, which increased the ambient noise, and made interactions more difficult to hear clearly and delineate. Thereafter, it was emphasized that parents make sure they were at home, but it was impossible to strictly enforce this. Nonetheless, maximizing external validity was crucial in order to reflect reality regarding the frequency and nature of these behaviors, and in doing so this study was both successful and unique.

Analyses revealed that key verbal behaviors and significant relationships between these behaviors exist, and helped illuminate potential limitations which will guide future research and further development of the iEPIC system. A more detailed discussion of results follows.

**Summary of Behavioral Observations**

Although a clinical population was not utilized for this study, as mentioned, the sample characteristics included several high-stress factors. Additionally, mothers included from the baseline of Phase 3 met an above-average level of stress on the Parenting Stress Index (PSI). The mothers were undergraduates who had their children under 24 years of age. Further, based on the demographics, the sample had limited financial resources (e.g., urban, high unemployment, low household income, requiring financial aid, and/or on public assistance), and more than a quarter of the mothers were not
involved in steady relationships, with only 18% married. These characteristics suggest increased demand on mothers in providing both formal and informal support to their child(ren). Additionally, although coding was only consented on one child, many households had more than one child (approximately 35%). These are important factors to consider when examining the data and analyses of the data, particularly since many of these stressors have been found to create a higher-risk climate for dysfunctional relationships and behavior dysregulation in children, as well as significant parenting stress (Bradley & Corwyn, 2002; Casalin, Luyten, Besser, Wouters, Vliegen, 2014; Huang, Costeines, Kaufman, Ayala, 2014; Vinopal & Gershenson, 2016).

As the summary statistics for the iEPIC codes demonstrate, dyad interactions in this sample consisted mostly of neutral talk for both parent and child (approximately 90%, see Table3), and the base rate of most iEPIC behaviors was low. Qualitatively, many audio clips contained no interaction at all, parents interacting primarily with others, or children watching TV for extended periods of time. In light of this, the four-hour time period may not have provided sufficient opportunity to sample verbal behavior on emotions and mental states, particularly with the myriad demands facing these mothers/dyads. However, the infrequent occurrence of even the lowest level iEPIC behaviors (e.g., basic emotion inquiries: “How are you/are you okay?” and labeling: “I’m sad!”) indicates that, in general, there is limited discussion of any emotions or mental states occurring in these interactions. A review of most data files revealed a paucity of communication regarding the explanation or description of behaviors, feelings, consequences, or events. As mentioned, there are unfortunately no other known naturalistic studies (i.e., without simulations or lab tasks, videos, or props), to compare this rate of “emotion talk” to at the present time. However, research on the importance of “emotion talk” for socio-emotional development highlights the concern these findings may raise.
Research shows that even labeling emotions is important for the socioemotional development of children, and that being unable to label one’s emotions has been linked to emotional and behavioral dysregulation (Brophy-Herb et al., 2015; Castro, Halberstadt, Lozada, Craig, 2015; Harden, Morrison, & Clyman, 2014). In light of this, and the previous study (using the same sample) that showed the lack of interactions was correlated with clinical-level scores on a measure of child’s disruptive behavior (REF), both the quantity and quality of communication appear to be important in healthy development and parent-child relationships. Of note, the previous study examining parenting practices also found that most of the interactions were not positive, but consisted of criticisms and commands, with parents spending only .02% of time praising children (Alonso & Ehrensaft, 2014). These characteristics serve to contextualize some of the findings.

Regarding, iEPIC code behaviors, the most frequent iEPIC behaviors coded were Exploring Emotion and State Level 1 (PEES1) for parents and Emotion and State Description Level 1 (CESD1) for children. The concurrent higher frequency of these behaviors is perhaps to be expected considering one likely results in the other (i.e., an answer following a question). Similarly, Reflections occur at the same rate in children and parents. Overall, the high positive correlations between the iEPIC code mean frequencies suggests that many of these behaviors do happen within a small time period of one another, and may in fact, perpetuate one another. Interestingly, of all codes, parents are engaging in more questioning (EES) of emotions and states while children are engaging in more simple labeling or explaining of emotions and states (ESD1). When parents are proactively engaging children in communication regarding emotions and states through inquiry, this may encourage their children to explain emotions and states more often. Previous systems (ECS) placed a greater emphasis on child behavior called “Hypothesis Testing” during this time period (Zahn-Waxler et al., 1992). This behavior entails children asking about emotions and states. However, as these results suggest, parents are
naturally engaging in this behavior more frequently, and in doing so, may encourage more emotion and state labeling/descriptions in children from 2-6 years old.

The mean frequencies support the hypotheses and theory underlying the construction of the iEPIC system. Overall, higher level codes were less frequent in both parents and children. Based on the PAM and aforementioned developmental theory, these behaviors are more complex, and expected to be less frequent overall during this time period. The “simplest” code, Reflections, occurred more often than most iEPIC codes. The simplistic nature of this code (i.e., mimicking verbal behavior), makes it the least complex. However, Parent EES1 and Child ESD1 occurred more often than Reflections, indicating that children are capable of basic descriptions of emotions and states by this time period (2-6 years old). Given the Reflections, parents and children may mimic verbalizations less frequently as children age because of the earlier developmental nature of this behavior.

Empathic Understanding and Concern (EUC) behaviors occur lease, and this result is developmentally and situationally explicable. First, because these behaviors require both the emotional and cognitive understanding of the state of another (and at higher levels, indications of altruistic behaviors), they were expected to be less frequent. However, again, the four-hour period, and significant periods of time without interactions, may have limited the number of opportunities for events to occur that would elicit empathic responses in children and parents. This is a limitation of the study, but also an important observation given the large proportion of no interactions overall in this sample. If the rate of interactions between parents and children is already low, discussing emotions and states are also expected to be low.

Correlations Between Codes

Most of the iEPIC codes were significantly positively correlated with one another both within and between parent and child codes. However, the Reflections code was either negatively correlated or
not significantly correlated with other codes. Because this code reflects simple mimicking of verbal behavior, and does not necessarily have an emotional or mental state component, this was expected. However, the significant negative correlation between Parent Reflection and Child Emotion and State Description Level 2 (Child ESD2) and Parent ESD2 may suggest that parent use of this behavior may decrease as children’s abilities to describe their own experiences (in lieu of mimicking to share an experience) increases. The high positive correlations between iEPIC codes, particularly those between parents and children at similar code levels, indicates a sense of growing attunement or parent’s adjustment to the child’s ability to make sense of emotions or mental states. It may also be evidence for modeling where the behavior in one is imitated in the other.

Interestingly, all iEPIC Level 1 behaviors for both parents and children are not correlated with most other codes and did not load onto any factor. Whereas, second and third level codes are more correlated with one another. The fact that Level 1 codes were also more frequently coded, may indicate a qualitative difference in these codes. These codes accounted also for a large portion of emotion and mental state-related verbal behaviors exhibited by both parents and children during this developmental time period. Simple questions, labeling, and expressions of feeling for another may be each their own construct given the lack of inductive reasoning required for these behaviors. This correlational pattern suggests that level 2 and 3 behaviors may also be more difficult to discriminate from one another, and that the Reflections code reflects an independent behavior, perhaps entirely unrelated to the other iEPIC codes. The greater number and strength of correlations between child codes, relative to the parent iEPIC codes, that these constructs are more similar. It also suggests that these behaviors may be more consistently coded. The EUC code levels 2-4 for both parents and children are positively correlated both with each other (i.e., within parent or child codes) and between the parent and child codes (i.e., PEUC
correlated with CEUC codes), suggesting that these behaviors are in fact occurring at the same rate and potentially coding for similar behaviors.

Overall, correlational analyses provided support that many of the iEPIC behaviors were in fact related to one another, but sufficiently different to be reflecting different behaviors. Because a number of codes were correlated with one another, performing an exploratory factor analysis was expected to both result in cross-loadings between parent and child codes, as well as a potentially different factor structure than hypothesized.

Reliability

Overall, the iEPIC was found to be a reliable measure of empathy-related verbal behaviors. Most of the codes obtained ICCs above .70 (see Table 8), and all rater pairs had mean ICCs above .70, with the exception of Raters 3 & 4, which had a mean ICC of .68 (see Table 9). The median ICC across all pair ICC means on all codes, was .89 (Table 9). However, child codes were more reliably coded than parent codes (see Table 6 & 7). This may be because child verbal behaviors (i.e., all verbalizations) were less frequent overall, slower, and occasionally inaudible. This made it potentially easier to differentiate/isolate child iEPIC behaviors from other verbalizations. Additionally, children exhibited less “complex” verbal behaviors (i.e., short utterances: “I’m angry!”), also making them less difficult to code. Whereas, parents often spoke faster, in greater volume, and sometimes, with several people at once. Specifically, for the parent iEPIC codes, there seemed to be greatest lack of agreement for EES2, EES3, ESD1, ESD2, and ESD3. ESD2 and ESD3 had the greatest disagreement between child and parent codes, which may again indicate a difficulty differentiating these codes from one another because of their high construct similarity because both require an explanation of emotions or states. Of note, prior to coding, these levels were most difficult to reach agreement on during training. This could
indicate a need for more training, further construct clarification/operationalization, or a need for revision.

The pattern of the ICCs, along with the correlational analyses, indicate that the greatest conceptual differences appear to be between Level 1 versus all other levels. In reality, this is in fact the case. Conceptually, Level 1 codes concern “what” the emotion or state is and Level 2 is coded when there is a reason (i.e., “why”) for the emotion or state mentioned. Level 3 was intended to be a more complex version of Level 2 (i.e., more in-depth questioning/hypothesis testing or more in-depth descriptions). Considering the hypothesized hierarchical structure of the iEPIC system overall, ESD2 and ESD3 may also have some conceptual overlap with EUC1 and EUC2, and likewise, EES3 (because a hypothesis is given after inquiry) might have high conceptual overlap with ESD1. For example, although ESD is intended to be a “self-focused” labeling or describing of the speaker’s state/emotion, EUC is intended to be “other-directed” (i.e., concerning another’s feeling/state). This distinction is difficult to make and there are incidences where both may be indicated, causing confusion for raters. Some conceptual similarities between codes was intended, but the codes may be too similar on their lower or upper limits. This may also explain higher positive correlations between several codes.

In regards to raters, Raters 3 & 4 had the least reliability. Importantly, these coding assignments had at least one rater late more often, and a time period during which one rater ceased coding for a period of time. This could have resulted in “coder-drift” (decrease in coding accuracy over time, particularly when not consistently coding). One of these raters was also trained later than the other indicating potential increased variability in quality, time, and/or methods of training. Although excluding the data for this pair was considered due to the inconsistency in coding and training, losing the data points would have decreased power and their data was kept. Nonetheless, the medians of all ICCs for codes were good, with only 4 values below .70. Surprisingly, the simplest code, Reflections did not
have the highest agreement as one might have expected given the simplicity of the behavior (verbal mimicking). On several occasions, raters questioned how to code Reflections that also counted as ESD1s or other codes, and they were instructed to code as a Reflection since it was simple repetition, but this may have resulted in more variability across how they were coded.

Neutral Talk was reliably coded, which indicates that raters were likely parsing verbalizations fairly consistently according to guidelines in the manual. Some of the less frequent behaviors such as EUCs for both parents and children were more reliably coded, indicating that this construct may be more discriminable from other codes. Because EUC codes intend to reflect the earliest behaviors of empathy in that they indicate increased self-other differentiation, it is perhaps unsurprising that they are coded more reliably and less frequently, due to their unique nature in comparison to other codes. This is also in-line with developmental theory. The children in the study ranged in age from 2 to 6, and Theory of Mind begins to occur at age 4 (allowing for greater self-other differentiation). Accordingly, this burgeoning ability may be in an early stage of development and appearing/presenting inconsistently, particularly when there is less opportunity for it to do so.

**Exploratory Factor Analysis**

The exploratory factor analyses sought to examine whether hypothesized levels of each hypothesized primary code (ie., EES, ESD, EUC) were coded frequently together. Additionally, the analyses sought to determine whether codes (i.e., variables) were different in that hypothesized levels on one primary code were not loading onto other primary codes. Data reduction was conducted to remove codes that did not contribute unique variance to the iEPIC system (i.e., codes/variables that were significantly accounted for by other variables). The original hypothesized model consisted of 20 variables (10 variables for parent, 10 for child) and 6 factors (3 factors for parents and 3 for children; see Hypotheses for more information). The model was modified after removing several variables because
they did not load onto any factor (were their own code similar to Reflections) or did not contribute much unique variance to the model (i.e., significant cross-loadings).

Several Level 1 behaviors were removed such as PEES1, CEES1, CESD1 and CEUC1. This is unsurprising given the aforementioned correlations, which showed that Level 1 behaviors were least correlated with other codes. CEUC2 was also removed due to contributing minimal unique variance to the model. The final model consisted of 5 factors and 15 variables with a good fit (RMSEA = .00).

The only factor found consistent with hypotheses was the PEUC factor. All PEUC levels loaded onto one factor, and this was consistent throughout the modification of the model. The factor loadings for EUC suggest variables that may be coding for a similar construct (e.g., Parent Empathic Understanding and Concern (PEUC): a cognitive understanding and emotional experience of the child’s emotion or state at differing levels of complexity). Because parents are expected capable of Theory of Mind and Empathy, it was perhaps easier to code for these levels. Accordingly, it may have been more difficult to see the same consistency in child behaviors, particularly considering the low frequency in child EUC levels expected (and found) in children of these ages.

Therefore, as suggested also by ICCs and correlations, “Parent Empathic Understanding and Concern” is one factor consisting of the original 4 levels. Factor 2 consists of all Level 3 child behaviors (CEES3, CESD3, CEUC3) or “Child Complex Explore, Describe, Empathic Concern.” Factor 3 consists of PEES3 and PESD3, or “Parent Complex Explore and Describe.” Factor 4 consists of PEES2, CEES2, and CEUC4 or “Parent and Child Explore and High Child Empathic Concern.” Finally, Factor 5 was “Parent and Child Describe” consisting of lower level parent and child describe behaviors: PESD1, PESD2, and CESD2. This final factor structure reveals an interesting pattern primarily divided by level, instead of the primary codes expected.
Accordingly, the levels may be more meaningful in parsing up these constructs, such that many of these behaviors are occurring concurrently (i.e., EES, ESD, and EUC), but at different frequencies and levels. That is, Child level 3 behaviors are co-occurring frequently, whereas Parent level 3 explore and describe are co-occurring together. As suggested by the aforementioned iEPIC code inter-correlations, most Level 1 behaviors did not load onto factors and were removed. The remaining Level 1 and 2 behaviors “collapsed” into factors representing “low level” iEPIC behaviors for parents and children. They appear to be reflecting similar or nearly the same behaviors.

This was confirmed by the variables that loaded on factors 4 and 5 for Parent and Child Explore and Parent and Child Describe respectively. These lower level behaviors likely do present similarly for parents and children. The CEUC4 that loads onto factor 4 is difficult to interpret conceptually. However, the very low prevalence of CEUC4, may be influencing this factor loading.

When examining the factor correlations (see Table 10), almost all factors are positively correlated, but also sufficiently different (i.e., correlations around .30-.50), which suggests good discrimination. However, factor 4 was negatively correlated with factor 5. Conceptually, this is appropriate because factor 4 represents primarily “explore” behaviors which are inquiries about emotions and states, whereas factor 5 represents “describe” behaviors, which are declarative in nature. The differences between behaviors similar to these were also found in research for existent coding systems such as the ECS (Zahn-Waxler et al., 1992).

These exploratory factor analyses evidence that the iEPIC coding system has discriminable, but sufficiently related, underlying constructs. The resulting factors also have a strong conceptual basis despite being different from the hypothesized factor structure. It is possible that either different dyads engage in more of one type of level behavior more frequently overall, or that over time, the level of
complexity of behavior changes across all codes, reflecting increased complexity in the understanding of emotions and states.

Results suggest that there may not be a developmentally linear relationship for iEPIC codes such that EES may not necessarily develop/present before ESD, which then presents before EUC, but that these behaviors can exist concurrently but at different levels of complexity. There is research to suggest that as early as 2 years of age, children may better understand emotions and states, but have limited ability to express this understanding (Vallotton, 2008). These results support this finding and demonstrate specifically, that children can explain “why” emotions and states occur at an earlier age than might be expected given existent research.

Child Age

Regression results were not consistent with hypotheses in that age did not significantly (concurrently) predict higher level iEPIC codes (Level 3 and above). There were no differences in the mean frequency of EUC codes in children over and under 4 years of age. When all codes were examined to see if any code was significantly more frequent over the age of 4, Child ESD2, Child ESD total mean (for all ESD levels), and Child EES1, on average, occurred significantly more in children over 4 years of age. The results of a follow-up regression showed that specifically ESD2 and ESD3 behaviors increase significantly in frequency with age. Although age only explained 5% of the variance, this is not abnormal when considering that parenting accounts for, on average, 6% of the variance of later displays of antisocial behavior in their children (e.g., Narusyte et al., 2012; Dogan, Conger, Kim, & Masyn, 2007). Other variables such as parenting style, quality of parent engagement, child’s interactions with others, attachment, and general verbal ability, may also be significant variables regarding children’s expression of their emotions as they age. Likewise, frequencies of parent iEPIC behaviors are low.
Parent’s lack of these verbal behavior may deter or prevent children from learning to engage in them. This will be described further below.

Nonetheless, Theory of Mind (ToM) requires an understanding of one’s own experience of emotions and states and a gradual increase in self-other differentiation. Therefore, attributing one’s emotions and states (Child ESD2 and ESD3) and “testing out/inquiring about” these attributions (Child EES1) are behaviors that one might expect, and research has found, to occur more frequently once ToM ability begins to develop (e.g., Lagattuta, 2005; Weimer, Sallquist, & Bolnick, 2012).

Interestingly, Parent ESD2 also was significantly more frequent in children with children 4 years of age and older and Parent EES1 was significantly less frequent. These results may provide support for the PAM model previously outlined, which posits imitation as the starting point to empathic processes (Preston & de Waal, 2002; Preston, 2007). Specifically, these findings demonstrate that children’s more sophisticated attempts at describing why emotions and states occur increases after 4 years of age, as does basic questioning of their mothers about emotions and states. In contrast, mothers ask significantly less basic questions about their child’s emotions and states, which indicates they may have grown more attune to their child’s emotions and states (e.g., Jonsson & Clinton, 2006). Research shows that better understanding through imitation and “mismatch and repair” grows between mothers and children over time (Harrist, Pettit, Dodge, & Bates, 1994; Harrist & Waugh, 2002), increasing accurate responding to their child’s needs and decreasing the necessity to explore their children’s problems. Further, a child’s increase in explaining/describing their emotions and states may result in a gradual decrease of their mother’s need to inquire about them.

Hypotheses regarding EUC behaviors were disconfirmed in that all levels of EUC behaviors were exhibited by children across the 2 to 6-year age period. However, the frequencies for these codes
were low overall. It is possible there was not enough opportunity to elicit these behaviors within the four-hour period of recording, considering this naturally low base-rate in this sample.

**ECBI and Child Disruptive Behavior**

Only three codes were significantly correlated with ECBI Intensity scores, PEES1, CESD1, and CEUC1. These findings were opposite to the hypothesized relationship. Considering the nature of the codes and the nature of the ECBI Intensity scale, this positive relationship may be explained better by context such as parent perceptions, parent-child relationship, and the constructs measured on the ECBI. PEES1 codes for parents inquiring about child emotions and mental states. The more parents question their children, the more their children may express these emotions. Thus, explaining the other positive correlation, CESD1. This ECBI scale is simply measuring the intensity or magnitude of the problems reported on the Problem Scale. If parents are inquiring about emotions (particularly negative emotions, which are what parents would report on the ECBI) more often and children are expressing them more often, parents may be perceiving this pattern of behavior as “high emotionality” or as “more disruptive,” and thus more intense. Additionally, the codes that were significant are lowest level codes, which may suggest that simple emotional exclamations or labeling, without explanation, reflects a lack of regulation in contrast to explaining one’s own emotions and states. It is possible that these lower level code behaviors in certain parent-child contexts (e.g., high stress, negative or lack of engagement) may be “scored” as disruptive in regards to self-report on the ECBI.

Further, CEUC1 is the simplest Child EUC code that was dropped from the factor analysis due to its overlap with CESD3. CEUC1 was intended to code for children labeling emotions or states in others, whereas CESD3 was intended to code for how others *are affecting the self* (i.e., more self-focused). Thus, the expression of reactions in one’s self more frequently, may also be perceived as more disruptive to some mothers as opposed to prosocial self-expression. Other factors such as cultural norms,
stressors, and family dynamics may also bear on these findings as the perceived valence of this behavior may differ based on context. The degree to which expression of emotion is normative varies widely by culture (e.g., Fernandez, Carrera, Sanchez, Paez, & Candia, 2000; Hareli, Kafetsios, & Hess, 2015; Palmer & Occhi, 1999). Therefore, the constructs that comprise the ECBI, a measure asking parents to respond on specific disruptive behaviors of their child, may be too unrelated to find meaningful relationships with the iEPIC codes. This may explain why no hypothesized significant negative correlations were found with either ECBI scale. Further, the iEPIC codes that were correlated to the ECBI did so solely with the Intensity scale, which reflects the magnitude of disruptive behaviors as opposed to the behaviors themselves.

However, the finding that was consistent with the hypotheses was the significant negative correlation between Child Disruptive Behavior (CDB) and total Child iEPIC codes (CTotal). This construct may be more appropriate to explore for relationships with the iEPIC, as it is a frequency count of objective naturally observed disruptive behavior. This is in contrast to the ECBI, which is a scaled parent self-report measure created with the primary purpose of reporting and assessing child disruptive behavior. Shelia Eyberg created the ECBI (1978; 1999) as a baseline and progress assessment measure for the treatment she began developing in the 1970s, Parent Child Interaction Therapy (PCIT), a parenting-focused treatment for children with clinically significant disruptive behavior problems. Although total Parent iEPIC (PTotal) codes were negatively related to CDB, this relationship was not significant. However, the relationship between PTotal and CTotal is strongly significant, which indicates parents may be influencing children’s use of the behaviors (discussed below), and children’s increased verbal empathy behavior is then associated with a decrease in their disruptive behavior as was seen.
Parent iEPIC Predicts Child iEPIC

The strong positive association between mother-child iEPIC behaviors highlights the consistency in coder’s perceptions of these behaviors, as well as the importance of parent influence on child behavior in this study. PTotal concurrently predicted CTotal and accounted for a large portion of variance. This finding is consistent with the hypothesis, and indicates that parents are influencing their children’s empathy-related verbal behavior. Based on the PAM model and the reviewed developmental and neurocognitive research, imitation both physically and in the mirror neuron system commences the processes that mature into true empathy (Decety & Meyer, 2008; Preston, 2007). These results reflect potential imitation in labeling and understanding emotions between parent and child. Research shows that inductive reasoning about emotions and states, labeling emotions, and connecting these emotions and states between one’s self and others helps to develop self-other differentiation (e.g., Preston, 2007). In doing so, it facilitates Theory of Mind skills (ToM), and results in an emotional understanding both experientially and cognitively, which constitutes empathy (Preston, 2007; Preston & de Waal, 2002).

Given these findings, parent empathy behaviors, as expected, appear to transmit to their children. These findings are also consistent with social learning theory and the PAM model processes that inspired the development of the iEPIC. This is the first study to date to demonstrate that empathy-related behaviors of these types can be verbally transmitted to children through their mothers. The iEPIC behaviors outlined in this study directly reflect expressions of emotional understanding, ToM skills, and a gradual connecting of the emotional and cognitive components that constitute empathy. Facilitating the growth and increased frequency of these behaviors in children through parent’s increased use of them may be able to play a key role in increasing empathic understanding and behaviors from early on. These results are promising for further investigation into parenting behaviors that increase iEPIC behaviors in their children, which are associated with less antisocial behavior in children. Although PTotal accounted
for much variance, investigation into additional variables that may impact this transmission of empathy
verbal behaviors to children were explored.

**Moderation Models**

Analyses including Parent Engagement (PE), Parent Positive Affect (PA), Child Disruptive
Behavior (CDB), Total Parent iEPIC Behaviors (PTotal), and total Child iEPIC Behaviors (CTotal),
were not entirely in the expected direction. CTotal and PTotal were negatively correlated with Parent
Engagement and Parent Positive Affect. It was expected that these would have a positive relationship in
that increased emotional expression and understanding was thought to be enhanced by more engagement
by parents and greater positive affect. However, engagement and affect were both global ratings that
may not specifically represent appropriate constructs to assess their relationship to iEPIC behvaiors. For
example, these ratings were made based on an overall subjective assessment of raters whereas frequency
counts are made in real-time similar to the iEPIC codes. Further, an increase in engagement or positive
affect may not necessarily be directly related to an increase in empathy-related verbal behaviors.

Increased engagement, if the content of verbal interactions is primarily neutral talk (the majority
of the data was), or negative in nature (which also characterizes a large portion of the data), it might be
expected to negatively correlate with empathic verbal behaviors. Additionally, the experience of the
engagement by both raters or children is important, particularly if it is high in emotional content (i.e.,
child or parent frequently expressing emotions). This data was characterized in a previous study as
consisting of frequent commands, lack of opportunity to comply with commands, and criticisms.
Therefore, if engagement is greater, but the nature of this engagement is negative, it may reduce a
child’s likelihood of modeling parents or encouragement to attend to parents, even if they are engaging
in emotionally exploratory or descriptive behaviors. In fact, research shows that parents that engage with
their children, but primarily in negative or stressful interactions, decreases prosocial behaviors toward
others (e.g., Carson & Parke, 1996; Sengsavang & Krettenauer, 2015), often causes avoidance and/or antisocial or oppositional behavior (e.g., Dougherty, Tolep, Smith, & Rose, 2013; Kazdin & Wassell, 1999; Konishi & Hymel, 2014; Podolski & Nigg, 2001; Rholes, Simpson, & Friedman, 2006; Tharner et al., 2012), and decreased attachment between child and parent (e.g., Mason, Briggs, & Silver, 2011; Stansfeld, Head, Bartley, and Fonagy, 2008). Therefore, children may not want to attend to or learn from parents in the context of such interactions.

In testing the influence of PE, PA, and CDB, only PE was significant in decreasing the influence of PTotal on CTotal. PTotal, strongly concurrently predicted CTotal, but increased parent engagement decreased the strength of this relationship. Because the variance accounted for by the model increased with PE in the model, it may be partially explaining the associations between PTotal and CTotal. In light of the discussion regarding the differing nature of engagement, as well as the child or raters varied subjective perceptions of parent engagement, there are a number of reasons engagement may play a significant role in PTotal’s influence on CTotal, and this relationship should be further explored.

PA did not have a moderating effect on PTotal. This was inconsistent with hypotheses, but may be due to the subjective global rating for PA and the fact that negative affect may more likely occur when interactions involving emotions or empathy-eliciting events arise. Only recently have researchers begun to investigate the existence of “positive empathy” (Morelli, Lieberman, & Zaki, 2015). Additionally, parents may differentially perceive emotional expressions as negative overall (Dunsmore, Her, Halberstadt, & Perez-Rivera, 2009; Eisenberg, Cumberland, & Spinrad, 1998), and the cognitive nature of the codes (i.e., they are not solely emotional in nature) may contribute to a lack of findings in the hypothesized direction. Understanding the perceived valence/nature of specific emotional behaviors and other contextual issues mentioned (e.g., parenting, frequency of negative interactions) need to be further accounted for in future research.
CDB was negatively correlated with CTotal indicating that children exhibiting more iEPIC behaviors, engaged in less disruptive behaviors. However, it did not influence PTotal’s influence on CTotal, which suggests that even if children are more disruptive, parents can still influence their children’s increased learning about their own and others’ emotions. There is support for parents continuing to be models of positive social behavior even in the midst of problems with child temperament and disruptive behavior, particularly when parents use inductive reasoning (e.g., Eisenberg & Morris, 2001; Krevins & Gibbs, 1996) and when dyads engage in discussions about emotions and expressing emotions (Dunn et al., 2001; Kleeck, Alexander, Vigil, & Teampleton, 1996; Ornaghi, Brockmeier, & Grazzani, 2014; Seehausen, Kazzer, Bajbouj, & Prehn, 2012; Strayer & Roberts, 1997). These types of behaviors characterize the parent EES, ESD, and EUC codes.

**Gender**

Results showed that male children engaged in more EUC3s than female children. However, the base rate of EUCs in children was low, and this finding should be taken with caution. There is a paucity of research on the qualitative and quantitative differences in empathy development in females versus males. In high-risk samples, particularly those exhibiting callous unemotional traits, it has been shown that both males and females show cognitive empathy deficits when young (Dadds et al., 2009). Males appear to overcome these deficits however during puberty and continue to show a deficit in emotional empathy whereas females do not (Dadds et al., 2009). Some research shows that males verbally express emotions less as they develop, perhaps due to processes of gender socialization (Auyeung, et al., 2009; Strayer & Roberts, 1997). Individuals with difficulties developing age-normative ToM abilities, have difficulty with perspective taking. This increases the risk of misattribution/misreading of intentions and emotions in others, resulting in aggressive, dysregulated, or antisocial behavior (Nentjes, Bernstein, Arntz, van Breukelen, & Slaats, 2015; Vonk, Zeigler-Hill, Ewing, Mercer, & Noser, 2015). Females
diagnosed with Borderline Personality Disorder and males with Antisocial Personality disorder present with this problem, in contrast to individuals with psychopathy who have ToM ability, but lack the emotional component of empathy (i.e., cannot feel for others) (Baez et al., 2015; O’Neill et al., 2015).

Research has also shown that greater aggression is associated with high levels of callous-unemotional traits similarly in both girls and boys (Stickle, Marini, & Thomas, 2012). However, aggressive antisocial girls have been found to show more indicators of severity and emotionality in contrast to boys, including negative affect, anxiety, distress about social provocation, and empathy (Stickle et al., 2012). These limited findings illustrate the complexity of the emotional, social, and cognitive processes involved in the development of empathy. They suggest potential social and biological influences that interact with gender to create differential trajectories of empathy and empathy deficits in adulthood. Further research is needed in this area to examine the relationships between gender, age, biological, and emotional/cognitive processes of empathy development.

**Ethnicity**

An exploratory analysis was conducted to examine whether there were mean differences between the different ethnic groups involved in the study. Latino-Non White and White children engaged in more questioning about why emotions and states occurred (EES2). There is some research to suggest that labeling and questioning of emotions does occur less in Black families, and negative emotions are more often ignored or thought of as unacceptable, but the research is limited in exploring this (e.g., Matsumoto, 1993; Nelson, Leerkes, O’Brien, Calkins, & Marcovitch, 2012). Comparable behaviors in the ECS and EC to the codes developed in the iEPIC (e.g., “Hypothesis Testing”) occurred at higher rates in previous studies. However, these studies not only used primarily Caucasian samples, but also utilized artificial simulations, laboratory tasks, interviews, and videos to elicit empathic responses. Whereas, the purpose of this study was to examine the natural occurrence of these behaviors in a more
diverse sample. The sample used in this study was comprised of only 2% Caucasian, and mostly Latina and Black participant dyads. Therefore, it is difficult to make comparisons, in as much as the methods and samples differ significantly from previous studies. Future research will aim on examining both minority and majority populations, and expanding methods to include more qualitative and cultural measures to determine potential cultural and social factors involved in differences in verbal emotional expressions.
CHAPTER NINE: LIMITATIONS AND FUTURE DIRECTIONS

This study was successful in achieving the main objective in obtaining reliable data of naturally occurring verbal behaviors to develop a reliable coding system for empathy-related developmental processes. It also demonstrated that most of these behaviors do naturally occur between parents and children, albeit at a relatively low rate, and that parents can influence the frequency of these behaviors exhibited by their children. However, there were several limitations.

Although reliability was assessed for the development of this coding system, the inability to address convergent validity of the iEAR-EPIC coding system with an empathy-construct measure was an important limitation. Further development of the iEPIC system will require establishing construct validity with such measures. At the time this project began, a careful review of the literature revealed few parent or child self-report measures for children this young. Many of the constructs included in the iEAR-EPIC were influenced by rudimentary versions of empathic behavior on measures in older children. More recently, measures are being developed for younger populations that will be sought for construct validity purposes.

Additionally, the only existing coding systems for empathy in young children (the EC and ECS) use laboratory tasks, empathy probes, distress simulations, and interviews to code for early empathic behavior. Therefore, although there was sufficient theoretical and empirical support in the social cognitive, developmental and neuroscience literature to construct the iEPIC system, there was no existent coding system or method available for the naturalistic observation and sampling of these behaviors. The iEAR provided a novel and relatively simple way to unobtrusively collect data from parent-child dyads, thereby decreasing attrition, as well as helping to increase the external validity of the study. However, due to the ambient noise that occurred, in the future, a task such as reading a book to
the child may be considered to ensure consistent interaction, as well as a decrease in confounding external factors during the recordings.

The iEPIC was a novel system in the initial stage of development, which entailed the codes and coding manual going through numerous revisions. Several raters were tested in the process of training, and provided input regarding clarity and ease of coding that led to the revised versions of the manual and codes. Although this was useful in familiarizing raters with the constructs and empirical literature, confounds and bias may have been introduced because of this process. For example, some raters started later than others and were trained only on the final version of the manual/coding system, whereas others were involved in the earlier revision process. This may have impacted the differential accuracy and reliability between raters. As mentioned, some raters took off or were also late on coding assignments, which may have also introduced “coder-drift.”

Future studies may aim to implement quizzes while coding is ongoing to check on reliability and any potential problems with reliability or “coder-drift.” The choice not to do this for the present study was in the interest of avoiding bias and determining how clear the manual and codes were with little direction other than training and answering/reviewing non-specific clarification questions in weekly lab meetings.

Additionally, although all raters were sent the audio files along with transcripts and the follow up sheets (indicating the persons and events in the home), there was no way to be certain that they would in fact use all of these materials. In order to accurately code, re-listening to the audio files was absolutely imperative and emphasized. However, there is a non-zero change that some raters may have used only the transcripts to code. Without the vital information of tone, inflection of voice, amongst other verbal cues, it may have been difficult to accurately code, particularly when differentiating between EES codes, which are inquiries, and ESD codes, which are declarative in nature.
As mentioned, analyses revealed that some codes had significant overlap with others. For example, the ESD2 and 3 codes share conceptual similarities with the EUC 1 and 2 codes. Overall, greater data reduction will be done in the future to tighten the constructs. A simplification of the iEPIC system to consider is a separation of codes by levels, and decreasing the number of levels. Many Level 1 behaviors appeared to be separate from other codes and Level 2 and 3 codes were more positively correlated. Additionally, based on the factor analysis, different codes may be more developmentally appropriate for parents. For example, parents demonstrate all 4 levels of EUC whereas only 2 EUC codes remained after the factor analyses for children. In order to better examine and modify the iEPIC, more samples of audio recordings could be randomly pre-selected and given to a larger number of raters to establish better discriminant validity prior to coding.

Originally, more accurate chance-corrected values (relative to Shrout and Fleiss ICCs) for reliability estimates was attempted because of the low base rate data expected. However, due to the frequency count nature of the coding and the differential parsing of verbalizations between raters, the data remained continuous and proportions had to be made to account for the differential amounts of interactions between dyads. Further, because the data was continuous in nature, it could not be categorized, which precluded the use of Gwet’s AC-1 statistic (2001; the statistic initially planned) without creating a large number of contingency tables. Even with these tables, the calculations would overweight agreement on behavior that did or did not occur, and make partial agreement difficult to account for. Therefore, future studies will seek to sample, categorize, and divide coding assignments to more raters to allow for the easier calculation of more accurate chance-corrected agreement coefficients for low base rate data.

Due to the extremely low frequencies of the EUC codes, they may require revision or the recording period extended. This may favor study designs that include the elicitation of empathic
behaviors via some artificial manipulation (e.g., parent stimulations). As this study showed, without the direct eliciting of empathic behaviors/reactions in parents and children, it is more difficult to investigate. In line with this limitation, because this coding system relies entirely on verbal behavior, many of the facial expressions and body posturing considered important for relaying emotional information is lost. Additionally, recordings were overall clear and audible, but environmental noise made it difficult to hear some interactions, particularly with younger children who had less accurate or clear pronunciation and/or verbal ability. These issues were considered in the development of recording methods, but were trade-offs for a less intrusive method that was more convenient for parents. In the future it may be possible to include visual components, or at least utilize a setting that would make recording clarity better or verbal information less ambiguous (i.e., more structured, quieter settings).

The data in this study was sampled at one time-point. To appropriately assess developmental processes, longitudinal study in the future would be ideal. As mentioned, further exploration of gender and ethnicity is also required, which may require the collection of qualitative data, the inclusion of measures on normative cultural behaviors surrounding emotions, the use of inductive reasoning, ToM differences, as well as measures of gender socialization.
CHAPTER TEN: SUMMARY, SIGNIFICANCE AND APPLICATION

Summary

The current study had several purposes. The primary purpose was to develop and conduct an initial evaluation of a coding system for empathy development and empathy-related behaviors in children-parent dyads. Results showed that the Empathy in Parent-Child Interactions (iEPIC)-iEAR coding system succeeds at being a promising coding system for verbal empathy-related behaviors in parent-child dyads. The interrater reliability results demonstrated that the iEPIC has good reliability, despite one rater pair being below .70. Each iEPIC code also demonstrated sufficient reliability with the majority of intraclass correlation coefficients exceeding .70. However, the iEPIC appeared to be more reliably coded for children. Further, although the hypothesized factor structure was not found, the final 5 factor model evidenced a “good fit. Groups of variables were found to be coded together frequently, and the factors that represent those variables are correlated but sufficiently different from one another. This suggests that there is a meaningful construct underlying each factor, as well as relationships between factors that exist.

It was also found that some variables are occurring more frequently in children 4 years and older, and that these are related to the occurrence of similar parent codes. Only Child ESD2, Total Child ESDs, and Child EES1 were significantly more frequent. Likewise, Parent ESD2 also occurred more often and Parent EES1 significantly less often for those with children 4 years and older. Overall, parent use of iEPIC behaviors concurrently predicts child iEPIC behaviors. In light of this, and the concurrent increase in both parent and child ESD2 codes, it appears that labeling and attributing (i.e., inductive reasoning) emotions and states is occurring concurrently more often for both children 4 years and older, and their parents. Because the attribution of mental and emotional states requires greater cognitive ability, ToM development likely supports the increase in this behavior. Parent attunement and parent-
child imitation likely accounts for the concurrent increase at this time. These results may also support the findings from other research that inductive reasoning about emotions is an important behavior in promoting socio-emotional development in children (e.g., Eisenberg & Morris, 2001).

In regards to child behavior, it appears that Child iEPIC behaviors occur more frequently in children that exhibit less disruptive behavior. In regards to child behavior reported on the ECBI, ECBI Intensity and Problem scores were (in contrast to hypotheses), positively correlated with Parent ESD3 and Child ESD1. The potential reasons for this were previously discussed in detail. Construct differences and parent perceptions of emotionality in children may have influenced this finding.

As mentioned, total Parent iEPIC behavior frequency was found to concurrently predict child iEPIC behavior. Although Parent Engagement moderated this relationship *in the negative direction*, it did not make the relationship insignificant. Therefore, parent’s verbal behaviors are strongly influencing child’s verbal behavior; if parents are exhibiting more iEPIC verbal behaviors on average, their children can be expected to do the same. This is important when considering the abundance of research discussed herein regarding social learning and parent influence on socio-emotional development. Making emotional expressions more normative in the parent-child dyad may have a lasting (i.e., into adulthood), possibly intergenerational, impact on socio-emotional understanding of others. Longitudinal research is required to address this further.

Finally, parent affect and the child’s mean disruptive behavior did not influence the positive relationship between parent iEPIC behaviors and child iEPIC behaviors. Regardless of whether parent affect is positive and/or the child is exhibiting disruptive behavior, parents can still positively influence their child’s empathy-related verbal behavior frequency. There were no differences between genders and only one significant difference between ethnicities for Child EES2 behavior, with Caucasian and Latino-
Non-White children displaying this behavior more frequently. Future analyses are required to further explore these relationships.

**Significance and Application**

The iEPIC system is intended to address critical gaps in current research by naturalistically and unobtrusively measuring empathy in the interactions between mothers and their children, ages two to six. The iEAR technology (pre-programmed recording application for obtaining acoustic data with an ipod) enabled this observational assessment in making it convenient and user-friendly for mothers and their children. Further, there is no observational assessment system available for empathic verbal behavior in young children *and their parents*, particularly one that assesses for developmentally important behaviors of children in the age range of two to six years old. The behavior of parents has been understated or entirely ignored in existent empathy coding systems (e.g., ECS and EC). Therefore, inclusion of parents at this young age may provide a more complete picture of the potential social and cultural context that may influence the development of empathy.

Substantial evidence demonstrates that two years of age is ideal for beginning study of the developmental processes of empathy, due specifically to increased verbal ability (e.g., Denham, 1986; Emde et al., 1992; Knafo et al., 2008; Young, Fox & Zahn-Waxler, 1999; Zahn-Waxler, Shirtcliff, & Marceau, 2008). Yet few studies have also capitalized on the direct assessment of verbal behavior, including parental “teaching” either through verbal modeling or direct explanation of empathic behavior.

Because empathy serves as “social glue,” emotionally and mentally connecting humans to one another, this study has implications for the development of healthy interpersonal interactions, decreasing antisocial behavior, as well as social isolation/alienation that leads to a variety of negative mental health outcomes. The present study identified significant verbal behavior that could inform clinical intervention
or prevention for children presenting with empathic deficits, or to simply improve the development of empathy in normally developing children.

In fact, the research of Golan et al. (2010) and Golan, LaCava, & Baron-Cohen (2009) have proven that empathy and ToM may be taught to young children with autism with training programs (e.g., animated series, “The Transporters”). Further, the program, Mind-Reading (Baron-Cohen et al., 2003), which is inspired by much of the theory supporting the creation of the iEPIC, has more recently been implemented in a variety of cognitive remediation programs to help boost social cognition in both youth and adults with schizophrenia (e.g., Lindenmayer et al., 2013). Interventions are also being posited and developed currently with the goal to “train” emotional understanding in high-risk children presenting with callous-unemotional traits that have had variable success (e.g., Frick, Ray, Thornton, & Kahn, 2014; Hawes & Dadds, 2005; Webster-Stratton & Reid, 2003). However, these programs do not start as early as two years of age. For high-risk children, a program to facilitate empathy development in the context of the parent-child dyad, at a critical socio-cognitive learning period, stands to have great preventative value. Therefore, the proposed iEPIC system may have implications for informing preventative treatment with young children with callous-unemotional traits, autism spectrum disorders, early psychosis, or other disruptive behavior disorders that present with empathy deficits.

This preliminary cross-sectional analysis of the iEPIC observational assessment for different hypothesized levels of empathic ability is intended to examine whether these behaviors are significant in fostering empathy in children. The iEPIC behaviors should be examined longitudinally to better investigate the chronological development and better capture gradual changes in these behaviors. In doing so, direct methods of fostering empathy in children may be extrapolated and adapted for effective implementation in treatment with parent-child dyads. Further research on ethnicity should also be a priority to determine how the iEPIC behaviors and emotional expression and learning may be
qualitatively and/or quantitatively different than the behaviors studied previously in primarily Caucasian populations. This would be crucial in tailoring assessments and interventions to better reach underserved and/or ethnic minority populations, particularly those facing multiple stressors such as participants used in this study.
The iEAR-Empathy in Parent-Child Interactions (iEPIC) Coding System Manual

July 21, 2015

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PURPOSE

The iEAR-Empathy in Parent-Child Interactions (iEPIC) was designed for use as an observational coding system to naturalistically assess parent verbal behavior empirically found to foster empathy development in their children, as well as child verbal behavior found to indicate different levels of empathy development. The iEPIC was created for use with children ages 2-6 years old. The iEPIC observational assessment system allows researchers to gather information about the frequency of empathic verbal behavior coded for, as well as the complexity of that empathic verbal behavior. This is made possible through the collection of auditory data with the Electronically Activated Recorder application (iEAR; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001). The iEAR is an electronically activated device that records behavioral data in naturalistic settings (Mehl, et al., 2001). For the purposes of iEPIC development, mothers bring home the iEAR for one evening to record interactions with their child during their evening routine. Data obtained from use of the iEAR with preschool age children has resulted in good inter-rater reliabilities (ICC = .92) across behaviors, such as crying and whining (Slatcher & Trentacosta, 2011).

DEVELOPMENT

Since the data obtained by the iEAR is acoustic in nature, parenting behavior codes were selected based on empirical findings of parents’ verbal communication known to foster empathy and their relation to the frequency and complexity of empathic verbal behavior demonstrated by children as they age. Content codes were developed and adapted for this acoustic device from a variety of sources including: (1) extant empirical literature on, and manuals for, two empathy coding systems developed for coding empathy development in young children. The first system, the Empathy Coding System (ECS; Robinson et al., 1994; Zahn-Waxler, Radke-Yarrow & Wagner, 1992), utilizes distress simulations, observation, and lab tasks, primarily coding for child behavior, with one mother code to assess for general engagement. The second coding system, the Empathy Continuum (EC; Strayer, 1993), is comprised of an observational assessment of children watching standardized empathy-provoking stimuli and a structured interview with these children, which requires children to identify the characters’ feelings, their feelings in reference to the characters’ feelings, and their understanding of the characters’ mental and emotional states. This system codes primarily by matching a level of cognitive complexity in the child’s understanding of the character’s emotional processes (i.e., the “what” and “why”) with the approximation of the child’s affective response to that of the characters’ emotion. (2) Research on the social, cognitive, and neurological development of the empathy system and (3) the Reflection code, which serves as the most basic of the verbal empathic behavior codes. Reflections are simply verbal mimicry of parent or child to the other.

TRANSCRIPTION AND CODING PROCEDURES

a. Transcription of audio files
The iEAR recording for each participant consists of a four-hour period in which two-minute samples are recorded, separated by 10 seconds each, resulting in 111 audio clips for each participant. All iEAR audio files are downloaded onto a single main computer in a locked laboratory space. Every fourth two-minute audio clip is sampled and transcribed by a research assistant (RA). This occurs after all RAs complete transcription training. After the files are transcribed, a second transcriber reviews them so as to identify
and correct errors or omissions in the original transcription. RA transcribers must obtain 80% accuracy or above on a test of competence using the transcription protocol before beginning to code usable data for the project. The protocol for transcription is attached in Appendix C.

The following procedures will ensure that transcription RA maximizes reliability in their transcriptions:

- Have the “Follow-up Sheet” in direct view for the case being worked on. This sheet lists, nondescriptly, the identity of each person who was in the home or around the child, and the activities engaged in during the iEAR recording. This document is completed immediately following the recording session via a brief telephone interview conducted by an RA.

b. Coding the transcribed audio files with iEPIC

After the files have been transcribed and reviewed, research assistants are trained to 70% reliability and above, at which point, they are ready to begin coding. The following procedures will ensure that coding RAs maximize reliability in their coding:

- Obtain and have the “Follow-up Sheet” for the case being worked on in direct view. This sheet lists, nondescriptly, each person in the home or around the child, and the activities engaged in during the iEAR recording. This document is completed immediately following the recording session via a brief telephone interview conducted by an RA.

- Also in direct view, maintain the coding manual and refer to it continuously when questions arise during coding.

- If anything is unclear in the coding manual, RAs make a note of it, and bring it to the attention of the principal investigator. RA feedback is essential for the refinement and implementation of this coding system.

- Spanish-speaking coders will be assigned Spanish-speaking cases. If a coder is assigned a case in which Spanish is spoken and the coder is not fluent in Spanish, s/he must immediately notify the principal investigator.

- Each two-minute audio clip is rated on a 4-point Likert scale to assess complexity of the verbal behavior for each of the behaviors described below, with the exception of the most basic code, Reflections, which are only given a frequency count. A summary of code descriptions and their relative measurement can be found starting on page 6.

- Coders are to use the transcription AND the audio files to ensure accurate coding of content and complexity, as well as immediacy of response. Coders will refer to the behavioral and language descriptors next to each code and complexity rating to assist in determining the best rating for each clip.

When a behavior does not occur within a given clip, do the following ratings:

Clips with no parent-child iEPIC interaction (no speech or clips in which the mother and/or child speak but not to each other OR that code does not occur) are assigned:
For all iEPIC, including Neutral Talk and Reflections, please leave the box blank and highlight it yellow. Indicate whether there was no coding due to sleeping or no interaction at all in the Note box at the bottom as follows: “clip # Sleep” or “clip# No Interaction.” In the case that there is mostly inaudible and/or indiscernible speech indicated in transcription by extensive use of “xxx’s,” due to an iEAR issue, also indicate this in the Note Box.

All iEPIC codes are to be tallied for each level. For example, if there are 3 Emotion or State Description (ESD) level 1s and 2 level 2 Emotion or State Descriptions (ESDs), you would put a 3 in the ESD1 box and 2 in the ESD 2 box.
EMPATHIC CHILD AND PARENT VERBAL BEHAVIORS

Introduction

Parent and child behaviors are coded only for their interactions with one another, but can be coded if the child or mother is speaking about another person. If the child spends substantial amounts of time interacting with people other than their mother (superfluous red text), please inform the principle investigator.

Important Reminders/Notes:

- Remember that the neurocognitive model inspiring this project is called the Perception Action Mechanism (Preston & de Waal, 2002), indicating initial mimicry (e.g., verbal Reflection in iEPIC) → labeling one’s own emotions → understanding emotions → understanding and labeling another’s emotions → connecting with those emotions/states → ACTION (i.e., altruistic behaviors).

- Please note that all codes are done per verbalization, which makes listening to the clips essential to accurate coding. Pauses indicate a break between verbalizations.

- Commands do not serve the purpose of offering information on emotions or states, but simply direct a child or parent, and thus are coded as Neutral Talk.

- Please indicate in the “Note Box” when a “want” statement occurs for any of the codes. For example, “Do you want attention?” or “I want the toy.” This is a state, and is tallied as such. It is also tallied separately as a “want.” There is a place in the Note Box of each the parent and child coding sheets to tally “want” statement or questions. If there is continued uncertainty, make a decision and indicate it in the Note Box with the clip #.

- If a statement is both an iEPIC code and a Reflection, “code up” as an EES, ESD or EUC. If the verbalization continues to be “reflected” by parent or child in the same verbalization, code the following verbalizations as Reflection(s). The Reflection is always coded for the person repeating the other (i.e., the person “reflecting”). If the child or parent repeats the other’s statement repeatedly in ONE verbalization e.g., “toys toys toys toys,” this is to be only coded as 1 Reflection.

- Descriptions or explanations may include statements where the parent or child make an explanatory statement immediately following an initial emotion or mental state statement. That is, statements do not have to include the direct explanatory word “because” to be considered an explanation. For example: “I am feeling angry. You are not listening to me.”

- Exploring Behavior (EB) and Behavior Descriptions (BD) have been removed from the coding manual and sheet due to (a) persistent inconsistencies and conceptual difficulties with coding them, (b) continued poor Inter-rater Reliability, and (3) their being
conceptually less essential to the constructs investigated by the iEPIC. Any behavior verbalizations are now Neutral Talk.

Reflections (R)

Reflections are the conceptually and developmentally simplest code in the iEPIC system. The code is based loosely off of DPICS’ Reflection code. Reflections signify shared attention between parent and child, and foster bonding between parent and child accordingly. These are coded via a frequency count when either mother or child repeats the statement just made by the other. See above “Introduction” for brief specific guidelines for more difficult Reflection scenarios.

Parent and Child Exploring Emotion and States (P-EES; C-EES)

Definition

This code is given when the mother or child is inquiring about emotions, emotion states, and mental states/intentions (e.g., feeling tired, feeling sick, understanding). The main construct behind this score is that it pertains to behaviors that are not directly perceivable. The lowest level of this code is assigned when the child or parent is asking about what the other is feeling or what state the other(s) are in, or a brief “what hypothesis” about what the others’ emotion or mental state is (“You Scared?”). At the lowest level a “what hypothesis” is an attempt at labeling an emotion or state rather than understanding why or how it occurs.

Inquiries about how or why the other is feeling or experiencing the state they are in infer a greater degree of mental effort to understand the emotion or state, and are therefore scored as a mid-level EES. Finally, inquiry about how or why, which includes a hypothesis regarding why or how the emotion or state is occurring obtains the highest-level EES score. This is because this type of inquiry demonstrates an attempt at confirming an already developed understanding of reasons for the emotion or mental state. It is important to note, that the highest EES level can also be assigned to verbal behavior that indicates an attempt to figure out the cause and effect or reason and result (e.g., “are you happy because you got a present?”). As long as it is an inquiry, it is functionally similar to a hypothesis. The essential differences between the levels can be determined by the following basic guideline:

*If an emotion or mental state is explained following an EES, this statement would receive a separate code as an Emotion and State Description (ESD) with its respective complexity level score (see below). The most important factor that differentiates this code from ESD is that this it is a verbalization involving inquiry, not a declarative statement. A basic guideline for EES coding is:

EES 1 = emotion/state: what? or what hypothesis?
EES 2 = emotion/state: how? or why?
EES 3 = emotion/state: how or why hypothesis?

Specific Rating Guidelines:

Lower scores reflect lower levels of complexity for that behavior and higher scores reflect higher levels of complexity. If there is question as to which level a behavior is scored, score the lower value of the two levels. A “0” is scored in each cell if no Parent and/or Child Exploring of Emotion and States for that level occurred during the clip.
1 = This complexity score is assigned to brief inquiry regarding an emotion or state. The verbalizations do not have to include direct emotion words, but can be words explaining emotion-related states such as “like,” “enjoy,” “hate.”

Examples:

“Sad?”

“What are you feeling?”

“What is wrong with him?”

“You sick?”

“Do you understand me?”

“Do you want attention?”

2 = This complexity score is assigned to parent or child’s efforts to comprehend why emotions or states occur or how they have come about. Additionally, this complexity level can be made for verbalizations during which an attempt is made to better understand and/or deliver hypotheses about why the emotion or state is (or was) occurring.

Examples:

“How did he get so sad?”

“Why is she crying?”

“Why are you angry?”

3 = This complexity score would be assigned when inquiries are about the attribution of emotions to mental processes, intentions, and/or events. Additionally, shared attention may be involved where the mother or child greater explain their potential understanding of something involving the emotion or state during their inquiry (i.e., a why hypothesis). Therefore, the inquiry demonstrates attempts to confirm understanding of cognitive processes or events that contribute to the emotional or mental states. They are also likely to be verbalizations that are longer, followed by immediate attempts to better understand the emotion or mental state, similar to level 2, but more complex. Several inquiries at once can be coded as one code of “3” if they are all stated in the same verbalization to inquire about emotions or states. Essentially, there will often be an emotion or state labeled (what it is) with a why hypothesis.

Examples:

“Are you happy because grandma is coming?”
“Are you getting cranky because you are hungry?”

“I can see that you are frustrated-do you want something?”

“Are you sad because you can’t have your toy back? If I give it back, will you feel better?”

“Are people scared when you turn the lights off because they cannot see where they are going?”

Examples of other potential exchanges:

“Is he sad because he wanted ice cream, but his mommy is angry and does not want him to have it?

“Why is she angry? –is she upset about his bad behavior?”

“Is she worried because her computer is broken and she needs it to get her work done for school?”

**Parent and Child Emotion and State Description (P-ESD; C-ESD)**

**Definition**

Parents or children receive this code when they label, identify or explain emotions or mental states of their own. This is a self-focused code. Simpler scores are attributed to the use of general emotion words or labeling words. This code involves the parent or child expressing the label for an emotion or state to each other. Most importantly, this behavior is a declarative statement, which includes the use of emotion or mental state words in reference to the self only. The mid-level code is assigned for simple how or why explanations of one’s own behavior(s). The highest complexity level is assigned for more descriptive explanations of how or why these emotions or states came about. This level can also be given for describing how or why others have caused an emotion or state in the self. For these codes, there is no question regarding the states and emotions in the verbalization, but they may frequently be coded following an EES. Therefore, these descriptions can be both in response to an inquiry or spontaneous in nature. A “0” is put in each cell when no Parent and/or Child Emotion and State Description occurred for that level during the clip. The essential differences between the levels can be determined by the following basic guideline:

**NOTE:** Again, descriptions or explanations include statements where the parent or child make an explanatory statement immediately following an initial emotion or state statement. Additionally, statements do not have to include the word “because” to be considered an explanation. For example: “My feelings are hurt. The other kids left me alone.” Or “It makes me sad to leave you here alone.”

**ESD 1 = what the emotion or state is in self**

**ESD 2 = how or why emotion state occurred in self**

**ESD 3 = descriptive how or why in self or how another caused emotion or state in self (but not a connection to another person’s emotion, i.e., another person’s mental or emotional state causing a change in emotion or mental state expressed in the observer (parent or child)**

**Rating Guidelines: Global Rating**
Lower scores reflect lower levels of complexity for that behavior and higher scores reflect higher levels of complexity. If there is question as to which level a behavior is scored, score the lower value of the two levels.

1 = This complexity score is assigned to a simple exclamation or labeling of emotion without explanation about why the emotion or state occurred.

Examples:

“Funny!”

“Scary!”

“That book [is] funny!”

“I am scared”

“Ow!” or “Yay!” statements (in younger children)

2 = This complexity score would be assigned to emotions clearly attributed to the “self” including simple how or why descriptions of what caused the emotions or states in themselves.

Examples:

“This movie makes me sad”

“That dog scares me”

“Being hungry makes me cranky”

3 = This complexity score would be assigned for more descriptive attributing of emotions or states to what caused them (how or why). These are complex declarative explanations about their own emotions and states. Additionally, this score would also be given to simple statements attributing emotions or states in one’s self, occurring because of another person.

Examples:

“I am happy because I love to get presents on my birthday”

“I am scared because I am afraid of falling in the dark”

“I am angry because you keep leaving things on the floor I have to pick up”

“Mommy is happy when you pick up your toys because she doesn’t have to do it”

“I like to share because it makes me feel good when I do it”
That boy upset me because he took my toy

**PARENT AND CHILD EMPATHIC UNDERSTANDING AND CONCERN (P-EUC; C-EUC)**

**Definition**
Most importantly this code is **other-focused always, but can be self-reflective of one's emotion/state change or reaction to another's emotion or state**. That is, the self can be included but only in comparison or connection to another person's emotion or state. **At higher levels, this code is assigned for the expression of emotional contagion and/or concern for another. The highest level code is assigned when there are indications of altruistic (e.g., helping, soothing) behavior.** This construct behind this code is meant to reflect an understanding of another’s emotion or state, which gets increasingly empathic (i.e., indicating a clear emotion or state connection between self and other) at higher levels of complexity.

Any noticeable response to the distress of others is coded, particularly parent or child expression of emotion and/or acknowledgement of the emotion in each other or another character. At the lowest level of complexity the child or parent is simply describing the emotion state in another. At the second-level of complexity, the parent or child is explaining/expressing an understanding of the how or why the emotion came about in another (including each other). At the third level of complexity, there is an indication of one’s own emotional reaction to the emotion in another or a parent or child’s attempt to connect the other’s emotional state to another. At the highest level of complexity, there is an additional expression of wanting to help or soothe the other (i.e., altruism) because of their emotional state or one’s own reaction to their emotional state. Therefore, shared-affect, as well as self-other differentiation involving emotion, are coded as a EUC. For these to be coded appropriately and at the correct complexity, **listening for tone in the recordings is often necessary in order to determine other-directedness and/or sympathetic concern.** A “0” is put in each cell if no Parent and/or Child Empathic Concern occurred for that level during the clip.

* Please refer to the first reminder in the “Introduction” for better conceptual understanding of this code.

This is a basic guideline for the scoring of this behavior:

**EUC 1** = acknowledgment/labeling the emotion or state is in the other  
**EUC 2** = expressing understanding of how or why emotion or state occurred in other  
**EUC 3** = expression/elicitation of one’s emotional reaction as a result of another’s emotional state  
**EUC 4** = sympathetic concern; expressing emotion for another and intention to soothe or help

**Rating Guidelines: Global Rating**
Lower scores reflect lower levels of complexity for that behavior and higher scores reflect higher levels of complexity. If there is question as to which level a behavior is scored, score the lower value of the two levels. Assign one of the following ratings for each audio clip.

1 = This complexity code is assigned if the parent or child expresses a simple acknowledgment/description of emotion in another.
Examples:

“I’m sorry!”

“That boy is really sad!”

“You look really happy”

“He’s [You’re] scared!”

2 = This complexity code is assigned if the parent or child demonstrates knowledge about how or why the emotion came about in another.

Examples:

“That boy is sad because they took all his toys”

“You are angry because I messed up the room”

“She is disappointed because she didn’t get a present”

“He gets annoyed when people don’t wait their turn”

3 = This complexity score is given for an indication of understanding what the person is going through and a connection to this emotional state through one’s own reaction to it. Essentially, this complexity score is expressing one’s own emotional reaction to another’s emotional state. It is assigned primarily when there are clear verbal statements relaying an emotional response to another or affect matching. Additionally, this can be coded when parents make an attempt to connect their child’s state to anothers.

“I am upset that you are sad”

“I feel bad when you are hurt”

“That upsets me!” (*this would have to be in response to another’s emotional or mental state. Thus, context and tone are important here)

“I’m sorry that you’re sad”

“You’re angry? I’m angry!”

“You and I are both tired!” or even “You tired? I’m tired” (*there is an attempt to affect match)

“Remember how sad you were when you lost your toy?”

“It feels really good when people share with you, right? Well, let’s share to make that little boy happy”
4 = This code is given for more complex expressions understanding an emotional state of another often with sympathetic reaction and/or simple intentions to soothe, calm, or help another are made clear (i.e., altruistic intentions are expressed with a noticeable reaction to the other). The tone of the verbalization should be one of concern or emotionally charged (i.e., a change from the person’s normal affective tone) with a potentially greater explanation of an emotional connection between self and other.

Examples:

“It makes me angry that they did that to you. Do you want me to speak with them?”

“You look tired. I can help you mommy?”

“That really stinks. I’m sorry you lost. Here’s a hug [to make you feel better]”

“I am sad he lost his toy. He looks really upset. I want to help him” or “I want to hug him because he is sad from losing his toy”

“I’m sorry that you are so angry about not getting to sit there. I will let you sit in my spot if that makes you feel any better?”

“I know how he/she feels. I was sad when I lost my toy too [I can help him find it]”

[Maybe we should help him]”

Neutral Verbalizations (N)

All verbalizations made between mother and child that are not coded by the iEPIC coding system will be counted via a frequency count for the purposes of analyses.
iEPIC “Cheat Sheet”

Exploring Emotion or State (Parent-EES; Child-EES)

EES 1 = emotion/state: what? or what hypothesis?
EES 2 = emotion/state: how? or why?
EES 3 = emotion/state: how or why hypothesis?

Emotion or State Description (Parent-ESD; Child-ESD)

ESD 1 = what the emotion or state is in self
ESD 2 = how or why emotion state occurred in self
ESD 3 = descriptive how or why in self or how another caused emotion or state in self

Empathic Understanding or Concern (Parent-EUC; Child-EUC)

EUC 1 = acknowledgment/labeling the emotion or state is in the other
EUC 2 = expressing understanding of how or why emotion or state occurred in other
EUC 3 = expression/elicitatation of one’s emotional reaction as a result of another’s emotional state; emotional contagion
EUC 4 = sympathetic concern; expressing emotion for another and intention to soothe or help

Differentiating between an ESD and an EUC guidelines:

EUC is acknowledging an emotion in another, and at higher levels another person's emotion changing an emotion in the self.

ESDs are self-focused however. That is, another person can do something to make you feel a certain way but you are NOT necessarily connecting with their emotion.

For example "I am angry because you did not pick up your toys" is an ESD
Whereas e.g., "It makes me sad when you are so down" is an EUC.

An ESD does not indicate a clear connection or acknowledgement to another person's emotion, whereas, an EUC (Empathic Understanding and Concern) does. The empirical definition of empathy is: one person's state or emotion changing the state or emotion in another, such that, had they not come into contact with the other person's state or emotion, their own would have remained unchanged. Therefore, it is a change from their "normal" state because of another's emotion or state.

An ESD does not indicate this kind of emotional contagion and/or connection between two people's states or emotions. Empathy requires emotional connection and this could be between mother and child or child and another person etc. (e.g., you are not coding their convo with anyone other than the mother, but they may mention feeling some way for another person because of that person's feelings -e.g., I feel sad about that boy being upset). Listening for changes in tone or mood is important.
APPENDIX B

iEAR-EPIC Coding Sheet

<table>
<thead>
<tr>
<th>#</th>
<th>Field 1</th>
<th>Field 2</th>
<th>Field 3</th>
<th>Field 4</th>
<th>Field 5</th>
<th>Field 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
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<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
<td>Value 5</td>
<td>Value 6</td>
</tr>
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<td>4</td>
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<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
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<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
<td>Value 5</td>
<td>Value 6</td>
</tr>
</tbody>
</table>

NOTES: Any additional notes go here.
Transcription Guidelines & Tips
(Internal document, created by Heather Knous-Westfall, M.A.)

It is important to put in place markers for words you are unclear about and things the child is uttering, or we won’t know by looking at the transcript whether or not there was any interaction. If you just can’t understand what the word or phrase is, just do your best to estimate how many separate words were spoken and put xxx xxx xxx place markers for each one. This includes utterances by the child that may sound like gibberish or baby talk. Please do not leave entire passages blank, just try your best to estimate how many place markers to put in there (one set of xxx per each unknown word).

We are only transcribing for ONE child, and that would be the OLDEST one under 6 years old (phase 2), or the oldest one between ages 2-6 (phase 3). If there are multiple children in the audio files, you MUST obtain information about the study child to ensure the correct child is transcribed either by asking me, and/or looking at the follow-up form.

*Always check the data dictionary document if unsure of something.

A few examples:
Daddy, papa, and dada are not in there, so we have to change these all to “dad.”
It’s either “oclock” or “o’clock” there can’t be a space in there. Some words you might not expect to be there, like “gonna,” are in fact there. Note, in this case, we are not following the document given to us by the other experimental team. We are leaving words like gonna, wanna, gotcha as is as they ARE in the data dictionary. However, coz, cos, and ‘cause have to be changed to “because” and “gotta” should be changed to “got to.” The word can not has to be typed as “cannot.”

Times and Numbers
• The only time we can put a number is if it is referring to a time. So if they say they are going to a movie at 8. You can put “I am going to a movie at 8pm” or “I am going to a movie at 8:00pm.” There’s can’t be a space between the number and the am or pm. If the person specifically says 8 o’clock, you would then write “I am going to a movie at eight o’clock.”
• If the child is counting numbers, you have to write them out and same thing if the mother is saying an address.

Fillers
Don’t forget to do a search for the words “like,” “well,” “I mean,” “oh well,” “I don’t know,” “ya know,” and “you know.” If they are used as fillers (some examples are given later), they need to be changed to “rrlike,” “rrwell,” “imean,” “ohwell,” “idontknow,” “yaknow,” and “youknow,” respectively.
Non-Fluencies

- DO NOT FORGET to change all “OH” or “AH” to “UH.” Also keep in mind that if the mom says “oh well” that is a filler and the oh stays, but it changes to “ohwell.”
- Hmm, hmm, um, umm, are all okay.
- Uh-uh and uh-huh need to be changed to “no” and “yes.”
- Huh? Should be changed to “what?”

Nonsense words

- You may run into a child who is potty training. If they use words like doodoo or caca, the word “poop” IS in the dictionary so you can change those to that.
- Be careful about writing out singing because one of the words may be an actual word. If the mom sings “le de da do de” for example, “do” is a real word and it will get counted incorrectly. In this instance, I would change the do to “doo” so it’s nonsense.
- Made up words that are close to real words should be changed to the real word, for example, bestest changed to best. Just make a note of this in the appendix.
- If something is read from a book but is nonsense, leave as is. For example, the word “gimmies.”
- Also, if the person is singing or saying something weird like “boom chicka boom” leave this as is and it will just be coded as nonsense.
- The words ow, ouch, and yo are not in the dictionary, but leave those in there as is.
- If the person swears, those words are in the data dictionary (at least most are), and need to be written as is.

Sleep

If it is clear that the child was sleeping for an HOUR OR MORE during the recording, please make a note of this in the appendix. We may later go back and transcribe more files from the portions when the child was not asleep.

The Appendix

- Put anything here that will help us understand the data.
- If you changed words, note that here.
- For those who translate, make sure to note any issues with translation or changed words here.
- Note unusual sleep issues here.
- Note any issues with the iear here, i.e., iear was removed, etc.

Punctuation is not necessary, but you are more than welcome to put it in there.

Examples of things people seem to have trouble with:
Stuttering:

- The mom says, "Hello, hello, are you listening to me?" The transcriber should leave this as is.
- The mom says, "I don't, I don't know what you mean." The transcriber should change to "Uh, I don't know what you mean."
• The mom says, "I think I um I think, you know, that I should" I would change this to "Uh, um, I think you know that I should"

• Like:
The mom says, "Oh, it was like, you know, 70 degrees outside" should be changed to "Uh, it was like you know, seventy degrees outside"
The mom says, "It's not like I wanted to." This stays as is.
The mom says, "Do you like that? It's like your other stuffed animal. You know what I mean baby, like fluffy? She's like smiling and laughing at this toy." Should be "Do you like that? It's like your other stuffed animal. You know what I mean baby, like fluffy? She's like smiling and laughing at this toy."

• Well:
Mom says: "Well, it's not like you started it." Should be "Well, it's not like you started it."
Mom says: "You know very well what I mean" stays as is.
Mom says, "Oh, well, I don't know, do whatever you want." Should be "Uh, well, I don't know, do whatever you want."

Formatting
The transcript should be formatted in a way that a reader can follow the flow of the language. If the mother says “What baby?” and the child then replies, “Look at the xxx,” and then at the same time they both say “Uh,” the transcript would look like this:

<table>
<thead>
<tr>
<th>Participant id</th>
<th>111111</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>3/31/2013</td>
</tr>
<tr>
<td>File Time</td>
<td>9:05-9:07</td>
</tr>
<tr>
<td>Mother’s Transcript</td>
<td>Child’s Transcript</td>
</tr>
<tr>
<td>What baby?</td>
<td>Look at the xxx.</td>
</tr>
<tr>
<td>Uh.</td>
<td>Uh.</td>
</tr>
</tbody>
</table>

Transcript color code legend:
Words need to be in red if the mother is talking to someone other than the target child (including talking to herself), and if the target child is talking to someone other than the mother (including to him/herself).

Highlight the heading (so the id, file time, etc.) in pink if you believe the audio file contains Spanish and you can’t translate.

If you can translate, then translate into English, and highlight the words you translate in yellow. Also make notes in an appendix in the end for what was changed, etc.

If the words you are translating into English are spoken to someone else, then make sure the text is red, and it’s highlighted yellow.
APPENDIX D

Eyberg Child Behavior Inventory (Robinson, Eyberg, & Ross, 1980)

Below are a series of phrases that describe children’s behavior. Please choose the response that describes how often the behavior currently occurs with your child, and then indicate whether or not the behavior is currently a problem for you.

Please answer the following questions about your child that is 6 years of age or younger. If you have two or more children age 6 or under, please answer about the oldest of those children.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>ecbi1a</td>
<td>Dawdles in getting dressed</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= Always</td>
</tr>
<tr>
<td>ecbi1b</td>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi2a</td>
<td>Dawdles or lingers at mealtime</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= Always</td>
</tr>
<tr>
<td>ecbi2b</td>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi3a</td>
<td>Has poor table manners</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= Always</td>
</tr>
<tr>
<td>ecbi3b</td>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi4a</td>
<td>Refuses to eat food presented</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= Always</td>
</tr>
<tr>
<td>ecbi4b</td>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi5a</td>
<td>Refuses to do chores when asked</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= Always</td>
</tr>
<tr>
<td>ecbi5b</td>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi6a</td>
<td>Slow in getting ready for bed</td>
<td>1= Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seldom</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Rating Options</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>ecbi6b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi7a</td>
<td>Refuses to go to bed on time</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi7b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi8a</td>
<td>Does not obey house rules on own</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi8b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi9a</td>
<td>Refuses to obey until threatened with punishment</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi9b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi10a</td>
<td>Acts defiant when told to do something</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi10b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi11a</td>
<td>Argues with parents about rules</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi11b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi12a</td>
<td>Gets angry when doesn’t get own way</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi12b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi13a</td>
<td>Has temper tantrums</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
</tr>
<tr>
<td>ecbi13b</td>
<td><em>Is this a problem for you?</em></td>
<td>Yes/No</td>
</tr>
</tbody>
</table>
| ecbi14a | Sasses adults | 1= Never  
|         |              | 2= Seldom  
|         |              | 3= Sometimes  
|         |              | 4= Often  
|         |              | 5= Always  
| ecbi14b | *Is this a problem for you?* | Yes/No  
| ecbi15a | Whines | 1= Never  
|         |          | 2= Seldom  
|         |          | 3= Sometimes  
|         |          | 4= Often  
|         |          | 5= Always  
| ecbi15b | *Is this a problem for you?* | Yes/No  
| ecbi16a | Cries easily | 1= Never  
|         |            | 2= Seldom  
|         |            | 3= Sometimes  
|         |            | 4= Often  
|         |            | 5= Always  
| ecbi16b | *Is this a problem for you?* | Yes/No  
| ecbi17a | Yells or screams | 1= Never  
|         |              | 2= Seldom  
|         |              | 3= Sometimes  
|         |              | 4= Often  
|         |              | 5= Always  
| ecbi17b | *Is this a problem for you?* | Yes/No  
| ecbi18a | Hits parents | 1= Never  
|         |              | 2= Seldom  
|         |              | 3= Sometimes  
|         |              | 4= Often  
|         |              | 5= Always  
| ecbi18b | *Is this a problem for you?* | Yes/No  
| ecbi19a | Destroys toys and other objects | 1= Never  
|         |              | 2= Seldom  
|         |              | 3= Sometimes  
|         |              | 4= Often  
|         |              | 5= Always  
| ecbi19b | *Is this a problem for you?* | Yes/No  
| ecbi20a | Is careless with toys and other objects | 1= Never  
|         |              | 2= Seldom  
|         |              | 3= Sometimes  
|         |              | 4= Often  
|         |              | 5= Always  
| ecbi20b | *Is this a problem for you?* | Yes/No  
| ecbi21a | Steals | 1= Never  
|         |          | 2= Seldom  
|         |          | 3= Sometimes  
|         |          | 4= Often  

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<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Question</th>
<th>Rating Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>ecbi21a</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi22a</td>
<td>Lies</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi22b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi23a</td>
<td>Teases or provokes other children</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi23b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi24a</td>
<td>Verbally fights with friends own age</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi24b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi25a</td>
<td>Verbally fights with sisters and brothers</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi25b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi26a</td>
<td>Physically fights with friends own age</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi26b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi27a</td>
<td>Physically fights with sisters and brothers</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi27b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi28a</td>
<td>Constantly seeks attention</td>
<td>1= Never, 2= Seldom, 3= Sometimes, 4= Often, 5= Always</td>
<td></td>
</tr>
<tr>
<td>ecbi28b</td>
<td>Is this a problem for you?</td>
<td></td>
<td>Yes/No</td>
</tr>
<tr>
<td>ecbi29a</td>
<td>Interrupts</td>
<td>1= Never, 2= Seldom</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Rating Options</td>
<td>Response Options</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>Is this a problem for you?</td>
<td>Yes/No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi29b Is easily distracted</td>
<td>1= Never</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi30a Has short attention span</td>
<td>2= Seldom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi30b Fails to finish tasks or projects</td>
<td>3= Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi31a Has difficulty entertaining self alone</td>
<td>4= Often</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi31b Is overactive or restless</td>
<td>5= Always</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi32a Wets the bed</td>
<td>3= Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi32b</td>
<td>4= Often</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi33a</td>
<td>5= Always</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi33b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi34a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi34b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi35a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi35b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ecbi36a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E

The iPARENT Coding System: a Manual

May 2013

Written by

Thailyn López Alonso

John Jay College of Criminal Justice
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PURPOSE

The iPARENT is designed for use as an observational assessment system for assessing the parenting practices of parents with children ages 2-6 years. The iPARENT allows researchers to rate naturalistic observations of parenting behaviors that have been collected through use of the Electronically Activated Recorder application (iEAR; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001). The iEAR is a device that is worn on the participant’s person for a specified time period and is designed to record the individual’s verbalizations in a naturalistic setting.

DEVELOPMENT

Since the data obtained by the iEAR is acoustic in nature, parenting behavior codes were selected based on empirical findings of parents’ verbal communication and their relation to the development and maintenance of child externalizing behavior problems. Content codes were developed and adapted for this acoustic device from a variety of sources including: (1) extant empirical literature on parenting practices that have been consistently and reliably shown to predict child behavior problems; (2) reliable and valid parent self-report measures, specifically the Parenting Scale (Arnold, O’Leary, Wolff, & Acker, 1993) and the Eyberg Child Behavior Inventory (Robinson, Eyberg, & Ross, 1980); and (3) the most psychometrically well-established observational coding system for live and videotaped parent child interactions, the Dyadic Parent-Child Interaction Coding System (DPICS; Robinson, & Eyberg, 1981).

TRANSCRIPTION AND CODING PROCEDURES

a. Transcription of audio files

The iEAR recording for each participant consists of a four-hour span in which two-minute samples are recorded, separated by 10 seconds each, resulting in 111 audio clips for each participant. All iEAR audio files are downloaded onto a single main computer in a locked laboratory space. Every fourth two-minute audio clip is sampled and transcribed by a research assistant (RA) who has completed transcription training. After the files have been transcribed, a second transcriber reviews them in order to identify and correct any errors or omissions. Transcription RAs receive a test of competence for the transcription protocol before beginning to code usable data for the project. Only after sample transcriptions are completed with 80% accuracy are transcribers permitted to begin work with the usable data files. The protocol for transcription is attached in Appendix B.

The following procedures will ensure that transcription RAs maximize reliability in their transcriptions:

- Maintain, in direct view, the “Follow-up Sheet” for the case being worked on; it lists the identity of each person who was at the home and the activities engaged in during the iEAR recording. This document is completed immediately following the recording session via a brief telephone interview that is conducted by an RA.

b. Coding the transcribed audio files with iPARENT

After the files have been transcribed and reviewed, research assistants are trained to 80% reliability, at which point, they are ready to begin coding.

The following procedures will ensure that coding RAs maximize reliability in their coding:

- Maintain, in direct view, the “Follow-up Sheet” for the case being worked on; it lists the identity of each person who was at the home and the activities engaged in during the iEAR recording. This document is completed immediately following the recording session via a brief telephone interview that is conducted by an RA.
Also in direct view, maintain the coding manual and refer to it continuously when questions arise during coding.
If anything is unclear in the coding manual, make a note of it and bring it to the attention of the principal investigator. RA feedback is essential for the refinement and implementation of this coding system.

Spanish-speaking coders will be assigned Spanish-speaking cases. If a coder is assigned a case in which Spanish is spoken and the coder is not fluent in Spanish, s/he must immediately notify the principal investigator.

Each two-minute audio clip is rated on a 5-point Likert scale or a frequency count for each of the behaviors described below. Due to the nature of the observation, conceptual differences between behavior codes, and past research, it was determined that some codes would be best assessed via global ratings and others via frequency counts. A summary of code descriptions and their relative measurement (global rating versus frequency counts) can be found on page 29. Coders are to use the transcription AND the audio files simultaneously, to ensure accurate coding of nonverbal cues, such as tone. Coders must refer to the behavioral and language descriptors next to each rating to assist in determining the best rating for each clip. When a behavior does not occur within a given clip, apply one of the following ratings:

- Clips in which there is no parent-child interaction (no speech or clips in which the mother and/or child speak but not to each other). Contact the principal investigator to determine how to rate clips in which there is very brief speech or clips in which no language is exchanged but sounds are transcribed (i.e., “Hmm,” “Mm”).
  - For global codes = 99,
    - Exception of Engagement and Negative Talk Harshness = 1
  - For frequency count codes = 0

- Clips in which iEAR issues arise such as: difficulty hearing/understanding speech due to unclear recordings or participant failure to wear the device (determined by transcriber notes and examining follow up sheets) = 88

Whenever inaudible/indiscernible speech is indicated by the use of “xxx’s,” these will be coded as Neutral Talk (p. 14). Use the audio component of the observation to determine how many “xxx’s” make up one count of Neutral Talk. If the extensive use of “xxx’s” is due to an iEAR issue, code the clip as 88.

- Clips in which the child is sleeping (determined by examination of the follow up sheet and any verbal indication on recordings, such as parent telling someone the child is asleep) = 77

In addition to receiving a unique parenting score for each behavior, the variability of individual parenting behaviors between clips will serve as a measure of parental consistency.
PARENTING BEHAVIORS

ENGAGEMENT (E)

Definition

Engagement is defined as the degree of parent involvement with the child. This code assesses the amount, not quality, of overall parent-child interaction(s) and parental responsiveness to the child. Either the parent or the child can initiate the interaction. Negative, neutral, and positive involvements all qualify as engagement.

1. **Negative involvement** (criticisms, name-calling, threats, etc.)
2. **Neutral involvement** (commands, statements, non-fluencies, etc.)
3. **Positive involvement** (terms of endearment, encouragement, praise, playful sounds, etc.)

Rating Guidelines: Global Rating

- Assign one of the following ratings for each audio clip. Lower scores reflect lower levels of parental engagement. Higher scores reflect higher levels of engagement, meaning more parent-child interaction, initiated or continued by the parent, overall.
- Please keep in mind that while some audio clips will have much more speech than others, more speech may not necessarily mean more engagement (although it could in many instances). Please refer to the rating guidelines when coding each audio clip.

1. **WHICH OF THE FOLLOWING BEST DESCRIBES THE PARENT’S OVERALL LEVEL OF ENGAGEMENT WITH THE CHILD? ____**

1 = **Disengagement.** Apply this code if there is no parent-child interaction. Absence of parent-child interactions includes audio samples that are silent throughout and samples in which the parent is only interacting with an individual other than the child (i.e., talking on the phone). This code is applied instead of 99.

2 = It is unclear as to whether or not the parent is listening; the parent may be distracted with another task or speaking to another person during the times that the child is attempting to interact. The parent may (1) very infrequently say something very brief to the child, or (2) the child may be making repeated attempts to obtain the parent’s attention and the parent rarely, if ever, verbally responds. When the parent does say something to the child, s/he shows little interest (i.e. responses are brief, monosyllabic, and monotone) and quickly returns to their previous task.

This rating is lower than “3” with regards to the amount of effort the parent makes to engage the child and/or the amount of effort the child has to make to obtain the parent’s attention. Frequency of parent response to the child’s calls for attention are also lower in “2” than “3.”
3 = Passive Involvement. The parent may (1) sometimes say something to the child or, (2) responds to many of the child’s calls for attention. However, the parent provides minimal attention and in some cases rarely initiates the interaction. When the parent does initiate the interaction, speech is brief (e.g., telling a child to stop doing something, giving the child a command, or providing brief praise, and returning to original activity). The parent rarely tracks or acknowledges the child’s activity or behavior. Verbalizations/interactions with the child are intermittent, brief, unenthusiastic (whether positive or negative), and may be mostly solicited by the child, rather than generated independent of the child’s efforts obtain the parent’s attention (e.g., “because,” “hmm,” “yeah,” etc.).

This rating also includes interactions in which there is a reasonably strong engagement but only for a brief portion (time) of the clip.

This rating is lower than “4” with regards to frequency with which the parent initiates the interaction, duration of engagement with the child, and in response to the child’s attempts to initiate interaction.

4 = The parent is involved and responsive to the child for the most part but there may be moments when she briefly disengages and then resumes active involvement soon thereafter. The parent frequently initiates the interaction but may be minimally distracted with another task or person.

This rating is lower than “5” with regards to frequency, intensity, and duration of engagement. It is also lower than “5” with regards to the amount of distraction the parent experiences while engaging the child.

5 = Active Involvement. The parent is fully immersed in activity/conversation with her child. She responds to most, if not all, of her child’s calls for attention, comments on the child’s activities, and displays interest in the outcome of the child’s activities. The parent frequently initiates the interaction and there is a high frequency of parent-child verbalizations in the audio sample. There may also be instances where there is a high frequency of parent verbalizations and low frequency of child verbalizations, but in these cases it is clear that the parent is interacting with the child at a high frequency, duration, and intensity. This high level of engagement can include positive, neutral, or negative verbalizations (i.e., intensely berating child or giving great amounts of enthusiastic praise).

Examples

Child calls out, “Mommy?” and mother never responds. (Code 2)


Child says, “Look at this. Look at this mommy.” and there is no response.

Child calls out again, “Mommy look!” no response.

Again, child says, “Look mommy!” and mother responds, “Hm.” (Code 2)
Child says, “Look at this. Look at this mommy.” and mother responds, “That’s cool.”
Child calls out again, “Mommy look.” and mother responds, “Yes, I saw it!” (Code 3)

Child calls out, “Mommy look!” and mother immediately responds (within 2-seconds) “Oh my goodness, what a beautiful drawing! You are such a good artist! Can we draw something together? [goes on for a significant portion of clip]” (Code 5)

“Joey, get down from there this instance! That’s so dangerous! Haven’t I told you to never do that?! Don’t you ever learn? Now I am going to have to…. [goes on for significant portion of clip]” (Code 5)

***Remember that interactions can be negative, neutral, or positive.

PARENT AFFECT (ParA)

Definition

Parent Affect is defined as the emotional quality of the parent’s verbalizations. It is coded on the basis of tone of voice and/or inflections. When judging affect, please take intensity, duration, and proportion of time into consideration. Two scales are used to code the affect demonstrated by the parent in each audio sample: Degree of positive affect and degree of negative affect.

1. Positive Affect: the parent’s positive evaluative expression of pleasure, warmth, enthusiasm, or gratitude. Laughter and giggling during interactions with the child are also coded as Positive Affect.

2. Negative Affect: the parent’s negative evaluative expressions of unhappiness, disapproval, anger, or hostility. Screaming, yelling, or crying are coded as Negative Affect.

Rating Guidelines: Global Rating

- Within each audio clip, rate the overall level of Positive and Negative Affect demonstrated by the parent’s audible behaviors.
- Only code parent affect that is demonstrated in interactions between the parent and the target child.
- Higher scores reflect higher levels of intensity (loudness, duration, or voice intonation) and proportion of time in which positive and negative affects are expressed. Lower scores reflect lower levels of intensity and proportion of time in which the positive or negative affect was expressed.

Decision Rule(s)
a. If parent affect shifts within a given audio clip, choose the rating that best reflects the dominant positive or negative affect demonstrated in the clip.
b. If the parent begins laughing or giggling uncontrollably while they are engaged with their child, automatically assign a Positive Affect rating of “5.”
c. If a parent screams, yells, or curses at their child, automatically assign a Negative Affect rating of “5.”

1. WHICH OF THE FOLLOWING BEST DESCRIBES THE PARENT’S OVERALL POSITIVE AFFECT WHEN INTERACTING WITH THEIR CHILD? ____

1 = Parent displays no positive affect. This code is applied when there is no positive affect demonstrated throughout an entire clip. This may occur when the parent displays only negative affect.

2 = Parent displays little positive affect (1-25% of the audio sample). When s/he does, statements, including positive evaluative expressions, are mostly stated in a neutral tone. This is different from “1” in that the tone of the parent’s speech leans towards slightly positive in some instances and/or the parent may make positive evaluative statements about the child (e.g., “Good job,” “Nice”) or use a term of endearment (e.g., “Baby,” “Sweetie”). The parent’s tone is flat most but not all of the time.

Neutral affect is typical of general conversations between family and friends. Only slight fluctuations in affect (from neutral to positive) are given this rating.

3 = Parent sometimes (25-50% of the audio sample) displays positive affect and is occasionally enthusiastic when doing so. Parent’s tone of voice leans towards pleased and happy in about half of all interactions.

*Example descriptors:* calm, mild, cordial, polite

4 = Parent displays several instances of positive affect (50-75% of the audio sample). Positive evaluative expressions are mostly stated in an enthusiastic tone. The parent demonstrates notable warmth, interest, pleasure, supportiveness or affection. Behavior may be expressed with laughter, affection and/or enthusiastic interest.

*Example descriptors:* warm, affectionate, enthused, interested, lively, happy, approving, encouraging, solicitous, playful

5 = Parent frequently and intensely (75-100% of the audio sample) displays marked expressions of intense happiness, warmth, affection, pleasure, and/or supportiveness.

The difference between “4” and “5” is that “5” indicates more intense expressions of positive affect that are unmistakably pleasurable and are less controlled. Intensity may be expressed by loudness, length of words, and intensity of voice intonation.
Example descriptors: overjoyed, exhilarated, rejoicing, loving, excited, enthusiastic, bursting with laughter

2. WHICH OF THE FOLLOWING BEST DESCRIBES THE PARENT’S OVERALL NEGATIVE AFFECT WHEN INTERACTING WITH THEIR CHILD? ____

1 = Parent displays no negative affect. This code is applied when there is no negative affect demonstrated throughout an entire clip. This may occur when the parent displays only positive affect.

2 = Parent displays little negative affect (1-25% of the audio sample). When s/he does, statements, including negative evaluative expressions, are mostly stated in a neutral tone. This is different from “1” in that the tone of the parent’s speech leans towards slightly negative in some instances and/or the parent may make negative evaluative statements about the child (e.g., “Stop being bad”). The parent’s tone is flat most but not all of the time.

Only slight fluctuations in affect (from neutral to negative) are given this rating. When a person is upset or stern but not clearly in a positive or negative way, code “2.”

3 = Parent sometimes displays negative affect (25-50% of the audio sample). Parent’s tone of voice is irritable in about half of all interactions.

Example descriptors: stressed, irritable, annoyed

4 = Parent displays several instances of negative affect (50-75% of the audio sample). The parent’s tone of voice indicates mild displeasure, irritation, sadness, contempt, slight hostility and/or mild disapproval. Tone of voice is less extreme than “5.”

Example descriptors: complaining, cold, dismissive, somber, curt, rejecting, defensive, bitter, unhappy, quarrelsome, contemptuous, exasperating, teasing, menacing, bossy

5 = The parent frequently and intensely (75-100% of the audio sample) displays marked expressions of clear and pronounced anger, disapproval, displeasure, or demeaning affect. Tone of voice is loud, harsh, tense, threatening, angry, provocative, extremely sad, depressed, or very unhappy. If the parent curses at the child or you can hear evidence of physical punishment, automatically apply this code (e.g., “I’m going to whoop your ass.”).

Example descriptors: abusive, belligerent, clearly disapproving, angry, enraged, vindictive, taunting, defeated, hostile, guilt-tripping, violent, tantrums, screaming
PRAISE (P)

Definition

Praise is a verbalization, containing one or more positive evaluative words or phrases that express a favorable judgment on an activity, product, or attribute of the child. Praise can be delivered in the form of a statement or a question. There are two kinds of praises, Unlabeled and Labeled.

1. Unlabeled Praise (UP) – a nonspecific verbalization that expresses a favorable judgment about an activity, product, or attribute of the child. Unlabeled Praises do not specifically state what activity, product, or attribute of the child is being praised. It does not explicitly indicate to the child what can be done again to obtain a similar praise.

   “Great!”
   “Excellent.”
   “Thanks!”
   “You’re right”
   “Good job!”
   “Awesome, honey!”
   “You’re my little helper.”
   “What a sweetheart!”
   “Here comes daddy’s princess”

   A positive metaphor or term of endearment referring to the child is Unlabeled Praise.

   “You’re my little helper.”
   “What a sweetheart!”
   “Here comes daddy’s princess”

   A brief positive evaluative word of phrase that occurs before or after a descriptive statement is an unlabeled praise.

   “Great! You finished putting away the Legos.” (UP + Neutral Talk)
   “You drew a horse. Nice” (Neutral Talk + UP)

   Sometimes parents attempt to praise their child but the adjectives they use are not sufficiently positive to qualify as praise. These are then considered statements and are coded as Neutral Talk. See below for examples.

   “You are so alert today.”
   “That’s very energetic of you.”
   “That’s very funny.”
   “You’re quick.”
   “That was carefully done.”
   “You’re helping to put the toys away.”
   “That was an interesting story.”
   “You’re being quiet.”
   “You are so patient.”
   “You’re cleaning up.”
   “That’s very straight.”
   “That’s exciting.”

2. Labeled Praise (LP) – a specific verbalization that expresses a favorable judgment about an activity, product, or attribute of the child. Labeled Praises specifically state what
activity, product, or attribute of the child is being praised. It explicitly indicates to the child what can be done again to receive a similar praise.

“You sing so well.”  “It’s awesome that you know all your letters!”
“You have a beautiful smile.”  “You’re coloring is beautiful.”
“Thank you for handing me the box.”  “I like the way you sit so quietly.”
“You’re a good builder!”  “Your picture is lovely.”
“Thanks for putting that in the box.”  “You’re so smart for finishing your homework.”

If the child asks for praise and the parent obliges, it is coded as praise.

“Did I do a good job?” --- “You did do a good job!” (UP; good job doing what?)
“Did I do a good job?” --- “You did do a good job stacking the blocks!” (LP)
“Did I do a good job cleaning up?” --- “You did do a good job!” (UP)
“Did I do a good job cleaning up?” --- “You did do a good job cleaning up!” (LP)

Another important point to remember is that a labeled praise must contain an evaluative component that is clearly positive.

“It’s great that you are trying so hard with that puzzle.” (LP)
“You’re trying so hard with that puzzle.” (Neutral Talk)

“I like the way you drew that picture so quickly.” (LP)
“You drew that picture quickly.” (Neutral Talk)

**Rating Guidelines: Frequency Count**

- For each audio clip, count the number of Unlabeled Praises and the number of Labeled Praises given by a parent to the child.
- Two consecutive praise statements are counted as two praises. See below for examples.

1. **HOW MANY UNLABELED PRAISES? ____**
2. **HOW MANY LABELED PRAISES? ____**

**Decision Rule(s)**

a. If unsure as to whether the praise is Labeled or Unlabeled, code Unlabeled.

**Examples**

“Cool.” (UP)
“You’re smart!” (UP)
“Wow! Look at you go!” (UP + DC)
“I like how carefully you are writing your numbers.” (LP)
“Good idea. You’re smart for gathering up the blocks first.” (UP + LP)
“Thanks for putting that back on the shelf. You’re the best.” (LP + UP)
“It’s nice how you hold her so gently.” (LP)
“You put the blue block on the red block (within 2 seconds) good for you! “ (Neutral Talk + UP)

**COMMANDS (COM)**

**Definition**

The Commands code refers to the instructions that a parent provides the child when requesting a behavior change. Commands must be worded positively (tells the child what to do rather than what not to do). There are two types of commands, Direct and Indirect.

1. **Direct Command (DC)** – a declarative statement that contains an order or direction for a vocal or motor behavior to be performed and indicate that the child is the one that is to perform this behavior.

   “Come here.”
   “Draw a cat.”
   “Sit in your seat.”
   “Go to bed.”
   “Please tie your shoes.”
   “You have to call your grandma tomorrow.”
   “Show me your smile.”
   “Please put the blocks in the bucket.”
   “Give me your hand.”
   “Be careful.”
   “Listen.”
   “Be quiet.”

   If a parent tells the child to do several things within one sentence, each of those things counts as a separate command. Each verb counts as a separate command:

   “Spell cat and write your name.” (DC + DC)
   “Give me the pen and toss that paper.” (DC + DC)

2. **Indirect Command (IC)** – a suggestion for a vocal or motor behavior to be performed that is implied or stated in question form.

   “Joey?”
   “It’s time for you to clean up.”
   “I want you to give me the red one.”
   “Please?”
   “Let’s pick this stuff up.”
   “We are going to build a tower now.”
   “You can sit down now.”
   “Can you give it to me?”
   “Would you mind getting your shoes?”
   “Let’s go.”
   “Hey!”
   “Will you sit down?”
   “When you’re done you can put the crayons away.”
   “Put this in the garbage, okay?”

   A statement indicating the parent’s preference for a behavior is an Indirect Command.

   “I would like you to eat your peas.”
“It would be nice if you picked up your toys.”
“I need you to hold my hand.”

Commands that tell the child what not to do are considered Negative Talk (NegT; see p. 15).

“Sit quietly in your chair.” (DC) vs. “Stop running around.” (NegT)
“Please keep your food on your plate.” (DC) vs. “Stop that right now!” (NegT)
“Put your toys in the box.” (DC) vs. “Don’t make a mess.” (NegT)

**Compliance Codes** – the child’s response to his/her parent’s direct or indirect commands are coded as compliance (C), non-compliance (NC), not available (NA), or no opportunity to comply (NO). For more details see page 27.

***The compliance code is an automatic NO when the parent:
1. Interrupts the 5-sec compliance period following a command with any other speech.
2. Gives the child a command that will take longer than 5-sec for the child to begin to comply with (e.g., a command about what to do in the future).
3. Gives child a vague command or a command for which behavior is not observable (i.e., thinking, pretending, listening). The command is still coded DC or IC.

“Pick up the toys (3-sec) put them in the box (1-sec) what did I just say?” (DC/NO + DC/NO + NeuT)
“How about we clean up now?” (1-sec) “Pick up all the crayons and put them in the box” (IC/NO + DC + DC)
“Bring your jacket next time.” (DC/NO)
“Be careful.” (DC/NO)
“Listen.” (DC/NO)
“Will you calm down?” (IC/NO)

**Rating Guidelines: Frequency Count**

- For each audio clip, count the number of Direct Commands and the number of Indirect Commands given by a parent to their child.
- Child compliance should be coded along with parent commands simultaneously.

1. **HOW MANY DIRECT COMMANDS? _____**
2. **HOW MANY INDIRECT COMMANDS? _____**

**Decision Rule(s)**

a. If you are sure the parent has given a command but are uncertain as to whether the command is Direct or Indirect, code Indirect.

b. When uncertain whether a sentence is an Indirect Command or Neutral Talk, code Neutral Talk.

c. If uncertain whether Command or Negative Talk, code Command.
Examples
“Give me your hand.” (DC)
“Stop yelling. Use your inside voice.” (NegT + DC)

NEUTRAL TALK (NeuT)

Definition
Neutral Talk is comprised of statements that introduce information about people, objects, events, or activities, or indicate attention to the child, but do not clearly evaluate the child or the child’s activities, products, attributes, or choices. Neutral Talk contains no praise or criticism of the child's products or activities. It does not contain orders or demands.

“It’s over there.”
“I’m feeling tired too.”
“It’s your turn to choose the game.”
“The dolly is going to sleep.”
“That's a tall tower you're making.”

“You seem to be feeling very happy today.
“We’re having spaghetti tonight.”
“This crayon is yellow.”
“I'm making my rainbow just like yours.”

Noncritical statements that describe what the child is not doing are coded as Neutral Talk.

“You’re not drawing yellow flowers today”
“You’re not using the purple crayon.”

Statements about future behaviors are Neutral Talk when they describe what will likely happen to the child in the future. They are commands when they directly instruct the child to perform a future behavior. Statements about future behaviors that are considered warnings or threats are coded as Negative Talk.

“Tomorrow you get to visit Grandma.” (NeuT)
“Tomorrow you have to wake up at 7:00am.” (DC/NO)
“You are not going to have any dinner if you keep acting this way.” (NegT)

A negatively worded statement (i.e., tells the child what not to do) that describes a rule about appropriate behavior in general and that does not criticize the child's ongoing or immediate behavior is coded Neutral Talk. If the statement is referring to the child’s ongoing behavior, it is coded as Negative Talk.

Child says, “Michael called his mom a witch” and parent responds, “Children aren't supposed to call their parents names.” (NeuT)

Child says, “You’re a witch” and parent responds, “Don’t call me names.” (NegT)
If parent responds, “Behave!” (DC/NO)
If parent responds, “Use nice words when speaking to your mother.” (DC)
Whenever inaudible/indiscernible speech is indicated by the use of “xxx’s,” these will be coded as Neutral Talk. In these situations, use the audio to determine how many “xxx’s” make up one conceptually self-contained thought (i.e., one remark/phrase or sentence). Remember that if the use of “xxx’s” is due to an iEAR issue, the clip receives a code of 88.

Rating Guidelines: Frequency Count

- Within each audio sample, count the number of times a parent uses Neutral Talk.
- One instance of Neutral Talk is equivalent to one conceptually self-contained thought (i.e., one remark/phrase or sentence)
  - Child asks, “What is a cactus?”
    Parent responds, “A prickly plant that grows in the desert.” (NeuT x1)
- Neutral Talk that is separated by a pause of 2 seconds or more is coded as a separate instance of Neutral Talk.
  - A, B, C (2 sec. pause) D, E, F, G. (NeuT x2)
  - Parent says, “I bet you can do it really fast! One (2-seconds), two (2-seconds), three (2-seconds), four.” (NeuT x5)

1. HOW MANY INSTANCES OF NEUTRAL TALK? __

Decision Rule(s)

a. When uncertain as to whether a verbalization is Neutral Talk or another type of verbalization, code Neutral Talk.

b. When uncertain whether Neutral Talk words strung together are one sentence or separate sentences (after using 2-second rule), code one sentence.

NEGATIVE TALK (NegT)

Definition

Negative Talk is a verbal expression of disapproval (i.e., direct or implied negative evaluation) of the child or the child's attributes, activities, products, or choices. Negative Talk consists of rude, critical, or threatening speech (i.e., name calling, swearing, etc.). Negative Talk receives frequency counts and a global rating (see both rating guidelines below).

“Your're being naughty.”
“Clean up the mess you made.”
“You put it in the wrong place.”
“What do you think you're doing?”
“You're working too slowly.”
“That's a messy picture.”
“That's crooked.”
“Bad, bad, bad.”
“No.” (following a child’s request)

“Your're cheating.”
“You can’t do that”
“That's not red.”
“You're a spoiled brat!”
“Wait ‘til dad gets home...”
“You're acting like a little baby.”
“Shut up!”
“I don’t give a damn.”
“Put it down or else!”
“Boy you sure made a big mess.”
“I just can’t believe it.” (blaming and accusatory)
“You’re going to get whooped.”
“If you don’t share, then we will just have to leave you here.”
“That’s not a watch.”

For purposes of this coding system, Negative Talk is coded as Direct and Indirect

1. **Direct Negative Talk (DNegT)** – Negative Talk that is specifically directed at the child.

2. **Indirect Negative Talk (INegT)** – Negative Talk about the child that is directed at someone other than the child, such as when the parent is talking on the telephone or with another individual in the home.

“I’m going to slap some sense into you.” vs. “I’m going to slap some sense into him.”
“Joey, you never listen!” vs. “He never listens to me.”
“Jennifer Michelle Jones, don’t you dare.” vs. “She’s drives me crazy sometimes.”
“How dare you!” vs. “He’s wild, just like his daddy.”
“This is all your fault.” vs. “He’s messing it up.”

A command that tells the child what not to do is Negative Talk.

“Will you stop whining?”
“Stop that.”
“Don’t jump on the couch.”

Correcting the child's behavior by highlighting what the child has done wrong is Negative Talk, even if communicated in a playful tone.

“That’s the wrong answer.”
“That's not quite right sweetie.”
“You’re not using the right colors.”
“That’s not red.”
“That’s not a watch.”

**Rating Guidelines (1 of 2): Frequency Count**

- Within each audio sample, count the number of times a parent uses negative talk.
- One instance of negative talk is equivalent to one conceptually self-contained thought (i.e., one remark/phrase or sentence).
  - The same single critical word repeated with no pause is coded as one instance of Negative Talk (i.e., “Bad, bad, bad” or “No, no, no”). Remember the 2-second rule!

**Decision Rule(s)**

a) When unsure as to whether a statement is Negative Talk or Neutral Talk, code Neutral Talk.
1. HOW MANY INSTANCES OF DIRECT NEGATIVE TALK? ____
2. HOW MANY INSTANCES OF INDIRECT NEGATIVE TALK? ____

Rating Guidelines (2 of 2): Frequency Count

- Rate the overall level of harshness in Negative Talk and when doing so, take degree of the following into account:
  - Parent’s reliance on the use of blame, guilt-induction, criticisms, threats, and punitiveness in directive statements to back up efforts to obtain the child’s compliance.
  - Displeasure, impatience, irritability, disapproval, and/or intolerance of the child.
  - Accusatory, hostile, tense, disgusted, or angry tone of voice.

- Lower ratings are reflected by mild to moderate bossiness, impatience, guilt, or blaming. Higher ratings are reflected by a more threatening, harsh, or punitive stance and may reflect a parent’s reliance on their position of power for power’s sake, rather than their use of an explanation of reasonable rationales. At higher levels, the parent is likely to entertain arguments with the child.

3. WHICH OF THE FOLLOWING BEST DESCRIBES THE OVERALL LEVEL OF HARSHNESS EXHIBITED BY THE PARENT’S NEGATIVE TALK? ____

1 = Not Harsh. Parent does not use any negative talk in this clip.

2 = Slightly Harsh. The parent’s talk is playful in nature but is nonetheless negative talk. The parent does not threaten or humiliate the child or his/her attributes.

  Ex: “You’re using the wrong colors honey” (although this is considered a criticism, the comment is delivered in a pleasant tone that others may not perceive as harsh had they not read the instructions for this code.)

3 = Moderately Harsh. The parent communicates with the child in a bossy, impatient, and blaming manner. The parent demonstrates some negative affect (i.e., irritable, snappy, and somewhat intolerant of the child).

4 = Harsh. The parent communicates disapproval and uses threatening directives for specific behavior change in the immediate future. The parent’s tone is threatening, angry, and highly critical of the child.

5 = Very Harsh. The parent humiliates or severely criticizes the child. The parent’s tone is angry and they may threaten to physically discipline the child. The parent may get into long arguments with the child. It may seem that the parent is relying on their position of power for power’s sake, rather than using reasonable rationales. If the parent uses audible physical force or swears at the child, automatically apply this rating.
Examples

“That’s not quite right sweetie.” (Code 2)
“You’re being slow.” (Code 3)
“Don’t you ever learn?” (Code 3)
“Pick up your toys right now or wait and see what happens.” (Code 4)
“Stop acting stupid.” (Code 4)
“Goddammit Joey!” (Code 5)

CHILD BEHAVIORS

ENGAGEMENT (E)

Definition

Engagement is defined as the degree of child involvement with the parent. This code assesses the amount, not quality, of overall interaction(s). This code also assesses the child’s responsiveness and attempts to initiate an interaction with their parent. Either the parent or the child can initiate the interaction. Negative, neutral, and positive involvements all qualify as engagement.

4. Negative involvement (criticisms, name-calling, threats, etc.)
5. Neutral involvement (commands, statements, non-fluencies, etc.)
6. Positive involvement (terms of endearment, encouragement, praise, playful sounds, etc.)

Rating Guidelines: Global Rating

Assign one of the following ratings for each audio clip. Lower scores reflect lower levels of engagement. Higher scores reflect higher levels of engagement, meaning more parent-child interaction overall.

1. WHICH OF THE FOLLOWING BEST DESCRIBES THE CHILD’S OVERALL LEVEL OF ENGAGEMENT WITH THE PARENT? ____

1 = Disengagement. Apply this code if there is no parent-child interaction. Absence of parent-child interactions includes audio samples that are silent throughout and samples in which the child is only interacting with an individual other than the parent (i.e., talking to self, talking to grandmother).

2 = It is unclear as to whether or not the child is listening; the child may be ignoring the parent or may be distracted with another task or speaking to another person during the times that the parent is attempting to interact. The child may (1) very infrequently say something very brief to the parent, or (2) the parent may be making repeated attempts
to obtain the child’s attention and the child rarely, if ever, responds. When the child does respond, s/he shows little interest in the parent (i.e. responses are brief, monosyllabic, and monotone) and quickly returns to their previous task.

This rating is lower than “3” with regards to the amount of effort the child makes to engage the parent and/or the amount of effort the parent has to make to obtain the child’s attention. Frequency of child response to parent’s calls for attention are also lower in “2” than “3.”

3 = **Passive Involvement.** The child may (1) sometimes say something to the parent or, (2) responds to many of the parent’s calls for attention. However, the child provides minimal attention and in some cases rarely initiates the interaction. When the child does initiate the interaction, speech is brief. The child rarely tracks or acknowledges the parent. Verbalizations/interactions with the parent are intermittent, brief, unenthusiastic (whether positive or negative), and may be mostly solicited by the parent, rather than generated independent of the parent’s efforts to obtain the child’s attention (e.g., “because,” “hmm,” “yeah,” etc.).

This rating also includes interactions in which there is a reasonably strong engagement but only for a brief portion (time) of the clip.

This rating is lower than “4” with regards to frequency with which the child initiates the interaction and duration of engagement with the parent and in response to the parent’s attempts to initiate an interaction.

4 = The child is involved and responsive to the parent for the most part but there may be moments when s/he briefly disengages and then resumes active involvement soon thereafter. The child initiates the interaction sometimes but may be distracted with another task or person.

This rating is lower than “5” with regards to frequency, intensity, and duration of engagement. It is also lower than “5” with regards to the amount of distraction the child experiences while engaging the parent.

5 = **Active Involvement.** The child is fully immersed in activity/conversation with his/her parent. The child responds to most, if not all, of his/her parent’s calls for attention, comments on the parent’s activities, and displays interest in the outcome of the parent’s activities. The child frequently initiates the interaction (seeks out the parent) and there is a high frequency of parent-child verbalizations in the audio sample. This high level of engagement can include positive, neutral, or negative verbalizations (i.e., screaming at the parent defiantly or giving great amounts of enthusiastic praise).

**Examples**

Parent calls out, “Joey?” and the child never responds. (Code 1)

Parent says, “Whoa! Look at this Joey” and there is no response.

Parent calls out again, “Joey look!” no response.

Again, parent says, “Joey! I asked you to look at this,” and child responds, “Hm.” (Code 2)

Parent calls out, “Joey pick up your toys” child immediately responds, “Why is this blue?” and parent replies, “Did you hear me? Pick up your toys” and child immediately responds (within 2-seconds), “Ok mommy.” (Code 3)

Parent calls out, “Joseph! Stop playing with your food!” and child immediately responds (within 2-seconds) “I don’t want to eat this yucky food. You’re mean! I’m not your friend.” (Code 5)

“Wow! Mommy look at that truck! Did you see it? Did you see it? Look!” (Code 5)

***Remember that interactions can be negative, neutral, or positive.

**COMPLIANCE CODES (C/NC/NA/NO)**

**Definition**

1. **Compliance (C)** is defined as the child obeying, or beginning to obey, a parent’s command within 5-seconds of being given that command.
   a. Compliance is only coded when (1) the child complies with a command that requires verbal compliance (e.g., “Tell me your name,” “Count to five”) OR if the (2) mother says “Thank you” for compliance within the 5-seconds following a command.

2. **Noncompliance (NC)** is defined as the child’s failure to begin to comply with a parent’s direct or indirect command within 5-seconds of being given that command. Examples of noncompliance include ignoring and/or refusing the parent’s command (e.g., “No”).
   a. Noncompliance is only coded when the child does not comply with a command requiring verbal compliance (e.g., “Tell me your name,” “Count to five”), even if you think there are clues in the audio or transcript indicating noncompliance (i.e., mother repeating command).

3. **Not Available (NA)** is defined as the parent having given a child a command that is compliable (i.e., not vague); however, not observable with acoustic data (e.g., “Pick up your shoes,” “Give me the socks,” “Put on your coat,” “Sit on the chair,” etc.)
   a. Commands are also coded as NA if the parent gives a command at the end of an audio clip, does not interrupt the compliance period after it, and the audio clip ends before the 5-sec period has elapsed and the child has audibly complied.
4. **No Opportunity (NO)** is defined as the child not having the opportunity to comply. A child’s reply to a parent’s direct and indirect commands is automatically coded NO in one of three situations:
   a. When the parent interrupts the 5-sec time period following a command by saying anything else.

   “Pick up the toys (3-sec) put them in the box (1-sec) what did I just say?”
   (DC/NO + DC/NO + NeuT)
   “How about we clean up now?” (1-sec) “Pick up all the crayons and put then in the box” (IC/NO + DC + DC)

   b. When the parent gives the child a command that will take longer than 5-sec for the child to comply (i.e., a command about what to do in the future).

   “Bring your jacket next time.” (DC/NO)
   “You should put them away when you’re done.” (IC/NO)

   c. When the parent gives a child a vague command (including bids for attention) or a command for which behavior is not ever observable (i.e., thinking, pretending, listening). The command is still coded DC or IC.

   “Johnny?” (IC/NO)
   “Think harder” (DC/NO)
   “Please.” (IC/NO)
   “Be careful.” (DC/NO)
   “Will you calm down?” (IC/NO)
   “Pretend.” (DC/NO)
   “Listen.” (DC/NO)

**Rating Guidelines: Frequency Count**

- Within each audio sample, count the number of times that a child: (1) complies (C), (2) does not comply (NC), compliance coding is not available (NA), and (3) is given no opportunity to comply (NO).
  - If the parent makes a command for which compliance cannot be audibly observed (i.e., “Look,” “Smile please,” “Sit down”) code not audible (NA). This is restricted to commands where audible compliance is not required as in the examples just mentioned. This does not apply to instances when the child does not reply to the command.
    - Ex: If the parent says, “Count your numbers” and the child does not respond within 5-seconds, code NC.

**1. HOW MANY INSTANCES OF COMPLIANCE (C)?**
**2. HOW MANY INSTANCES OF NONCOMPLIANCE (NC)?**
**3. HOW MANY INSTANCES OF NO OPPORTUNITY (NO)?**
4. HOW TIMES DID THE PARENT MAKE A COMMAND FOR WHICH AUDIBLE COMPLIANCE WAS NOT POSSIBLE (NA)? ____

BACKTALK (BT)

Definition

Backtalk is impudent or disrespectful speech including: arguing, refusing, counter commanding, criticizing the parent, verbally threatening the parent, and swearing. Backtalk also includes the child using negative talk towards parent (e.g., "You suck," "Stop touching my toys"). Frequency of backtalk is taken into account.

“So!”
“You dummy!”
“What will you give me if I do it?”
“It’s not fair!”
“Put it away yourself!”
“I hate you!”
“You are fat and ugly!”
“You can’t make me.”
“You are a doodie head!”
“You’re mean.”
“I don’t want to clean up!”

Rating Guidelines: Frequency Count

- Within each audio sample, count the number of times that a child talks back.
- One instance of backtalk is one phrase or sentence said by the child including: refusals, counter commands, criticisms, threats, or swears. The 2-second rule applies here.
- BT’s and CWY’s are not mutually exclusive.

1. HOW MANY TIMES DOES THE CHILD TALK BACK? ____

CRY/WHINE/YELL (CWY)

Definition

A Cry/Whine/Yell is considered a general deviance. In order to qualify as a Cry/Whine/Yell, the child’s behavior must match at least one the following descriptions.

1. **Cry** - inarticulate verbalizations of distress (audible weeping) at or below the loudness of a typical conversation.
2. **Whine** - words uttered by the child in a slurring, nasal, high-pitched voice. The voice quality of the word or phrase is the primary distinguishing element for coding whine.

3. **Yell** - a loud screech, scream, shout or loud crying. The sound must be loud enough so that it is clearly above the intensity of a typical indoor conversation and loud enough to distract others. Code yells that express annoyance, frustration, or anger. A child’s gleeful exclamation would not be considered a yell; it would be coded as Child Positive Affect.

**Rating Guidelines: Frequency Count**

- Within each audio sample, count the number of times that a child cry/whine/yells.
- A cry/whine/yell is coded at its inception at 5-second intervals throughout its duration. A 2-second pause in between cries, whines, and yells means that the behavior has subsided and begun again.
- Simultaneous crying, whining, or yelling occurring within a 5-second interval counts as one cry/whine/yell
- BT’s and CWY’s are not mutually exclusive.

1. **HOW MANY CRY/WHINE/YELLS? ____**

**Examples**

Child cries for 5-seconds, stops crying for 2-seconds, and then whines. (CWY x2)
Child cries for 20-seconds and stops (CWY x4)

**POSITIVE AFFECT (PosA)**

**Definition**

Positive Affect is defined as the child’s positive evaluative expression of pleasure, warmth, enthusiasm, or gratitude, including praise of self or parent. Laughter and giggling during interactions with the parent are also coded as Positive Affect.

- “This is fun!”
- “I have a good idea.”
- “I’m good at singing.”
- “I’m getting better at reading.”
- “You’re funny mommy!”
- “Yummy dinner.”
- “Yours looks cool.”
- “I love you Mommy.”
- “You’re welcome.”
- “I’m good at this right?”
- “Thank you!”
- “I’m so excited”

**Rating Guidelines: Frequency Count**

- Within each audio sample, rate the overall level of Positive Affect demonstrated by the child’s audible behaviors.
- When assigning a Positive Affect rating, take into account the intensity of enthusiasm in the child’s voice, as this will help you assign a rating. Intensity may be expressed by
loudness, duration, or voice intonation. If the child begins laughing or giggling uncontrollably, automatically assign a “5.”

Higher scores reflect higher levels of intensity and frequency of Positive Affect. Lower scores reflect lower intensity and frequency.

1. WHICH OF THE FOLLOWING BEST DESCRIBES THE CHILD’S OVERALL LEVEL OF POSITIVE AFFECT? ____

1 = The child displays no positive affect. This does not mean that the child only demonstrates negative affect (although it could); it is merely an absence of positive affect.

2 = The child displays little positive affect (1-25% of the audio sample). When s/he does, positive evaluative expressions or expressions of gratitude are mostly stated in a neutral tone with a slight inclination towards positive.

3 = The child sometimes displays positive affect and is occasionally enthusiastic when doing so (25-50% of the audio sample).

If there is no speech, but child is giggling or laughing, code “3.”

4 = The child displays several instances of positive affect (50-75% of the audio sample). Positive evaluative expressions are mostly stated in an enthusiastic tone of voice.

5 = The child frequently and intensely (75-100% of the audio sample) displays positive affect. The child is frequently exuberant (listen for tone). Uncontrollable laughter should be automatically coded a “5.”
REFERENCES


<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parent Behaviors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement</td>
<td>This code assesses amount, not quality, of parent-child interaction and the parent’s responsiveness to the child.</td>
<td>GR*</td>
</tr>
<tr>
<td>Parent Affect</td>
<td>The emotional quality of the parent’s audible behaviors. Coded on the basis of tone of voice and/or inflections. Two kinds: Degree of Positive Affect and degree of Negative Affect.</td>
<td>GR</td>
</tr>
<tr>
<td>Praise</td>
<td>Positive evaluative words/phrases that express a favorable judgment on an activity/product/attribute of the child. Two kinds: Labeled Praise and Unlabeled Praise.</td>
<td></td>
</tr>
<tr>
<td>Commands</td>
<td>This code assesses the adequacy of instructions a parent provides their child when requesting a behavior change. Two types: Direct Commands and Indirect Commands.</td>
<td>FC*</td>
</tr>
<tr>
<td>Neutral Talk</td>
<td>Statements that introduce information about people, objects, events, or activities, or indicate attention to the child. Does not clearly evaluate the child or the child’s activities, products, attributes, or choices. Contains no orders, demands, praise, or criticism of the child's products or activities. Nonfluencies (i.e., “Mm,” “Hm,” etc.) qualify as Neutral Talk.</td>
<td>FC</td>
</tr>
<tr>
<td>Negative Talk</td>
<td>Verbal expression of disapproval (i.e., direct or implied) of the child or the child's attributes, activities, products, or choices including sassy, sarcastic, rude, or impudent speech (i.e., threats, criticisms, name calling, swearing, etc.). A frequency count, of Direct and Indirect Negative Talk (e.g., negative talk directed at the child versus speaking negatively about the child to another person), and a global rating of harshness is obtained.</td>
<td>FC &amp; GR</td>
</tr>
<tr>
<td>Coaxing</td>
<td>A parent’s attempt to obtain a child’s compliance by begging, pleading, or offering a reward.</td>
<td>FC</td>
</tr>
<tr>
<td>Lenience</td>
<td>Lack of response to child misbehavior that is obvious in quality (screaming, back talking) and intensity (loudness, duration).</td>
<td>FC</td>
</tr>
<tr>
<td><strong>Child Behaviors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement</td>
<td>This code assesses amount, not quality, of parent-child interaction and the child’s responsiveness to their parent and their attempts to engage their parent.</td>
<td>GR</td>
</tr>
<tr>
<td>Noncompliance</td>
<td>Child’s failure to obey a parent’s direct or indirect command within 5-seconds. This code assesses frequency of Compliance, Noncompliance, and No Opportunity.</td>
<td>FC</td>
</tr>
<tr>
<td>Backtalk</td>
<td>Impudent or disrespectful speech including: arguing, refusing, counter commanding, criticizing the parent, verbally threatening the parent, and swearing.</td>
<td>FC</td>
</tr>
<tr>
<td>Cry/whine/yell</td>
<td>A cry, whine, or yell is considered a general deviance. See p. 22 for complete description</td>
<td>FC</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>The child’s positive evaluative expression of pleasure, warmth, enthusiasm, or gratitude, including praise of self or parent.</td>
<td>GR</td>
</tr>
</tbody>
</table>

*GR = Global Rating, *FC = Frequency Count; Between clip variability of individual codes will serve as a measure of consistency.
Transcription Guidelines & Tips  
(Internal document, created by Heather Knous-Westfall, M.A.)

1. It is important to put in place markers for words you are unclear about and things the child is uttering, or we won’t know by looking at the transcript whether or not there was any interaction. If you just can’t understand what the word or phrase is, just do your best to estimate how many separate words were spoken and put xxx xxx xxx place markers for each one. This includes utterances by the child that may sound like gibberish or baby talk. Please do not leave entire passages blank, just try your best to estimate how many place markers to put in there (one set of xxx per each unknown word).

2. We are only transcribing for ONE child, and that would be the OLDEST one under 6 years old (phase 2), or the oldest one between ages 2-6 (phase 3). If there are multiple children in the audio files, you MUST obtain information about the study child to ensure the correct child is transcribed either by asking me, and/or looking at the follow-up form.

3. Always check the data dictionary document if unsure of something. A few examples:
   a. Daddy, papa, and dada are not in there, so we have to change these all to “dad.”
   b. It’s either “oclock” or “o’clock” there can’t be a space in there.
   c. Some words you might not expect to be there, like “gonna,” are in fact there. Note, in this case, we are not following the document given to us by the other experimental team. We are leaving words like gonna, wanna, gotcha as is as they ARE in the data dictionary. However, coz, cos, and ‘cause have to be changed to “because” and “gotta” should be changed to “got to.”
   d. The word can not has to be typed as “cannot.”

4. Times and Numbers
   a. The only time we can put a number is if it is referring to a time. So if they say they are going to a movie at 8. You can put “I am going to a movie at 8pm” or “I am going to a movie at 8:00pm.” There’s can’t be a space between the number and the am or pm.
   b. If the person specifically says 8 o’clock, you would then write “I am going to a movie at eight o’clock.”
   c. If the child is counting numbers, you have to write them out and same thing if the mother is saying an address.

5. Fillers
   a. Don’t forget to do a search for the words “like,” “well,” “I mean,” “oh well,” “I don’t know,” “ya know,” and “you know.” If they are used as fillers (some examples are given later), they need to be changed to “rrlike,” “rrwell,” “imean,” “ohwell,” “idontknow,” “yaknow,” and “youknow,” respectively.
6. Non-Fluencies
   a. DO NOT FORGET to change all “OH” or “AH” to “UH.” Also keep in mind that if the mom says “oh well” that is a filler and the oh stays, but it changes to “ohwell.”
   b. Hm, hmm, um, umm, are all okay.
   c. Uh-uh and uh-huh need to be changed to “no” and “yes.”
   d. Huh? Should be changed to “what?”

7. Nonsense words
   a. You may run into a child who is potty training. If they use words like doodoo or caca, the word “poop” IS in the dictionary so you can change those to that.
   b. Be careful about writing out singing because one of the words may be an actual word. If the mom sings “le de da do de” for example, “do” is a real word and it will get counted incorrectly. In this instance, I would change the do to “doo” so it’s nonsense.
   c. Made up words that are close to real words should be changed to the real word, for example, bestest changed to best. Just make a note of this in the appendix.
   d. If something is read from a book but is nonsense, leave as is. For example, the word “gimmies.”
   e. Also, if the person is singing or saying something weird like “boom chicka boom” leave this as is and it will just be coded as nonsense.
   f. The words ow, ouch, and yo are not in the dictionary, but leave those in there as is.
   g. If the person swears, those words are in the data dictionary (at least most are), and need to be written as is.

8. Sleep
   a. If it is clear that the child was sleeping for an HOUR OR MORE during the recording, please make a note of this in the appendix. We may later go back and transcribe more files from the portions when the child was not asleep.

9. The Appendix
   a. Put anything here that will help us understand the data.
   b. If you changed words, note that here.
   c. For those who translate, make sure to note any issues with translation or changed words here.
   d. Note unusual sleep issues here.
   e. Note any issues with the iear here, i.e., iear was removed, etc.

10. Punctuation is not necessary, but you are more than welcome to put it in there.

11. Examples of things people seem to have trouble with:
a. Stuttering:
   i. The mom says, "Hello, hello, are you listening to me?" The transcriber should leave this as is.
   ii. The mom says, "I don't, I don't know what you mean." The transcriber should change to "Uh, I don't know what you mean."
   iii. The mom says, "I think I um I think, you know, that I should" I would change this to "Uh, um, I think you know that I should"

b. Like:
   i. The mom says, "Oh, it was like, you know, 70 degrees outside" should be changed to "Uh, it was rl like you know, seventy degrees outside"
   ii. The mom says, "It's not like I wanted to." This stays as is.
   iii. The mom says, "Do you like that? It's like your other stuffed animal. You know what I mean baby, like fluffy? She's like smiling and laughing at this toy." Should be "Do you like that? It's like your other stuffed animal. You know what I mean baby, like fluffy? She's rl like smiling and laughing at this toy."

c. Well:
   i. Mom says: "Well, it's not like you started it." Should be "Well, it's not like you started it."
   ii. Mom says: "You know very well what I mean" stays as is.
   iii. Mom says, "Oh, well, I don't know, do whatever you want." Should be "Uh, well, I don't know, do whatever you want."

Formatting:

The transcript should be formatted in a way that a reader can follow the flow of the language. If the mother says “What baby?” and the child then replies, “Look at the xxx,” and then at the same time they both say “Uh,” the transcript would look like this:

<table>
<thead>
<tr>
<th>Participant id</th>
<th>111111</th>
</tr>
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<tbody>
<tr>
<td>Date</td>
<td>3/31/2013</td>
</tr>
<tr>
<td>File Time</td>
<td>9:05-9:07</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mother’s Transcript</th>
<th>Child’s Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>What baby?</td>
<td>Look at the xxx.</td>
</tr>
<tr>
<td>Uh.</td>
<td>Uh.</td>
</tr>
</tbody>
</table>

Transcript color code legend:

Words need to be in red if the mother is talking to someone other than the target child (including talking to herself), and if the target child is talking to someone other than the mother (including to him/herself).
Highlight the heading (so the id, file time, etc.) in pink if you believe the audio file contains Spanish and you can’t translate.

If you can translate, then translate into English, and highlight the words you translate in yellow. Also make notes in an appendix in the end for what was changed, etc.

If the words you are translating into English are spoken to someone else, then make sure the text is red, and it’s highlighted yellow.
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