

**AN EMOTION-COGNITION INTERACTION:
EMOTION KNOWLEDGE AND THEORY OF MIND IMPACT THE
DEVELOPMENT OF EMOTION SCHEMAS**

by

Adina M. Seidenfeld

A thesis submitted to the Faculty of the University of Delaware in partial
fulfillment of the requirements for the degree of Master of Arts in Psychology

Spring 2011

Copyright 2011 Adina M. Seidenfeld
All Rights Reserved

**AN EMOTION-COGNITION INTERACTION:
EMOTION KNOWLEDGE AND THEORY OF MIND IMPACT THE
DEVELOPMENT OF EMOTION SCHEMAS**

by

Adina M. Seidenfeld

Approved:

Carroll E. Izard, Ph.D.

Professor in charge of thesis on behalf of the Advisory Committee

Approved:

Paul C. Quinn, Ph.D.

Associate Chair for Research and Graduate Education

Approved:

Paul C. Quinn, Ph.D.

Interim Chair of the Department of Psychology

Approved:

George H. Watson, Ph.D.

Dean of the College of Arts and Sciences

Approved:

Charles G. Riordan, Ph.D.

Vice Provost for Graduate and Professional Education

ACKNOWLEDGMENTS

I wish to thank my advisor, Carroll Izard, and Elizabeth Woodburn as well as all of the members of the Human Emotions Lab. I must also thank Elana Gruber, Stacy Grossman, Joanna Herres, and Brendt Parrish for their helpful critiques. Last, but not least, I am grateful for my family and friends' support that helped me throughout this process.

TABLE OF CONTENTS

LIST OF TABLES.....	vii
LIST OF FIGURES	viii
ABSTRACT	viii
Chapter	
1 INTRODUCTION	1
The Development of EK and Emotion Schemas	2
Early Emotion Experiences and Their Effects on Emotion Schemas.....	4
Maladaptive EK Development: Emotion Biases	5
Maladaptive EK Development: Caregiver Depression	6
Social-Cognitive Understanding and Its Effects on Emotion Schemas.....	8
Summary and Present Study	11
2 METHOD	13
Participants	13
Procedures	13
Measures.....	14
Verbal Ability.....	14
Emotion Knowledge.....	15
Sad Bias	16
Theory of Mind.....	16
Kindergarten Emotion Schemas	17
Caregiver Depression	18
3 RESULTS	19
Preliminary Analyses.....	19
Final Analyses	21
Model 1: TOM by Sad Bias Interaction	22

Model 2: TOM by Caregiver Depression Interaction.....	25
4 DISCUSSION.....	28
Limitations and Future Directions	30
Appendix	
HUMAN SUBJECTS APPROVAL LETTER	33
REFERENCES	35

LIST OF TABLES

Table 1	Means and Standard Deviations of All Variables	20
Table 2	Inter-correlations Among All covariates, Predictors, and Outcome Measure	21
Table 3	HLM Analyses of TOM Moderating the Relation Between Sad Bias and Kindergarten Emotion Schema.....	23
Table 4	HLM Analyses of TOM Moderating the Relation Between Caregiver Depression and Kindergarten Emotion Schemas.....	25

LIST OF FIGURES

Figure 1	Relation between sad bias in preschool and kindergarten emotion schema presented across low, mid, and high TOM performance in preschool	24
Figure 2	Relation between caregiver depression scores when his/her child was in preschool and kindergarten emotion schemas presented across low, mid, and high TOM performance	26

ABSTRACT

Children's emotion knowledge (EK) influences their current and long-term social functioning. Emotion schemas are theorized to incorporate basic EK and cognitions. The present study of 64 3-to 5-year-old Head Start children explored the relation between two preschool emotion factors (sad bias and caregiver depression) and a cognitive factor (Theory of Mind; TOM) on children's development of emotion schemas in kindergarten. The results partially supported our hypotheses. TOM moderated the relation between preschool maladaptive EK and emotion schema development. Higher levels of TOM understanding in preschool buffered the negative effects of maladaptive EK on kindergarten emotion schemas. Hence, both EK and TOM interventions may prevent at-risk Head Start children from developing maladaptive emotion schemas.

Chapter 1

INTRODUCTION

A growing body of literature demonstrates the benefits and risks of emotion knowledge (EK) in children's functioning. EK is defined as the ability to identify emotion expressions, understand the motivational function of emotions, and apply such knowledge in social situations in accord with developmental expectations (Izard, 1971). EK relates to academic success, development and maintenance of friendships, prosocial and maladaptive behaviors, and psychopathology (Cunningham, Kliewer, & Garner, 2009; Denham et al., 2003; Eisenberg & Fabes, 1992; Izard et al., 2008; Keltner & Kring, 1998; Schultz, Izard, Ackerman, & Youngstrom, 2001; Trentacosta & Izard, 2007). Whereas these outcomes are often observed concurrently with children's measured EK, some are the result of long-term EK impairment (Keltner & Kring, 1998; Tangney et al., 1996). Thus, in addition to studying outcomes related to EK, there is a need to study factors that may influence its development.

Identifying kindergarten children's EK level helps teachers as well as clinicians understand children's current functioning and predict future behavior. Yet, understanding the etiology of children's EK helps clinicians create better interventions that target crucial elements that influence EK development. The present study aims to investigate precursors of kindergarten EK.

The Development of EK and Emotion Schemas

Social expectations for children's EK increase with development. High levels of effective emotion socialization lead to increased EK, that can be observed in infancy (Izard, 2007). Infants learn rudimentary EK by associating their emotional response (e.g. crying) to their parent's behavioral response (e.g., parent's attempt to soothe) (Izard, 1978, 2007). In the preschool years, children acquire basic EK: they learn to identify emotion expressions, match emotion expressions to their physiological feelings, and begin to understand the causes and motivational functions of emotion feelings in themselves and others (Denham, 2007; Izard, 1977). By the time children are in kindergarten, they have acquired some emotion situation knowledge, the ability to associate expressions and feelings with different social situations (i.e., emotion situation knowledge; Schultz, Izard, & Bear, 2004). By kindergarten, they also begin to develop some self-regulation strategies that allow them to select adaptive behaviors while experiencing and being motivated by either positive or negative emotion feelings (Garner, 1999; Izard, 1977). For instance, a kindergarten child may realize that when a child A steals child B's toy, that B will be mad and that B should tell the teacher rather than physically attacking the perpetrator. However, a preschool child may not have sufficient EK or emotion regulation to refrain from physical aggression. Thus, EK encompasses multiple, progressive developmental milestones that increase children's ability to more accurately identify and understand emotions in themselves and others.

During typical development, children's acquisition of basic EK lays the foundation for non-basic EK or emotion schemas, which are defined as the

combination of emotions with thoughts (Izard, 2007). Emotion schemas are motivational and influence behavior according to one's desires and expectations (Izard, 1977, 2007). Also, because they are personalized by experiences, they continually develop and become increasingly complex with age (Izard, 1977, 2007). Emotion experiences, the thoughts associated with those experiences, and the consequential outcomes are integrated into emotion schemas to provide the person with a context for understanding future emotion experiences (Schultz, Grodack, & Izard, 2010; Tomkins & McCarter, 1964). Therefore, the environment in which the experiences take place shapes emotion schema development.

Unfortunately, emotion schemas are a difficult construct to measure. Emotion schema development is dependent on an individual's experience and so innumerable construction possibilities exist between individuals. However, EK is operationalized and measured. There are many measures that test children's ability to identify, functionalize, and apply emotions to social situations (Denham, 1986; Morgan, Izard, King, Diaz, & Trentacosta, 2005). These measures adapt to fit different EK developmental levels. Early EK measurements assess children's knowledge of basic EK by focusing on children's ability to identify emotion expressions and use emotion language (e.g., Morgan et al., 2005). However, EK measures that incorporate knowledge of social situations, such as assessing children's ability to associate anger with being insulted, also inherently assess children's social-cognitive knowledge of the situation, e.g. being insulted, as well as their EK. Kindergarten (and older) children's EK assessments may be early markers for their emotion schema development. Therefore, the authors used the term emotion schemas to refer to kindergarten EK.

Early Emotion Experiences and Their Effects on Emotion Schemas

Research has supported the idea that early experiences can affect children's basic EK. Children's familiarity and social bonding with a caretaker may positively influence children's ability to recognize different emotion expressions in other individuals (Herba et al., 2008; Shackman & Pollak, 2005). Studies on the effects of abuse and neglect highlight the role that early experience has on children's EK development. Physically abused children are better at identifying anger expressions than non-abused children (Pollak, Cicchetti, Hornung, & Reed, 2000; Pollak & Sinha, 2002). Neglected children perform worse at discriminating emotion expressions than either control or physically abused children (Pollak et al., 2000). These children's exposure to emotions, through either overexposure or underexposure, affects their EK development. Furthermore, while these children's basic EK may be adaptive in their current environment because it may serve as a coping mechanism, their EK may prove maladaptive in other environments and later in life due to their narrow EK understanding.

Emotion schemas that develop from basic EK can therefore be adaptive or pathological (Izard, 2007). A typical person may develop associations between feeling sad and coping thoughts such as "things will get better" or with memories of talking to a friend to alleviate sadness. A person with a depressive emotion schema may instead associate maladaptive thoughts with the experience of a sad feeling. The sad feeling may conjure additional sad memories and consequently motivate maladaptive behaviors. Considering that children's early EK is associated with an array of outcomes that influence children's environment and experiences (e.g., friendships;

Denham et al., 2003), we may also posit that early EK influences the development of adaptive or maladaptive emotion schemas.

Maladaptive EK Development: Emotion Biases

Researchers have found evidence of early EK biases and their relation to child behavior. Children with social anxiety are hyper-vigilant to angry faces (Mathews & MacLeod, 1986; Mueller et al., 2009). This finding suggests a positive association between children's social anxiety and a biased sensitivity to emotion cues. Also, researchers have identified a group of children who erroneously identify angry faces and incorrectly associate anger to situations and to behaviors. These children with an anger bias often exhibit higher rates of aggressive behavior than their peers (Fine, Trentacosta, Izard, Mostow, & Campbell, 2004; Schultz, Izard, & Ackerman, 2000). Researchers hypothesize that children with an anger bias have developed an over-active anger emotion schema and that these children's social understanding is consequently skewed (Horsley, de Castro, & Van der Schoot, 2010; Schultz et al., 2010). Emotion biases may distort children's interpretation of the world, which is reflected in their behavior.

Although research on anger biases continues, little research has been devoted to other emotion biases. Schultz, Izard, & Bear (2004) found that children's emotionality (i.e., temperament) related to their emotion accuracy and biases and that children's emotion accuracy and emotion biases are related to teacher reported levels of aggression. However, the authors did not focus on sad emotionality and sad biases, although they noted that children rated with sad emotionality scored high on anger

bias. In another study investigating sad perception accuracy and anger perception accuracy in a clinical sample, the authors found that most perception biases occurred from the over-identification of sadness (Martin, Boekamp, McConville, & Wheeler, 2010).

Despite these findings, children's sadness may be overlooked. Children's sadness is hard to detect. Adults may miss children's sadness in light of being distracted by children's anger, which causes more apparent problems. Children often demonstrate anger through displays of aggression whereas sadness does not often lead to similar outward disruptions. Furthermore, children do not express sadness in a consistent manner. Children may express their sadness through either internalizing behaviors or externalizing behaviors (Zeman, Shipman, & Suveg, 2002). Also, some researchers suggest that excessive sadness in childhood is not well understood (Kashani, Ray, & Carlson, 1984). However, by identifying children with sad biases, we may be able to attain insight into their developing sad emotion schema.

Maladaptive EK Development: Caregiver Depression

Children with a depressed caregiver also are at risk for developing maladaptive EK because caregivers can bear a strong influence on children's intrapersonal and interpersonal environment. Parent depression has both biological and environmental effects on children (Goodman & Gotlib, 1999). Dawson et al. (2003) found that 3-year-old children with depressed mothers had under-activated frontal and parietal brain regions while viewing video clips that elicited positive and negative emotions when compared to children with non-depressed mothers. The authors

conceptualized these brain regions as a proxy for emotion regulation. Additionally, these depressed mothers reported higher stress and marital discord and rated their children with more behavior problems.

While the exact heritable mechanisms of depression are not confirmed, depressed parents teach their children about emotions through modeling, which is colored by parents' own EK. Depressed individuals have been shown to engage in more negatively-focused conversations and demonstrate more negative behaviors during interactions than non-depressed individuals (Kowalik & Gotlib, 1987). Also, depressed women have been shown to use inadequate problem-solving behaviors and express more anger towards their partners (Biglan et al., 1985). In addition to these behaviors being observed by their children, depressed mothers express more sad and angry emotions during interactions with their children than do non-depressed mothers (L. Murray, Kempton, Woolgar, & Hooper, 1993).

The behaviors that depressed parents model for their children result in poor child EK and less adaptive behavior. Infants and 2-year-olds of depressed mothers demonstrated flattened affect and school-aged children of depressed mothers have poorer peer relationships when compared to children of non-depressed mothers (Cohn, Campbell, & Ross, 1991; Goodman, Brogan, Lynch, & Fielding, 1993). Overall, children of depressed mothers often demonstrate higher rates of problem behaviors than children of non-depressed mothers (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001). Thus, depressed parents may promote their own EK biases in their children, which may place their children at risk for learning a depressive emotion schema.

Social-Cognitive Understanding and Its Effects on Emotion Schemas

As discussed, emotion schemas are the combination of both emotion and cognitive processes. Thus, children's social-cognitive understanding may be another influence on their developing emotion schemas and on their performance on later measures of EK. Social-cognitive understanding includes the ability to understand others' beliefs, desires, and intent in isolation from one's own. This developmental construct is called Theory of Mind (TOM; Woodburn & Izard, 2010). TOM assessments focus on children's attribution of different types of cognitions such as desires, emotions, knowledge, and beliefs (Wellman & Liu, 2004). Matured TOM is observed through individual's understanding of metaphors, irony, and double deception (Wellman & Liu, 2004). Similar to EK, children progressively acquire TOM understanding. In a sample of 3-to-5-year-old children, 84-95% understood that people can have diverse desires and beliefs, 73% understood that people do not have knowledge of what they cannot see (i.e., knowledge access), 59-57% understood that people may have incorrect beliefs (i.e., false belief), and 32% understood that people may hide their felt emotions (i.e., real-apparent emotions) (Wellman & Liu, 2004). As demonstrated by the low percent of 3-to-5-year-old children who understand real-apparent emotions, TOM is independent from EK and may gradually associate to EK later in development.

Although EK and TOM are not routinely compared, they appear to share early precursors and relate to similar behaviors. Both constructs are predicted by children's emotion language application, such that children who use the terms happy, sad, mad, and scared score higher on TOM and EK measures (Astington & Gopnik,

1991; Izard et al., 2008). Furthermore, Capage & Watson (2001) found that preschool and kindergarten children's TOM predicted social competence skills above that of social problem-solving skills—a finding that mirrors results from a recent emotion-focused intervention study suggesting that TOM and EK both impact social competence (Finlon et al., 2010). Additionally, there is evidence in both the EK and TOM literature that suggests longitudinal relations with problem behaviors (Hughes & Ensor, 2006; Izard et al., 2001). Although a plethora of literature exists that implies the relation between emotions and social-cognition (Bear, Manning, & Izard, 2003; Keltner & Kring, 1998; Trentacosta & Fine, 2010), the relationship between EK and TOM has not been explicitly demonstrated.

Evidence for a TOM-EK relation can be observed from impairments in clinical samples in which deficits in these areas tend to co-occur. Children with autism have poor EK as seen through their difficulty with empathy and ability to identify emotion expressions (Downs & Smith, 2004; Golan & Baron-Cohen, 2006). Additionally, TOM has been identified as a central deficit in autism that inhibits social communication including understanding emotional cues, desires, and predicting behavior (Baron-Cohen, 2001; Baron-Cohen, Leslie, & Frith, 1985). Woodburn & Izard (2010) suggests that the EK and TOM deficits observed in autism may not only represent a central explanation for the social impairments in autism, but also may elucidate social deficits in other psychopathology. In support of this hypothesis, TOM deficits are associated with other types of psychopathology, including bipolar disorder, schizophrenia, and depression (Badgaiyan, 2009; Brüne, 2005; Fredrickson, 2001;

Kerr, Dunbar, & Bentall, 2003) that are also associated with deficits in EK (Brüne, 2005; Keltner & Kring, 1998).

In addition to sharing similar predictors and outcomes to EK, TOM has similar consequences to biased EK when TOM is dysfunctional. Analogous to the relation between aggressive behavior and anger bias, research suggests a relation between aggressive behavior and misattributing hostile intentions to benign situations (Dodge & Coie, 1987). Through eye-tracking methods, Horsely et al. (2010) attempted to determine whether children with hostile attribution biases attend more to hostile or non-hostile cues in order to support a bottom-up processing (via attention to environment) or top-down processing (via internal schemata influences) explanation of hostile attribution bias. Children focused more on non-hostile cues than hostile cues despite their hostile attributions, which supports the idea that misattribution of intent is a top-down process. Children have internal cognitive biases, similar to EK biases that affect their understanding of their social environment. Ultimately, these internal biases associated with maladaptive EK and maladaptive TOM may affect the same construct: emotion schemas.

We may conjecture that EK and TOM understanding complement each other in order for children to understand accurately social situations. When one component is maladaptive, the other component may be able to compensate. The ability to identify correctly emotions may counter erroneous cognitive information. A child who can correctly identify an individual's sad expression may reconsider a thought that the individual hurt someone on purpose. Similarly, accurate TOM understanding may buffer biased EK. A child who can correctly isolate his/her own

thoughts from others may reconsider a sad emotion misattribution. Ultimately, emotion schemas may be a balancing act between basic EK and TOM understanding.

Summary and Present Study

Thus far, the literature review highlights caregiver depression, emotion biases, and TOM as contributing factors of developing EK, a proxy for emotion schemas. Children who demonstrate a sad bias may be at risk for a depressive emotion schema. Similarly, children with a depressed caregiver may be at risk for developing their own depressive emotion schema. Children's TOM understanding may further relate to emotion schemas by influencing the way children interpret their social environment. These factors can be generalized into emotion and cognitive components that interact to develop emotion schemas. TOM provides cognitive information regarding intentions and desires, while sad bias and caregiver depression create and prime sad schemas (Woodburn & Izard, 2010). Thus, accurate TOM may protect against the risk for a depressive emotion schema.

The following study investigated preschool risk and resiliency factors of kindergarten children's developing emotion schemas. Preschool children with a risk for a depressive emotion schema, defined as children with higher levels of either a sad bias or caregiver depression, were predicted to have maladaptive emotion schema knowledge in kindergarten compared to their peers. Additionally, preschool children's TOM was hypothesized to demonstrate a positive relation with adaptive emotion schema development. Kindergarten children's developing integration of EK and social-cognition led to further predictions. We posited that TOM would moderate the

relation between preschool children's sad bias and kindergarten adaptive emotion schema knowledge. We also predicted that TOM would moderate the relation between caregiver depression scores from when their child was in preschool and the children's adaptive emotion schema knowledge in kindergarten.

Chapter 2

METHOD

Participants

Participants were obtained from a longitudinal emotion-based preventative intervention study (for a description of the intervention see Izard et al., 2008). Head Start children and their primary caregivers were recruited from seven inner-city centers. Eighty-six children and their caregivers were selected to complete the follow-up data collection because they had completed the preschool assessment battery. Of these 86 dyads, five moved, two were not enrolled in kindergarten, three had unknown contact information, and 12 children were unable to be interviewed in school. The final sample included 64 caregiver-child dyads.

The 64 children were enrolled in 23 elementary schools. They were nested in 28 preschool classrooms the previous year. Children's age at consent ranged from 3.97-5.15 –years-old, $M = 4.66$; 34 were boys. The study included 39 African Americans and 24 Hispanics. As a Head Start community, 90% of the participants have an income at or below the poverty level.

Procedures

Preschool data were collected at the beginning and end of the academic year. Covariates such as demographic information were collected in the beginning of

the year, while the main predictors were collected at the end of the preschool year. The kindergarten data collection occurred at the end of the following academic year.

Trained research assistants interviewed the children. Children's verbal ability and EK were assessed prior to the preschool intervention. Their EK was assessed again, as was TOM, at the end of the preschool year. Children's emotion schemas were assessed in kindergarten.

The primary caregiver was interviewed in the beginning of their child's preschool year, completing measures assessing demographic information along with other measures pertinent to the overarching intervention study. They received a similar interview at the end of their child's preschool year that included a measure of depression. Trained research assistants read the questionnaires aloud and answered any questions posed by the parents. Research assistants fluent in Spanish conducted the interview for guardians whose primary language was Spanish. Caregivers were compensated \$75 for completing each interview.

Measures

Verbal Ability

The Peabody Picture Vocabulary Test-Third Edition (PPVT-III; Dunn & Dunn, 1997, $\alpha = .94$) assesses receptive vocabulary skills and provides a good estimate of verbal ability. Verbal ability is often found to correlate with EK and TOM (Astington & Gopnik, 1991; Eisenberg, Sadovsky, & Spinrad, 2005). Children are asked to select one picture of four that represents an orally presented word. Standard scores are obtained relative to an age-based sample of the population.

Similar to the PPVT-III, the Test de Vocabulario en Imagenes Peabody (TVP; Dunn (TVP; Dunn, Padilla, Lugo, & Dunn, 1986) is a measure of receptive Spanish language skills. It is adapted from the PPVT-Revised (Dunn & Dunn, 1981) and we used it in place of the PPVT-III for Spanish speaking children when their TVP standard score was higher than their PPVT-III standard score. Children with TVP scores greater than their PPVT-III scores completed the remaining assessments in Spanish.

Emotion Knowledge

The Emotion Matching Task (EMT; Izard, Haskins, Schultz, Trentacosta, & King, 2003) assessed preschool children's EK. The four subparts measure different aspects of basic EK: (a) matching emotion expressions, (b) receptive emotion labeling, (c) expressive emotion labeling, and (d) emotion situation knowledge. The EMT focuses on the target emotions of happy, sad, afraid/surprised, and mad. The EMT's construct validity was supported from correlations with other widely used measures of EK and with verbal ability and age (Morgan, Izard, & King, 2009). From the original 48-item measure, split-half versions were created in order to shorten the assessment length, EMT-A fall $\alpha = .77$ and spring $\alpha = .77$; EMT-B fall $\alpha = .80$ and spring $\alpha = .76$ (Finlon et al., 2010). Independent samples t-tests revealed no significant differences between the EMT versions at either preschool assessment, $t(62) = -.42$, $p = .68$, $t(62) = -.18$, $p = .86$, for fall and spring assessments respectively. The fall preschool measure of EK was used as a covariate in the analyses due to EK treatment differences in the

spring. Spring EMT results were used for the creation of the sad bias measure (see below for details).

Sad Bias

The sad bias score was obtained from the preschool spring EMT assessment because we were interested in the EK biases that they may have acquired across the year. Items from any of the four subparts where the child provided an inaccurate “sad” response were counted. However, the number of non-sad target items was different between the two split half assessments; version A had 20 non-sad target items and version B had 18 non-sad target items. Thus, the sad bias score was divided by the number of opportunities for making an erroneous sad response. The subsequent ratio score was used for the analyses. An independent samples t-test revealed no significant difference in sad bias ratio score between EMT-A and EMT-B, $t(62) = -0.47$, $p = .68$.

Theory of Mind

Three false belief measures were selected from Wellman & Liu’s (2004) recommended 6-assessment TOM battery. False belief tasks were used because they are recognized as early predictors of later social understanding and 3-to-5 year old children’s performance resulted with good variability in previous research (Wellman & Liu, 2004). The three examples of false belief used were Knowledge Access, Contents False Belief, and Explicit False Belief. In the Knowledge Access assessment, children were privy to seeing the contents of a box while another character was not. Children were then asked if the character knew what was in the box. In the Contents

False Belief task, children were privy to knowledge that contradicted the expectations of normal bystanders. They were asked what the other character would expect. In the third assessment, Explicit False Belief, children were informed that a character had an incorrect belief. Given the character's error in knowledge, children were asked what the character would do. Each assessment includes a control question that assesses children's memory for vital factual information provided to the child. In order to receive full credit for a story (1-point), children must answer both the control and the test questions correctly. A total score was calculated by adding the children's scores from the three stories ($\alpha = .53$).

Kindergarten Emotion Schemas

The Assessment of Children's Emotion's Skills (ACES; Schultz et al., 2004, $\alpha = .68$) provided the measure of EK in kindergarten, which represented children's emotion schema development. ACES assesses three aspects of developing EK: (a) receptive emotion labeling, (b) emotion situation knowledge, and (c) emotion social behavior identification. Receptive emotion labeling and emotion situation knowledge are similar to components from the EMT. Emotion social behavior identification presents children with 1-3 sentences describing children exhibiting behaviors that are prototypically associated with an emotion. For example, behaviors associated with sad would be withdrawn and lethargic. For every item, children selected from happy, sad, angry, and afraid. There are an equal number of items for every target emotion. The assessment was abbreviated from a 40-item test to a 30-item test in order to limit strains on attention. Items were randomly omitted from each of

the three parts, with the caveat that constraints were placed to maintain balance across emotions. The shortened form maintained adequate internal consistency ($\alpha = .65$). Emotion situation knowledge and emotion social behavior identification were theorized to represent early signs of emotion schema development. High scores indicate adaptive emotion schema development whereas low scores indicate maladaptive emotion schema development.

Caregiver Depression

The Quick Inventory of Depressive Symptomatology—Self Report (QIDS- SR16; Rush et al., 2003, $\alpha = .86$) is a 16-item self-report questionnaire that measures severity of depression symptoms based on the nine DSM IV criterion diagnostic domains. Caregivers selected one of four possible options that best described themselves over the past week. Items relating to suicide were omitted. QIDS--SR16 was shortened from the original 30-item Inventory of Depressive Symptoms (IDS). These measures' psychometric qualities have been validated in previous studies (Rush, Carmody, & Reimitz, 2000; Rush et al., 2003). Caregivers' scores ranged from 0 to 17, out of a possible 24 maximum score.

Chapter 3

RESULTS

Preliminary Analyses

Independent samples t-tests were conducted to assess for sample selection biases that may have occurred from attrition. We compared the final sample of 64 dyads to the 22 dyads with preschool data but no kindergarten data. Independent samples t-tests revealed no significant differences for demographic information such as age, sex, and ethnicity (between African American and Hispanic). Analyses revealed no group differences for verbal ability, preschool EK, sad bias, caregiver depression, and TOM. Thus, these results suggest that no differences exist between dyads with complete assessments and dyads without complete assessments. The remaining analyses were conducted with the sample that completed data.

Additionally, because the primary predictors were collected after the initiation of the preschool intervention (i.e., the larger project from which participants were recruited), we assessed for treatment differences. Independent sample t-tests revealed that the main predictors, caregiver depression, sad bias, and TOM, did not vary by treatment group. Also, kindergarten emotion schema knowledge did not significantly differ by treatment group. However, preschool EK (EMT) treatment differences existed post intervention, $t(58) = -2.16$, $p < .05$, but not pre-intervention in the fall. Therefore, groups were collapsed across treatment for the final analyses, but

fall preschool EK scores were included as a covariate instead of spring preschool EK scores.

Table 1 presents the means and standard deviations of the predictors and kindergarten emotion schema knowledge. We log transformed the caregiver depression variable (QIDS) to adjust for its positive skew. The transformed variable was used in the remainder of the analyses.

Table 1 Means and Standard Deviations of All Variables

Variable	Mean	Standard Deviation
Age	4.62	0.42
Verbal Ability	84.02	11.74
EMT	13.11	3.18
Sad Bias	0.11	0.08
QIDS	5.66	4.06
Theory of Mind	0.88	0.97
Emotion Schemas	19.73	3.53

Table 2 presents the inter-correlations among all variables, with the exception of the interaction terms. Both preschool EK and age positively related to emotion schema knowledge. Also of note, all three primary predictors, sad bias, caregiver depression, and TOM, correlated with kindergarten emotion schema knowledge in the expected direction. Higher sad bias scores and higher caregiver depression scores related to less adaptive emotion schema knowledge. Yet, higher scores on TOM related to more adaptive emotion schema knowledge.

Table 2 Inter-correlations Among All covariates, Predictors, and Outcome Measure

Variable	1	2	3	4	5	6	7
1. Age	-	-.08	.55**	-.22	.12	.08	.29*
2. Verbal Ability		-	.37*	-.15	-.19	.26*	.23
3. EMT			-	-.26*	.04	.14	.44**
4. Sad Bias				-	.09	-.11	-.31*
5. QIDS					-	-.08	-.29*
6. Theory of Mind						-	.39*
7. ACES							-

** $p < .01$. * $p < .05$.

Final Analyses

We selected Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002) to examine our hypotheses. Often when investigating data from educational settings, data are nested within classrooms and within schools. If unaccounted for, nested data can lead to biased standard errors and an increased probability for Type I errors (D. M. Murray, 1998). HLM controls for the interdependence of nested data. We chose to perform 2-Level models that accounted for the clustering of data in preschool classrooms due to the limited number of preschool centers ($n = 7$). To investigate the influence of center clustering, models were compared that included center clustering as a covariate with models that excluded this covariate. In HLM, deviance score comparisons provide an estimate of goodness-of-fit. Chi-square tests revealed no difference between the models, indicating that the models fit the data

equally well. Models that excluded center are more parsimonious, and thus, center was excluded as a covariate in analyses.

We selected HLM to account for the effects of preschool classroom clustering over kindergarten classroom clustering because the preschool data may have been influenced by its collection in the classroom. Child data are represented at Level-1 while classroom data are represented at Level-2. The intra-class correlation showed that 0.11% of the variance in kindergarten emotion schema knowledge is due to between preschool classroom differences. Despite this relatively small intra-class correlation, HLM was best suited for analyzing these data because small intra-class correlations can still inflate alpha levels and risk a type I error (Kreft & de Leeuw, 1998).

We estimated 2 models in HLM. In each model, EK, age, and verbal ability were included as covariates at Level 1. Age, verbal ability, sad bias, caregiver depression score, and TOM were grand mean centered. The slopes of TOM, sad bias, caregiver depression score, and both interaction terms were allowed to vary at the individual level. These variables were chosen because they are the primary predictors in the model and allowing for individual variance in the slopes creates a conservative estimate of these effects.

Model 1: TOM by Sad Bias Interaction

Table 3 provides estimates for Model 1, which investigated the potential moderating effect of TOM on sad bias and kindergarten emotion schema knowledge.

The results support the hypothesis that TOM interacts with children's sad bias to predict children's developing emotion schemas in kindergarten.

Table 3 HLM Analyses of TOM Moderating the Relation Between Sad Bias and Kindergarten Emotion Schema

Fixed Effect	Coefficient	t	df
ACES			
Intercept	15.15	8.27**	27
Age	<0.01	1.50	56
Verbal Ability	-0.01	-0.30	56
EMT	0.36	2.59	56
QIDS	-3.31	-2.08	27
Sad Bias	-6.86	-1.57	27
Theory of Mind	1.43	3.30**	27
TOM x Sad Bias	11.74	2.24*	27

** $p < .01$. * $p < .05$.

Figure 1 visually presents the interaction effect showing that children with poor TOM understanding and high sad bias remained at risk for maladaptive emotion schema knowledge; however, higher levels of TOM understanding buffered the negative effects of sad bias and improved children's overall kindergarten emotion schema knowledge. A positive relation remained between TOM and emotion schema knowledge such that children with higher TOM also scored higher on emotion schema knowledge in kindergarten compared to their peers with lower TOM scores. Additionally, caregiver depression was observed as a main effect in that preschool children whose caregivers reported higher depression scores performed lower on

kindergarten emotion schema knowledge. Although sad bias was not a significant predictor, the analyses revealed that preschool EK had a positive relation with emotion schema knowledge.

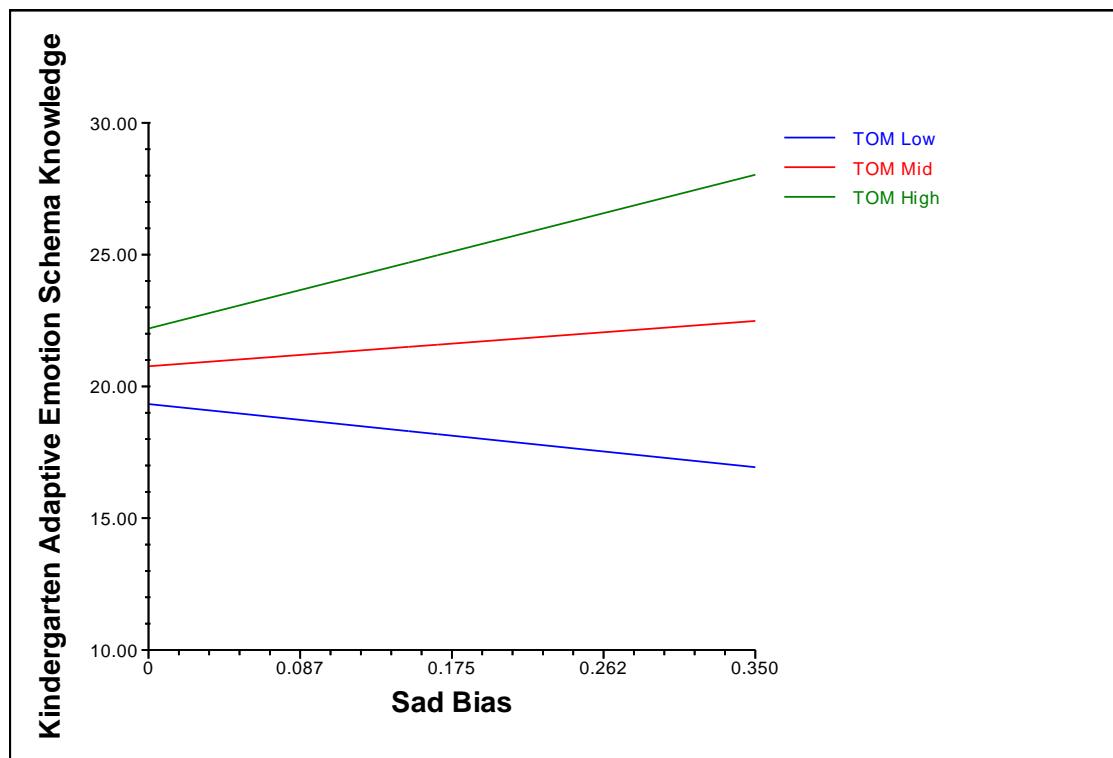


Figure 1 Relation between sad bias in preschool and kindergarten emotion schema presented across low, mid, and high TOM performance in preschool

Model 2: TOM by Caregiver Depression Interaction

Table 4 provides estimates for Model 2, which investigated TOM as a potential moderator of caregiver depression scores and kindergarten emotion schema knowledge. The hypothesis was supported: TOM influenced the relation between caregiver depression and kindergarten emotion schema knowledge. Figure 2 visually presents these results.

Table 4 HLM Analyses of TOM Moderating the Relation Between Caregiver Depression and Kindergarten Emotion Schemas

Fixed Effect	Coefficient	t	df
ACES			
Intercept	15.61	8.63**	27
Age	<0.01	0.75	56
Verbal Ability	-<0.03	-0.82	56
EMT	0.32	2.35*	56
QIDS	-1.86	-1.22	27
Sad Bias	-13.02	-2.86**	27
Theory of Mind	1.43	3.30**	27
TOM x QIDS	4.48	2.73*	27

** $p < .01$. * $p < .05$.

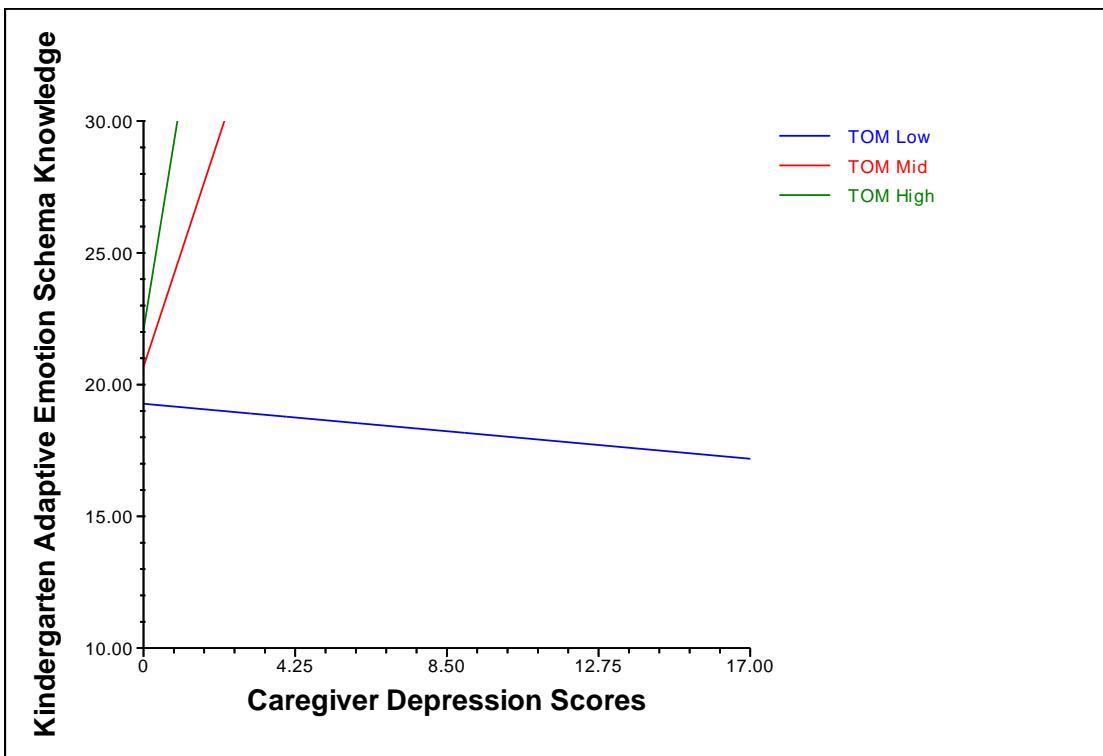


Figure 2 Relation between caregiver depression scores when his/her child was in preschool and kindergarten emotion schemas presented across low, mid, and high TOM performance

Similar to results from Model 1, TOM understanding compensated for the risk of caregiver depression such that children with greater TOM understanding scored higher on kindergarten emotion schema knowledge, negating the negative effects of caregiver depression. Both TOM and preschool EK remained significant predictors of kindergarten emotion schema knowledge in the same direction as in Model 1. Sad bias emerged as a significant predictor such that children with higher sad bias scores

performed lower on the kindergarten emotion schema assessment compared to their peers. Caregiver depression was no longer a significant predictor of kindergarten emotion schema knowledge.

Chapter 4

DISCUSSION

The present study aimed to identify positive and negative precursors to kindergarten emotion schema knowledge. We cited evidence suggesting that sad bias and caregiver depression provide a maladaptive foundation for developing sad emotion schemas (e.g., Carter et al., 2001; Martin et al., 2010). Additionally, although TOM literature has remained within the social-cognitive area, TOM appears to relate to EK and may influence developing emotion schemas (Woodburn & Izard, 2010). TOM understanding promotes accurate assessment of social situations, which may lead to the incorporation of adaptive cognitions into developing emotion schemas. Because emotion schemas are theorized to be developed from both emotion and cognition, we investigated whether TOM would buffer the negative effects of both sad bias and caregiver depression on kindergarten emotion schema knowledge.

Model 1 and Model 2 supported the proposition that TOM moderates the relation between an identified risk for depressive emotion schema and kindergarten emotion schema knowledge. TOM affected both the relation between preschool sad bias scores and kindergarten emotion schema knowledge as well as the relation between caregiver depression scores assessed at the time the child was in preschool and kindergarten emotion schema knowledge. TOM, as a social-cognitive construct, appears to counter the negative effects from maladaptive basic EK. In both models,

children with poor TOM understanding were affected by their maladaptive EK and consequently performed worse on an assessment of kindergarten emotion schema knowledge than their peers. Higher levels of TOM were observed to buffer this effect. The consistency of this buffering effect across both EK risk assessments, assessed directly from the child and assessed indirectly from a caregiver, speaks to the impact that TOM has on developing emotion schemas. These results provide further evidence for a relation between EK and TOM. Moreover, these findings demonstrate an emotion-cognition interaction, which supports emotion schema theories (Izard, 2007).

Children's sad EK was not a consistent predictor of later emotion schema development. The caregiver depression and sad bias main effects were inconsistent across the two models, suggesting that the negative relation between these measurements and kindergarten emotion schema knowledge were better accounted for by the interaction effect. The absence of maladaptive EK main effects on developing emotion schemas supports the idea that developing EK is comprised of elements other than basic EK. Developing emotion schemas may arise from the integration of TOM and EK, rather than simply from an expansion of EK.

TOM, however, predicted kindergarten emotion schema knowledge in both models. Children with greater TOM understanding subsequently had more adaptive emotion schema knowledge. The kindergarten emotion schema assessment asked children to match emotions to behaviors and situations. Although the assessment measures children's EK, in some parts children also need to cognitively interpret the social situation. For example, one question asks "You see Emily running to join you and the other kids playing basketball. Does Emily feel happy, sad, mad, or scared?"

Before the child can correctly identify that Emily feels happy because she is joining a game with friends, the child needs to understand that, regardless of the child's personal beliefs and desires about basketball, other children may enjoy it. TOM attainment may signify a crucial milestone for children to apply their emotion knowledge in an accurate manner and promote adaptive emotion schema development.

Limitations and Future Directions

The current study provides evidence for the positive effects of adaptive cognitive development on maladaptive EK. Yet other studies are needed to fully understand the relation between TOM and EK on development. For example, the researchers advise investigating the effects of adaptive EK on maladaptive TOM. They recommend replication of these findings prior to further conclusions.

There are multiple methods of investigating children's EK and social-cognition and their associations to emotion schemas that may prove lucrative. Broad constructs such as EK and cognitions may be better attained from multiple measures. Although the current study included two measures of maladaptive EK, their evaluation was not integrated. Also, only one measure of TOM was used. TOM measures directed at different TOM aspects should be included. To these authors' knowledge, TOM and EK have not been previously studied within the same study. From the present results, the next step may be to determine which source of maladaptive EK produces a larger impact on emotion schemas by including both measures in the same model.

The resulting sample may have unintentionally affected the generalizability and conclusions of the findings. Despite the unremarkable attrition

analyses, we may have neglected to measure a variable that selected a biased sample. Furthermore, we were unable to follow all preschool children from the original sample due to previous attrition within the overarching intervention study. Finally, the study's sample consisted of urban economically disadvantaged Head Start children and these findings may not generalize to other populations.

The study has additional notable limitations that were unavoidable. Preschool data were collected at two time-points to account for effects from the intervention. A single preschool data collection time-point would have been a superior research design. Furthermore, longitudinal studies benefit from repeated assessments across multiple time points in order to investigate developmental trajectories. Because the present study only compared preschool assessment to kindergarten assessment it assumed linear relationships; however, the relation between the predictors and observed outcome may be non-linear. Future studies with the means should address these limitations.

Future studies also should investigate the relations between EK, TOM, and behavior. Current evidence in the literature supports the relations between EK and behavior and between TOM and behavior (Capage & Watson, 2001; Fine et al., 2004; Izard et al., 2001). However, demonstrating that EK interacts with TOM to predict behavior would extend the current studies' conclusions and would stress, in practical terms, the importance of these constructs on development.

In conclusion, preschool children's TOM plays an important role for developing emotion schemas and may compensate for maladaptive EK. Thus, our findings highlight the importance of not only accurate development of basic EK, but

also accurate development of TOM. From our analyses, we clearly demonstrated that the combination of poor basic EK and poor TOM related to lower levels of adaptive emotion schema knowledge in kindergarten. Yet, children with increased levels of TOM understanding were able to combat this risk. Children from economically disadvantaged homes are frequently exposed to negative emotions. Economically disadvantaged families have higher rates of depression and family discord which may put children at greater risk for developing biased EK (Keenan & Shaw, 1994). Hence, these findings may present the greatest impact for Head Start children and these disadvantages can be addressed through EK and TOM intervention programs.

HUMAN SUBJECTS APPROVAL LETTER



RESEARCH OFFICE

210 Hullihan Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: October 22, 2009

TO: Carroll Izard
FROM: University of Delaware IRB

STUDY TITLE: [137613-1] HS 09-125 renewal
IRB REFERENCE #:
SUBMISSION TYPE: Continuing Review/Progress Report

ACTION: APPROVED
APPROVAL DATE: October 21, 2009
EXPIRATION DATE: November 11, 2010
REVIEW TYPE: Full Committee Review

Thank you for your submission of Continuing Review/Progress Report materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Full Committee Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

REFERENCES

- Astington, J. W., & Gopnik, A. (1991). Theoretical explanations of children's understanding of the mind. *British Journal of Developmental Psychology. Special Issue: Perspectives on the child's theory of mind: I*, 9(1), 7-31.
- Badgaiyan, R. D. (2009). Theory of mind and schizophrenia. *Consciousness and Cognition*, 18(1), 320-322. doi: DOI: 10.1016/j.concog.2008.10.008
- Baron-Cohen, S. (2001). Theory of mind and autism: A review. *International Review of Research in Mental Retardation: Autism*, 23, 169-184.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition*, 21(1), 37-46. doi: Doi: 10.1016/0010-0277(85)90022-8
- Bear, G. G., Manning, M. A., & Izard, C. E. (2003). Responsible behavior: The importance of social cognition and emotion. *School Psychology Quarterly*, 18(2), 140-157. doi: 10.1521/scpq.18.2.140.21857
- Biglan, A., Hops, H., Sherman, L., Friedman, L. S., Arthur, J., & Osteen, V. (1985). Problem-solving interactions of depressed women and their husbands. *Behavior Therapy*, 16(5), 431-451. doi: Doi: 10.1016/s0005-7894(85)80023-x
- Brüne, M. (2005). Emotion recognition, 'theory of mind,' and social behavior in schizophrenia. *Psychiatry Research*, 133(2-3), 135-147. doi: 10.1016/j.psychres.2004.10.007
- Capage, L., & Watson, A. C. (2001). Individual differences in theory of mind, aggressive behavior, and social skills in young children. *Early Education & Development*, 12(4), 613 - 628.
- Carter, A. S., Garrity-Rokous, F. E., Chazan-Cohen, R., Little, C., & Briggs-Gowan, M. J. (2001). Maternal depression and comorbidity: Predicting early parenting, attachment security, and toddler social-emotional problems and competencies. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(1), 18-26. doi: Doi: 10.1097/00004583-200101000-00012

- Cohn, J. F., Campbell, S. B., & Ross, S. (1991). Infant response in the still-face paradigm at 6 months predicts avoidant and secure attachment at 12 months. *Development and Psychopathology*, 3(04), 367-376. doi: doi:10.1017/S0954579400007574
- Cunningham, J. N., Kliewer, W., & Garner, P. W. (2009). Emotion socialization, child emotion understanding and regulation, and adjustment in urban African American families: Differential associations across child gender. *Development and Psychopathology*, 21(01), 261-283. doi: doi:10.1017/S0954579409000157
- Dawson, G., Ashman, S. B., Panagiotides, H., Hessl, D., Self, J., Yamada, E., & Embry, L. (2003). Preschool Outcomes of Children of Depressed Mothers: Role of Maternal Behavior, Contextual Risk, and Children's Brain Activity. *Child Development*, 74(4), 1158-1175. doi: 10.1111/1467-8624.00599
- Denham, S. A. (1986). Social cognition, prosocial behavior, and emotion in preschoolers: Contextual validation. *Child Development*, 57, 194-201.
- Denham, S. A. (2007). Dealing with feelings: How children negotiate the world of emotions and social relationships. *Cognition, Brain, Behavior*, 11(1), 1-48.
- Denham, S. A., Blair, K. A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, S., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence? *Child Development*, 74(1), 238-256. doi: 10.1111/1467-8624.00533
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53(6), 1146-1158. doi: 10.1037/0022-3514.53.6.1146
- Downs, A., & Smith, T. (2004). Emotional Understanding, Cooperation, and Social Behavior in High-Functioning Children with Autism. *Journal of Autism and Developmental Disorders*, 34(6), 625-635. doi: 10.1007/s10803-004-5284-0
- Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test-Revised*. Circle Pines, MN: American Guidance Services.
- Dunn, L. M., & Dunn, L. M. (1997). *Peabody Picture Vocabulary Test: Manual* (3rd ed.). Circle Pines, MN: American Guidance Services.

- Dunn, L. M., Padilla, E. R., Lugo, D. E., & Dunn, L. M. (1986). *Test de Vocabulario en Imágenes Peabody: Adaptación Hispanoamericana*. Circle Pines, MN: American Guidance Service.
- Eisenberg, N., & Fabes, R. A. (1992). Emotion, regulation, and the development of social competence. In M. S. Clark (Ed.), *Review of personality and social psychology: Emotion and social behavior* (Vol. 14, pp. 119-150). Newbury Park, CA: Sage.
- Eisenberg, N., Sadovsky, A., & Spinrad, T. L. (2005). Associations of emotion-related regulation with language skills, emotion knowledge, and academic outcomes. *New Directions for Child and Adolescent Development, 2005*(109), 109-118. doi: 10.1002/cd.143
- Fine, S. E., Trentacosta, C. J., Izard, C. E., Mostow, A. J., & Campbell, J. L. (2004). Anger perception, caregivers' use of physical discipline, and aggression in children at risk. *Social Development, 13*(2), 213-228. doi: 10.1111/j.1467-9507.2004.000264.x
- Finlon, K. J., Izard, C. E., Woodburn, E. M., Krauthamer-Ewing, E. S., Grossman, S. R., Seidenfeld, A. M., & Laurenceau, J.-P. (2010). Emotion-based preventative intervention: Effectively promoting emotion knowledge and self-regulation among at-risk preschoolers. Manuscript in preparation.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218-226. doi: 10.1037/0003-066x.56.3.218
- Garner, P. W. (1999). Continuity in emotion knowledge from preschool to middle-childhood and relation to emotion socialization. *Motivation & Emotion, 23*, 247-266.
- Golan, O., & Baron-Cohen, S. (2006). Systemizing empathy: Teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology, 18*(02), 591-617. doi: 10.1017/S0954579406060305
- Goodman, S. H., Brogan, D., Lynch, M. E., & Fielding, B. (1993). Social and emotional competence in children of depressed mothers. *Child Development, 64*(2), 516-531. doi: 10.1111/j.1467-8624.1993.tb02925.x

- Goodman, S. H., & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*, 106(3), 458-490. doi: 10.1037/0033-295x.106.3.458
- Herba, C. M., Benson, P., Landau, S., Russell, T., Goodwin, C., Lemche, E., . . . Phillips, M. (2008). Impact of familiarity upon children's developing facial expression recognition. *Journal of Child Psychology and Psychiatry*, 49(2), 201-210. doi: 10.1111/j.1469-7610.2007.01835.x
- Horsley, T., de Castro, B., & Van der Schoot, M. (2010). In the eye of the beholder: Eye-tracking assessment of social information processing in aggressive behavior. *Journal of Abnormal Child Psychology*, 38(5), 587-599. doi: 10.1007/s10802-009-9361-x
- Hughes, C., & Ensor, R. (2006). Behavioural problems in 2-year-olds: links with individual differences in theory of mind, executive function and harsh parenting. *Journal of Child Psychology and Psychiatry*, 47(5), 488-497. doi: 10.1111/j.1469-7610.2005.01519.x
- Izard, C. E. (1971). *The face of emotion*. New York: Appleton-Century-Crofts.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum Press.
- Izard, C. E. (1978). On the ontogenesis of emotions and emotion-cognition relationships in infancy. In M. Lewis & L. A. Rosenblum (Eds.), *The development of affect* (pp. 389-413). New York: Plenum Press.
- Izard, C. E. (2007). Basic emotions, natural kinds, emotion schemas, and a new paradigm. *Perspectives on Psychological Science*, 2(3), 260-280. doi: 10.1111/j.1745-6916.2007.00044.x
- Izard, C. E., Fine, S., Schultz, D., Mostow, A. J., Ackerman, B., & Youngstrom, E. (2001). Emotion knowledge as a predictor of social behavior and academic competence in children at risk. *Psychological Science*, 12(1), 18-23. doi: 10.1111/1467-9280.00304
- Izard, C. E., Haskins, F. W., Schultz, D., Trentacosta, C. J., & King, K. A. (2003). *Emotion Matching Test*. (Contains 182 standardized color photos of children's emotion expressions). University of Delaware.

- Izard, C. E., King, K. A., Trentacosta, C. J., Morgan, J. K., Laurenceau, J.-P., Krauthamer-Ewing, E. S., & Finlon, K. J. (2008). Accelerating the development of emotion competence in Head Start children: Effects on adaptive and maladaptive behavior. *Development and Psychopathology*, 20(01), 369-397. doi: doi:10.1017/S0954579408000175
- Kashani, J., Ray, J., & Carlson, G. (1984). Depression and depressive-like states in preschool-age children in a child development unit. *Am J Psychiatry*, 141(11), 1397-1402.
- Keenan, K., & Shaw, D. (1994). The development of aggression in toddlers: A study of low-income families. *Journal of Abnormal Child Psychology*, 22(1), 53-77. doi: 10.1007/bf02169256
- Keltner, D., & Kring, A. M. (1998). Emotion, social function, and psychopathology. *Review of General Psychology*, 2(3), 320-342.
- Kerr, N., Dunbar, R. I. M., & Bentall, R. P. (2003). Theory of mind deficits in bipolar affective disorder. *Journal of Affective Disorders*, 73(3), 253-259. doi: Doi: 10.1016/s0165-0327(02)00008-3
- Kowalik, D. L., & Gotlib, I. H. (1987). Depression and marital interaction: Concordance between intent and perception of communication. *Journal of Abnormal Psychology*, 96(2), 127-134.
- Kreft, I., & de Leeuw, J. (1998). *Introducing Multilevel Modeling*. London: Sage Publications.
- Martin, S., Boekamp, J., McConville, D., & Wheeler, E. (2010). Anger and sadness perception in clinically referred preschoolers: Emotion processes and externalizing behavior symptoms. *Child Psychiatry & Human Development*, 41(1), 30-46. doi: 10.1007/s10578-009-0153-x
- Mathews, A., & MacLeod, C. (1986). Discrimination of threat cues without awareness in anxiety states. *Journal of Abnormal Psychology*, 95(2), 131-138. doi: 10.1037/0021-843x.95.2.131
- Morgan, J. K., Izard, C. E., King. (2010). Construct validity of the Emotion Matching Task: Preliminary evidence for convergent and criterion validity of a new emotion knowledge measure for young children. *Social Development*, 19(1), 54-70.

- Mueller, E. M., Hofmann, S. G., Santesso, D. L., Meuret, A. E., Bitran, S., & Pizzagalli, D. A. (2009). Electrophysiological evidence of attentional biases in social anxiety disorder. *Psychological Medicine*, 39(07), 1141-1152. doi: doi:10.1017/S0033291708004820
- Murray, D. M. (1998). *Design and analysis of group-randomized trials*. New York: Oxford University Press.
- Murray, L., Kempton, C., Woolgar, M., & Hooper, R. (1993). Depressed mothers' speech to their infants and its relation to infant gender and cognitive development. *Journal of Child Psychology and Psychiatry*, 34(7), 1083-1101. doi: 10.1111/j.1469-7610.1993.tb01775.x
- Pollak, S. D., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotion in faces: Developmental effects of child abuse and neglect. *Developmental Psychology*, 36(5), 679-688. doi: 10.1037/0012-1649.36.5.679
- Pollak, S. D., & Sinha, P. (2002). Effects of early experience on children's recognition of facial displays of emotion. *Developmental Psychology*, 38(5), 784-791. doi: 10.1037/0012-1649.38.5.784
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.
- Rush, A. J., Carmody, T., & Reimitz, P.-E. (2000). The Inventory of Depressive Symptomatology (IDS): Clinician (IDS-C) and Self-Report (IDS-SR) ratings of depressive symptoms. *International Journal of Methods in Psychiatric Research*, 9(2), 45-59. doi: 10.1002/mpr.79
- Rush, A. J., Trivedi, M. H., Ibrahim, H. M., Carmody, T. J., Arnow, B., Klein, D. N., . . . Keller, M. B. (2003). The 16-Item quick inventory of depressive symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. *Biological Psychiatry*, 54(5), 573-583. doi: Doi: 10.1016/s0006-3223(02)01866-8
- Schultz, D., Grodack, A., & Izard, C. E. (2010). State and trait anger, fear, and social information processing. In M. Potegal, G. Stemmler & C. Spielberger (Eds.), *International Handbook of Anger: Constituent and Concomitant Biological, Psychological, and Social Processes* (pp. 311-325). New York: Springer.

- Schultz, D., Izard, C. E., Ackerman, B., & Youngstrom, E. A. (2001). Emotion knowledge in economically disadvantaged children: Self-regulatory antecedents and relations to social difficulties and withdrawal. *Development and Psychopathology*, 13, 53-67. doi: 10.1017/S0954579401001043
- Schultz, D., Izard, C. E., & Ackerman, B. P. (2000). Children's anger attribution bias: Relations to family environment and social adjustment. *Social Development*, 9(3), 284-301. doi: 10.1111/1467-9507.00126
- Schultz, D., Izard, C. E., & Bear, G. (2004). Children's emotion processing: Relations to emotionality and aggression. *Development and Psychopathology*, 16(02), 371-387. doi: 10.1017/S0954579404044566
- Shackman, J. E., & Pollak, S. D. (2005). Experiential influences on multimodal perception of emotion. *Child Development*, 76(5), 1116-1126. doi: 10.1111/j.1467-8624.2005.00901.x
- Tangney, J. P., Hill-Barlow, D., Wagner, P. E., Marschall, D. E., Borenstein, J. K., Sanftner, J., . . . Gramzow, R. (1996). Assessing individual differences in constructive versus destructive responses to anger across the lifespan. *Journal of Personality and Social Psychology*, 70(4), 780-796. doi: 10.1037/0022-3514.70.4.780
- Tomkins, S. S., & McCarter, R. (1964). What and where are the primary affects? Some evidence for a theory. *Perceptual and Motor Skills*, 18, 119-158.
- Trentacosta, C. J., & Fine, S. E. (2010). Emotion knowledge, social competence, and behavior problems in childhood and adolescence: A meta-analytic review. *Social Development*, 19(1), 1-29. doi: 10.1111/j.1467-9507.2009.00543.x
- Trentacosta, C. J., & Izard, C. E. (2007). Kindergarten children's emotion competence as a predictor of their academic competence in first grade. *Emotion*, 7, 77-88. doi: 10.1037/1528-3542.7.1.77
- Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development*, 75(2), 523-541. doi: 10.1111/j.1467-8624.2004.00691.x
- Woodburn, E. M., & Izard, C. E. (2010). Belief and emotion: Developmental overlap and social implications. Manuscript submitted for publication.

Zeman, J., Shipman, K., & Suveg, C. (2002). Anger and sadness regulation:
Predictions to internalizing and externalizing symptoms in children. *Journal of Clinical Child & Adolescent Psychology*, 31(3), 393 - 398.