Preschoolers' Knowledge of Specific Emotions

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By

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DEDICATION

This thesis is dedicated to my parents, John and Debbie Tarpey, for always supporting and believing in me. Thank you.

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ABSTRACT

PRESCHOOLERS' KNOWLEDGE OF SPECIFIC EMOTIONS

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The current study examined preschoolers' knowledge of specific emotions (happy, sad, angry, and afraid) as assessed through the Affect Knowledge Test (AKT) and had several goals. The first goal was to determine whether preschoolers' emotion knowledge varied by emotion type and valence, overall and by age, sex, and preschool type. The second goal was to determine whether preschoolers' varied in the type of errors that they made on vignettes, overall and by age. The third goal was to determine whether emotion knowledge scores assessed in fall of 2006 (Time 1) were associated with teacher ratings on the Social Competence and Behavior Evaluation – The Short Form (SCBE-30) in spring of 2007 (Time 2). The fourth and last goal was to determine whether emotion knowledge scores assessed in fall of 2006 (Time 1) predicted teacher ratings on the SCBE-30 in spring of 2007 (Time 2) above and beyond using a total score for overall emotion knowledge. Results indicated that preschoolers' emotion knowledge for happiness was significantly greater than emotion knowledge for the three negative

emotions (sad, angry, afraid). This finding was significant across vignette-types (stereotypical and non-stereotypical). Results also indicated that for negative emotions, preschoolers were most competent at recognizing sadness, followed by anger and then fear. Emotion knowledge for negative emotions was significantly higher for four year-olds for stereotypical and non-stereotypical vignettes, with emotion knowledge for happiness also being significantly greater for four year-olds, but only for non-stereotypical vignettes. Males were significantly better at correctly identifying anger, but only for stereotypical vignettes, and no significant differences in emotion knowledge were found for preschool type. For errors in emotion knowledge, results indicated that preschooler's made a significantly greater number of 'angry' and 'sad' errors compared to 'afraid' errors, and these errors were significantly greater for three year-olds. Correlational analyses revealed that emotion knowledge for sadness at Time 1 was significantly correlated with teacher ratings of withdrawal/avoidance at Time 2, and emotion knowledge for happiness, sadness, and anger at Time 1 were significantly correlated with teacher ratings of sensitivity/cooperation at Time 2. Lastly, regression analyses indicated that using a score of overall emotion knowledge at Time 1 significantly predicted teacher ratings of sensitivity/cooperation at Time 2, but scores for knowledge of specific emotions at Time 1 did not predict scores above and beyond using an overall score of emotion knowledge. Future research should focus on incorporating preschoolers' differences in knowledge of each specific emotion to better understand individual differences in emotion knowledge and to help tailor prevention and intervention programming to individual children.

INTRODUCTION

The nature of emotions has been discussed and debated for thousands of years, even going back as far as the classical Greek philosophers, Socrates and Plato (Solomon, 2008). Emotions themselves, however, have remained in the background of discussion and debate until the last couple of decades. This relatively recent increase of interest in emotions has occurred in many areas of study, including developmental psychology.

Denham and Burton (2003) define emotions as, "regulators of behavior within ourselves (intrapersonal) and in interactions with others (interpersonal)" (p. 2). Emotions are an ever-present part of our lives. Even as infants, humans exhibit a range of emotional behaviors, though that range is narrow, and by the age of three or four, children display almost as many emotions as adults (Lewis, 2008). Though the acquisition of a wide range of emotional behaviors occurs at a young age, understanding those emotions and emotional behaviors does not occur synonymously with their acquisition. Emotions are by no means simple; they must be understood, expressed, and regulated accurately. To acquire these skills, emotional competence is required (Denham, 1998; Saarni, 1999). Denham (1998) defines emotional competence as the understanding of emotions. The importance of emotional competence can be seen through its rewards as well as through the consequences of its absence (Goleman, 1995). Forming relationships, behaving appropriately, and having positive interactions with peers all require emotional

competence, and emotional competence becomes critical as children reach preschool-age and begin to lay the foundation for these skills (Denham, 1998; Denham & Burton, 2003; Saarni, 1999).

Emotional competence is also interconnected with social competence, which involves having high peer status, being able to form positive relationships with others, and having social goals and tasks, and the two are often combined and referred to as social-emotional competence, especially in developmental psychology; Saarni (1999) even describes emotional and social development as inseparable. Taking this relation into consideration, for preschool-age children to be socially competent, they must also be emotionally competent, and deficits in one area would likely cause deficits in the other. Therefore, it is important to consider both social and emotional development in order to gain a more accurate picture of emotional competence in preschoolers.

Emotional Competence

Preschoolers' emotional competence, an important aspect of development, has been linked to social competence and academic achievement in later childhood (Denham et al., 2003; Duncan et al., 2007; Hamre & Pianta, 2001; Rimm-Kaufman, Pianta, & Cox, 2000) as well as internalizing behavior in later childhood (Fine et al., 2003). It has several main components and there are at least four components of emotional competence that should be taken into account with preschool-age children: emotion expression, emotion understanding, emotion regulation, and cultural context (Gordon, 1989; Denham, 1998; Saarni, 1999). These components are discussed in greater detail below:

Emotion Expression

This component of emotional competence is largely nonverbal and involves how a child interacts with another person, such as a peer, a stranger, or a family member (Denham, 1998). Children who are adept at emotion expression are able to use gestures to express emotional messages, such as running up to dad and hugging him when he comes home from work, and are capable of responding appropriately to other people's emotional states, such as patting a friend's back to console him after his mother drops him off at class and he begins to cry (empathy). Children who are adept at emotion expression also understand that the expression of emotions (and the degree of expression) is contextual and changes depending on where the child is and whom they are with, and they can react appropriately (Denham, 1998). An example of competent emotion expression is a child who may not like one of his peers but is friendly and playful when the child comes over to play. Lastly, emotion expression involves displaying equivocal emotions, such as shame and guilt, in appropriate situations, such as feeling guilty after pushing a peer off the swing.

Expressing emotions appropriately enables children to develop positive relationships with peers and teachers, and develop social skills (Denham, 2005; Halberstadt, Denham, & Dunsmore, 2001; Saarni, 1999). Building a block tower with a classmate who commonly reacts with aggression (such as throwing a chair) when the blocks fall down is not likely to be as appealing as building a block tower with a classmate who responds to the same situation in a non-aggressive manner, such as briefly crossing his arms, stomping his foot in frustration, and moving on. Consequently, the

child who does not throw chairs when he is angry is more likely to be approached by peers (or even the teacher) and will have more opportunities for positive interactions with others.

Emotion Understanding

Emotion understanding requires children to be able to differentiate between their emotional states, particularly when more than one emotion may be felt at the same time, such as feeling a lot of excitement but also a little bit of fear before going on a roller coaster ride (Denham, 1998). It also requires the understanding of others' emotional states; when big brother comes home from school, stomps into the house, and slams his bedroom door shut, that means he is angry and it would not be a good idea to ask him to play with you right now. Emotion vocabulary is also an important part of emotion understanding. If a child consoles his crying friend by patting his back and telling him about how he also used to become sad when his mom dropped him off at school, the child is demonstrating good emotion understanding and emotion expression.

Individual differences in emotion understanding emerge at an early age, even as early as the age of three (Dunn, Brown, & Beardsall, 1991) and can persist throughout childhood (Pons, Lawson, Harris, & de Rosnay, 2003). In fact, the possible consequences of deficits in emotion knowledge, in areas such as academic achievement, have far-reaching lifespan implications

Individual children's differing emotion knowledge abilities have been linked to several potential contributing factors, including language ability, quality of attachment to caregivers, and the home environment (Cutting & Dunn, 1999; Harris, de Rosnay, &

Pons, 2005). Although individual differences in emotion understanding and their persistence throughout childhood can be cause for dismay, emotion understanding can be taught to children as young as preschool-age, potentially reducing deficits in emotion understanding (Bennett & Hiscock, 1994; Greenberg, Kusché, Cook, & Quamma, 1995; Pons & Harris, 2005).

Emotion Regulation

This component of emotional competence requires the possession of coping and strategy skills for not only emotions and situations that are upsetting, but also for emotions and situations that are pleasant (Denham, 1998; Eisenberg, Hofer, & Vaughan, 2007). Although it may be tempting for a preschooler to become angry and cry when someone pushes them off the swing during recess, remaining calm and finding the teacher and asking her for assistance is not only a socially acceptable response, it also demonstrates emotion regulation. Likewise, a child may find it amusing when a classmate spills milk all over himself during lunch, but upon noticing that the child is embarrassed, is able to suppress their laughter by covering their mouth and diverting their attention somewhere else. Lastly, emotion regulation involves strategically "up-regulating" the expression of emotions when necessary or appropriate (Denham, 1998; Izard, 1991). If a child is playing a game of tag with friends, they may up-regulate their laughter or dance around and stick out their tongue to playfully taunt the child who is "it". Likewise, if a child falls and is hurt, the child may increase the intensity of their crying/screaming in order to be heard and have somebody come to their aid.

Cultural Context

Emotions and emotional competence are universal in that they exist and are important in essentially all cultures around the world. Although emotions and emotional competence are universal, their definitions are not. "Emotional competence is embedded in cultural context. The particular society into which we are born provides us with a system of beliefs, which facilitates how we make sense of emotional experience" (Saarni, 1999, p. 54). One example of the cultural differences of emotions and emotional competence is the collectivistic and individualistic views of shame and guilt. Exploration into the differences of Western and non-Western collectivistic cultures suggests that individualistic societies view shame as more aversive than guilt, whereas collectivistic societies view shame as a normal and useful mode to promote social bonds and compliance (Walbott & Scherer, 1995). Furthermore, a society in which violence toward women is an everyday reality might encourage young girls to be aggressive and defiant because in that cultural context, the ability to defend oneself would very likely be necessary for survival (Saarni, 1999). Being as culturally diverse as the United States is, cultural context is especially important to consider and integrate into the interpretation and implementation of research on emotional competence, as these cultural differences could affect emotional competence and emotional behaviors.

Component Relationships in Emotional Competence

These components of emotional competence are all interrelated. Denham (1986) found that emotion expression and emotion understanding were related to each other, and this relationship was replicated (Denham et al., 2003). Miller et al. (2006) found that

emotion knowledge was associated with positive emotion regulation, and negative emotion expression was related to emotion regulation variables. On a more practical level, the relations among these components make sense. Understanding the emotions of oneself and others could assist someone in deciding how to express one's emotions. If a child approaches a friend and is able to recognize that their friend is sad and not angry, they may decide to approach the friend and console them (i.e., expressing empathic sadness), instead of going to a different area of the classroom (i.e., perhaps suppressing expression of anxiety over the other's perceived anger). Or, if a child bumps into the class bully on the playground, understanding that the look on the bully's face means he is angry may assist the child in deciding whether they should run away or stand their ground (i.e., displaying assertive annoyance). Although having good emotion knowledge doesn't mean that a child will always use that knowledge to react appropriately (both behaviorally and emotionally) in emotion-eliciting situations, it does play a part and can help them decide how they want to handle various situations.

As the above descriptions and examples illustrate, the development of emotional competence is essential; its social competence implications are extensive. Moreover, its necessity persists throughout the lifespan. An adult who lacks emotional competence may have difficulty making and maintaining close friendships and romantic relationships, holding a job, and interacting appropriately with coworkers and superiors (Mayer & Salovey 1997; Salovey & Sluyter, 1997). The lifelong necessity of emotional competence exemplifies the importance of facilitating the development of emotional competence in

children and continuing to create and improve interventions, especially for children in high-risk populations.

Social Competence

As with emotional competence, there are several different definitions for social competence. Rose-Krasnor (1997) provides a table that lists thirteen different definitions of social competence, from 'social success' (Atteli, 1990) to "the ability to achieve personal goals in social interaction while simultaneously maintaining positive relationships with others over time and across settings" (Rubin & Rose-Krasnor, 1992, p. 285). Social competence is often defined from an operational or functional approach, such as having high peer status, being able to form positive relationships with others, and having social goals and tasks; another important aspect of defining social competence is looking at the processes and outcomes of social behavior (Rose-Krasnor, 1997).

Social competence has important implications. Although having many friends and being well-liked means a person is probably very socially competent, it takes knowledge of one's emotions and the emotions of others, i.e. emotional competence, to attain that social competence and maintain that high social status. Thus, although emotional competence and social competence are separate constructs, they are intimately related and their association continues throughout the lifespan.

Although the current research is mainly focused on emotional competence, the intricate and constant relations among aspects of social and emotional competence cannot be ignored. Even the way that we measure emotional competence is set in social contexts.

It is a connection that is hard, if not impossible to separate. It is crucial to consider the important implications of social-emotional competence for children's lives.

Social-Emotional Competence

"Almost every behavior involved in maintaining social interactions and relationships involves emotional experience and expressiveness, understanding of emotion, emotion regulation, or some combination of the three" (Denham & Burton, 2003, p. 14). Furthermore, in most instances, emotional competence involves interactions between two or more people. Thus, there is a social element to most aspects of emotional competence because emotional competence almost always takes place in a social context. Therefore, it is helpful to discuss not just emotional competence or social competence, but the closely related concept social-emotional competence. How are these two concepts related? The understanding of the emotions of oneself and others (emotional competence) contributes to how children evaluate their success in interacting with one's peers (social competence) (Denham & Burton, 2003). Thus, social-emotional competence encompasses the development of these two constructs together. Social-emotional competence is not only a buffer for children who are transitioning to kindergarten (Masten & Coatsworth, 1998), but is also an important factor in school readiness, academic achievement, and relationships with peers (Carlton & Winsler, 1999; Ladd, Birch, & Buhs, 1999).

Socialization of Social-Emotional Competence.

One very important social context for the development of social-emotional competence in young children is preschool. Preschool provides children with the

opportunity to learn and develop in many different aspects. Through lessons, games, and interactions with other children and teachers, children develop new relationships and learn what is and is not socially and emotionally acceptable.

Adults, specifically parents and teachers, also play an important role in social-emotional competence and the socialization of emotions (Calkins & Hill, 2007; Denham & Burton, 2003; Thompson & Meyer, 2007). Socialization of emotions is constantly occurring in children's lives; from interactions with parents and siblings to interactions with teachers and peers, children are constantly observing and absorbing the emotions of others and the reactions that those emotions elicit (Denham & Burton, 2003). This modeling is a large part of how children learn about emotions. A child further learns about their own emotions by expressing themselves and observing how others react when they do so. Parents and teachers play a large role in teaching their children about the world of emotions (Denham, 1998; Denham & Burton, 2003). It would be difficult for a young child to develop social-emotional competence if the environment that they lived in did not foster social exploration or the discussion and expression of feelings. For those children, school becomes an even more important part of their social-emotional development because it gives them the opportunity to learn, grow and explore, which they don't get at home.

Emotions, School Readiness, and Academic Achievement

Young children, specifically of preschool-age, are rapidly developing socially, emotionally, physically, and cognitively. In addition to these events, this age-period is also the age in which many children have their first experiences in a school setting.

Considering that children and adolescents spend much of their time in school, and considering society's belief in the importance of getting a good education, preparing children for school and promoting academic success are crucial.

"Measures of children's emotional, behavioral, and social skills in early childhood have repeatedly been found to be associated with children's later competence in adulthood" (Raver, Garner, & Smith-Donald, 2007, p. 121). This finding is a testament to the lasting impact of emotional competence throughout the lifespan. Like emotional competence, academic achievement can have effects that last over the entire lifespan. There is an abundance of research that supports the importance of emotions and emotional competence in school readiness and academic achievement (Duncan et al., 2007; Hamre & Pianta, 2001; Miller, Gouley, Seifer, Dickstein, & Shields, 2004; Rimm-Kaufman, Pianta, & Cox, 2000). Caprara et al. (2000) found that prosocial behavior in children in third grade predicted academic achievement in eighth grade, and Howse et al. (2003) found that children's emotion regulation and behavioral self-regulation in the preschool classroom were related to tests scores for measures of achievement in kindergarten. In addition, Ponitz, McClelland, Matthews, and Morrison (2009) also found that levels of behavioral regulation of children attending kindergarten in the fall predicted levels of academic achievement and teacher-rated classroom self-regulation in the spring of the same school year. With growing evidence of the lifelong impact of academic achievement, and with the also increasing evidence that emotional competence has significant affects for school readiness and academic achievement, it is clear that emotional competence must be taken into account when addressing the issues of school

readiness and academic achievement. The current study addresses this issue by looking at aspects of social-emotional competence in the classroom setting.

Gender and Socioeconomic Status

There is a growing body of research to support the indications that children who come from low socioeconomic status and minority families often have lower social-emotional competence than children who are not from families of low socioeconomic status (Kupersmidt, Bryant, & Willoughby, 2000; Miller et al., 2004). Studies have also found that boys are more likely than girls to have behavioral problems in the classroom, such as verbal and physical aggression (Kupersmidt, Bryant, & Willoughby, 2000). Prevention and intervention programs that focus on teaching emotion knowledge skills can assist in increasing social-emotional competence and school readiness in high-risk children. In a study of three and four-year-old children attending Head Start programs, Domitrovich, Cortes, and Greenberg (2007) found that children who were taught with the Promoting Alternative Thinking Strategies curriculum (PATHS; Domitrovich, Greenberg, Kusché, & Cortes, 1999), a social-emotional curriculum geared at increasing social-emotional competence and reducing problem behavior, had higher emotion knowledge skills and were more socially competent as compared to peers who were not taught with PATHS. Another program, the Head Start *REsearch-based, Developmentally Informed* (REDI) Program, which also implements the PATHS curriculum for social-emotional skill enrichment, has been found to promote academic and social-emotional school readiness, with children who received the intervention having significantly greater scores on measures of vocabulary, literacy, emotion understanding, and social problem

solving and behavior (Bierman et al., 2008). This research shows that although gender and socioeconomic status can put children at a disadvantage in regards to social-emotional competence, school readiness, and academic achievement, these disadvantages are preventable and can be counteracted through prevention and intervention programs.

Assessing Preschoolers' Emotion Knowledge

Children's school experience has many social-emotional components, such as interactions with peers and teachers, developing and maintaining friendships, learning and following directions, and how they feel about going to school and learning. These social-emotional aspects are important and contribute to adjustment to school, academic achievement, and even mental health, later delinquency, and drug abuse (Carlton & Winsler, 1999; Denham & Burton, 2003; Izard et al., 2001; Shields et al., 2001). Although preschoolers' emotion knowledge has been assessed in numerous studies with numerous measures, the majority of that research has analyzed emotion knowledge based on overall scores of emotion knowledge, or a summed total. Children's level of emotion understanding of each individual emotion is usually not calculated or analyzed.

For example, the majority of research that has used the Affect Knowledge Test (AKT; Denham, 1986), the Kusché Affective Interview (KAI; Kusché, Greenberg, & Beilke, 1988), and the Emotion Matching Task (EMT; Izard, Haskins, Schultz, Trentacosta, & King, 2003) to assess preschoolers' emotion knowledge has calculated and analyzed the data using a summed total score for emotion knowledge (Brown & Dunn, 1996; Cassidy, Werner, Rourke, Zubernis, Balaraman, 2003; Denham, 1986; Denham et al., 2003; Denham, Blair, Schmidt, & DeMulder, 2002; Denham, Bouril, &

Belouad, 1994; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Domitrovich, Cortes, & Greenberg, 2007; Izard et al., 2008; Miller et al., 2006; Miller et al., 2005). The summed score is a single score that can tell you how competent a child is at understanding emotions (usually happy, sad, angry, and afraid) overall; a lower score indicates low emotion understanding and a higher score indicates higher emotion understanding. The method of using a summed total score is not only widely accepted and used, but has also been found to be a valid and reliable method for assessing emotion knowledge. However, this method of using a summed total to represent overall emotion knowledge on the AKT does not demonstrate or utilize the full potential of these measures, in particular, the AKT.

The AKT, also commonly known as the Puppet Measure or Puppet Task, looks at children's level of emotional competence. A trained researcher uses puppets to act out 20 scenarios (vignettes) in which specific emotions are expressed. The first 8 scenarios are stereotypical, meaning the emotional response of the puppet matches the emotional response that the child who is being assessed would have, such as being happy upon receiving ice cream. The remaining 12 scenarios are non-stereotypical, meaning the emotional response of the puppet is the opposite of how the child would feel, such as being happy when the puppet is served the child's least favorite food for dinner. Children are asked how the puppet feels at the end of each task. The children respond by pointing to one of four felt faces in front of them; each face has a different emotion expressed on it (happy, sad, angry, and afraid). Responses are recorded and scored on a scale of 0-2, with 0 indicating an incorrect response, 1 indicating an incorrect response on the same valence

as the correct response, and 2 indicating a correct response. The AKT is an excellent measure for many reasons; it is easy to learn and administer, children enjoy it, it requires minimal verbalization on the part of the child so even children who are shy or do not speak much can be assessed using it, and it has been used and adapted many times over the past 20+ years, passing the test of time through its extensively reported psychometric reliability and validity. In addition to using the AKT with typical total scores, there is the potential to examine children's emotion knowledge for each separate emotion.

Past research has shown that preschoolers' ability to recognize happiness on the AKT was greater than recognition of any of the negative emotions, sad, angry, and afraid (Denham & Couchoud, 1990). Such findings could suggest that emotional competence for negative emotions develops later and/or more slowly (Camras & Allison, 1985; Camras & Fatani, 2008). It is important to consider this set of findings when analyzing children's scores on the AKT. These findings suggest that using a summed total score for emotion knowledge could potentially overestimate a child's emotional competence. Take for instance a child who has high emotion knowledge for happy expressions, but confuses negative expressions. On the AKT (and many other measures like it), the child would receive 2 points for each happy vignette and at least 1 point for each negative emotion vignette because their high emotion knowledge for happy expressions enables them to disregard the happy face for the negative emotion vignettes. Consequently, they are able to guess a response that is at least on the same valence as the correct answer. So, simply knowing that the happy face is not the right answer gives the child a 1 in 3 chance of

picking the correct emotion for each negative vignette, even if they do not actually know the right answer.

Incorporating Knowledge of Specific Emotions

The addition of looking at children's emotion knowledge for each individual emotion has many potential benefits. Although a total score can give you an idea of a child's overall emotional competence, it cannot tell you if the child has problems recognizing all emotions or if they only have problems recognizing certain emotions. It also cannot tell you if the child is consistently mistaking a certain emotion for another emotion. If a child is showing a lot of aggressive behavior in the classroom, it could be beneficial to be able to see if that child's responses on the AKT showed a tendency to over-attribute anger to the vignettes; this over-attribution could help give a better idea of why the child is behaving the way that they are and whether it is due to a lack of emotion knowledge, something else, or a combination of factors. For example, Schultz, Izard, and Ackerman (2000) found that greater anger attribution bias in a sample of preschool children predicted higher levels of aggression in boys and predicted higher levels of peer rejection for all children. The negative results of anger bias on social behavior have also been duplicated in other studies (Barth & Bastiani, 1997; Garner, Dunsmore, & Southam-Gerrow 2008; Schultz, 2001).

The Present Study

With these data, I examined the following research questions:

Research Question 1: Do preschool children have an easier time correctly identifying certain emotions than others? Does emotion knowledge differ based on child age, sex, or

preschool type?

It is hypothesized that preschool children have an easier time correctly identifying happiness compared to any of the negative emotions (sad, angry, afraid). For the negative emotions, sad will be the easiest to identify, followed by anger and then fear. Although no differences in emotion knowledge of happiness are expected based on child age, sex, or preschool type, it is hypothesized that females will be significantly better than males at correctly identifying negative emotions, four year-olds will be significantly better than three year-olds at correctly identifying negative emotions, and preschoolers in private care will be significantly better than preschoolers in Head Start at correctly identifying negative emotions.

Research Question 2: What emotions do preschool children most often confuse with each other? For stereotypical vignettes, when children incorrectly identify an emotion, does the type of error that they make depend on their age? For non-stereotypical vignettes, do three year-olds make significantly greater errors than four year-olds for specific error types?

It is hypothesized that preschool children most often confuse fear with anger or sadness. It is unclear if/how error type will be affected by children's age.

Research Question 3: Are preschoolers' emotion knowledge scores for each emotion at Time 1 associated with their scores on each of the three SCBE-30 scales (anger/aggression; anxious/withdrawn; cooperative/sensitive) at Time 2?

It is hypothesized that children who have lower emotion knowledge scores for fear at Time 1 will have higher scores on the anxious/withdrawn scale for the SCBE-30 at

Time 2. Children who have lower emotion knowledge scores for anger at Time 1 will have higher scores on the anger/aggression scale for the SCBE-30 at Time 2. Children who have higher emotion knowledge scores for happiness at Time 1 will have higher scores on the cooperative/sensitive scale for the SCBE-30 at Time 2.

Research Question 4: Do emotion knowledge scores for each individual emotion at Time 1 predict scores on all three scales of the SCBE-30 (anger/aggression; anxious/withdrawn; cooperative/sensitive) at Time 2 above and beyond using a total score of emotion knowledge at Time 1?

It is hypothesized that emotion knowledge scores at Time 1 will predict scores on all three scales of the SCBE-30 at Time 2 above and beyond using a summed total score of emotion knowledge.

METHOD

The data sets used for this research are from a battery of preschool social-emotional outcome measures that have been refined and tested with the support of a NIH funded grant, Social-Emotional Assessment for Young Children's School Readiness. The first wave of data were collected in late 2006 (November) to early 2007 on a sample of three and four year-old children who were enrolled in Head Start or private care centers in Northern Virginia. Children were reassessed in the spring of 2007 (April – June). Teachers filled out teacher measures in the spring of 2007.

Participants

Participants were 364 preschool children between the ages of three and four (M = 3.61) at the time of the first assessment; 49.1% were male. The sample represented children from several Head Start programs and private child care centers in Northern Virginia. Preschoolers were recruited to participate in 2006 and children were initially assessed in the fall of 2006 and into early 2007. Participants were reassessed in the spring of 2007 and averaged 4.07 years of age at the start of reassessment in the spring.

Head Start Sample. Participants were 169 preschool children from twelve Head Start classrooms in Northern Virginia. Our Head Start sample represented 46.4% of our total sample and came from four different Head Start locations; 46.6% were male. The average age of participants at the start of the first round of assessments was 3.7 years and the average age of participants at the start of the second round of assessments was 4.17

years. The majority of this sample was African American (70%), followed by 41.4% Caucasian, 7.9% multiethnic, and 17.5% not reported. Of the participants whose maternal education was reported (47.9%), the majority of mothers' highest level of education completed was a high school degree or GED (59.3%), 17.3% did not complete high school, and 6.2% completed an undergraduate degree or higher.

Private Daycare Sample. Participants included 195 preschool children from 27 private daycare classrooms in Northern Virginia. They represented 53.6% of our total sample and came from 10 different private daycare centers; 51.1% were male. The same company ran all private daycare centers. Participants averaged an age of 3.53 years at the start of the first round of assessments and averaged an age of 3.98 years at the start of the second round of assessments. The majority of participants (81.9%) were either Caucasian (62.7%, n = 121) or African American (19.2%, n = 37). Race was unknown or not reported for 4.6% (n = 9) of participants. Of the participants whose maternal education was reported (95.4%), the majority of mothers' highest level of education completed was a college degree (19.9% undergraduate degree, 20% graduate degree), 38.7% earned a high school degree or GED, and 0.5% did not complete high school.

Procedure

Data were collected at two different time points during the fall 2006 – spring 2007 school year. After parental consent was obtained, trained research assistants went to the Head Start and private daycare locations and would briefly remove each child from their classroom, one at a time, and take them to a quiet location in the school to be assessed. Researchers became familiar with each class' schedule prior to data collection so that

children would not be removed during lessons and so that assessments would be conducted at the most convenient times for the teachers. Once researchers entered the classroom and asked the teacher if they may complete assessments at that time, the research assistant always asked the child if they wanted to participate by asking the child if they would like to play a game with them. Children who did not want to participate or did not want to leave the classroom with the research assistant were not removed from the classroom. Children who assented were taken out of the classroom and assessed in a location that was designated by the teacher and/or school administrator, such as the library or in the hall outside the child's classroom. Once children completed the assessment, the research assistant took them back to their classroom and the child would re-join the rest of their class. If at any time during the assessment the child no longer wanted to participate, the research assistant immediately discontinued the assessment and brought the child back to their classroom.

Measures

Affect Knowledge Test (AKT; Denham, 1986). Participants were assessed using the Affect Knowledge Test. This measure, also commonly known as the Puppet Measure or Puppet Task, assesses emotional competence in preschool-age children. More specifically, it looks at emotion knowledge based on the child's success in labeling four basic emotions (happy, sad, angry, and afraid) based on faces and context. Prior to assessment, research assistants are trained and certified in administering the AKT and become familiar with the materials used.

The first component of the child assessment is checking, scoring, and teaching the identification of each of the four emotional faces (happy, sad, angry, and afraid). The four felt faces are placed in front of the child and the assessor points to each face, one at a time, and asks the child how he/she (the face) feels (expressive). Once an answer is recorded for each face, the order of the faces is rearranged and the child is asked to point to the appropriate emotional face (receptive). For example, the assessor will say, "Point to the happy face". Once the child's responses are recorded, the assessor shows the child each face by holding it up and tells the child what emotion that face represents, and expresses that emotion on their own face (teaching phase). Originally, for each emotion of the expressive and receptive components, children receive a score of 2 if they respond correctly, a score of 1 if their answer is the same valence as the correct response, and a score of 0 if their response is not correct and not on the same valence as the correct response. For the purposes of this study, the scoring system has been changed so that children are not given points for an incorrect answer that is on the same valence as the correct answer. If a child responds correctly, they receive a score of 1. If a child responds incorrectly, they receive a score of 0. Because knowledge of each specific emotion is an important component of this research, the correct response and the child's response are recorded for each scenario.

The second component of the AKT involves acting out eight puppet scenarios that show stereotypical affect using the AKT's Situation Puppets. Specific content for each vignette can be found in Table 2. After each scenario is acted out, the child is asked how the main puppet feels and their response is recorded with the same scoring system as the

expressive/receptive component. The Situation Puppets include a "puppet family" that includes a boy and a girl (siblings) and their mother. The test is culturally sensitive, with the puppets coming in various races/ethnicities (African American, Asian, Caucasian, and Hispanic) and the puppets that are used during the assessment reflect the participating child's ethnicity; also, the gender of the main puppet always matches the participating child's gender.

The last component of the AKT involves acting out 12 additional puppet scenarios, but the puppet's emotional response is different from what the child's typical emotional response would be for that scenario (non-stereotypical). This component further examines the child's perspective-taking abilities because unlike the stereotypical scenarios, the puppet is no longer responding to the scenarios the same way that the child would. The non-stereotypical script for each child is pre-coded based on answers that the child's parent gave on the parent questionnaire. On the questionnaire, parents were asked to indicate which emotion they thought their child would be most likely to display by circling one of two emotions for each scenario. The non-stereotypical script for each child was then pre-coded so that the puppet would show the opposite emotion that the child was expected to display. Specific content for each vignette can be found in Table 3. The scoring system for this component of the AKT is the same as the scoring system for the expressive/receptive and stereotypical components discussed above. It is also important to note that assessors are trained to record the child's answer based on whichever face the child points to, not their verbal response. If a child gives a verbal response to the scenario and does not point to a face, they are asked if they can pick/point

to a face. If the face that the child points to is different from the emotion that they chose verbally, the face that the child points to is recorded in the answer box as their official answer; the child's verbal response is recorded next to the correct answer box in quotation marks to indicate a verbal response. No verbal response is recorded if the verbal response matches the nonverbal response. If the child's response is something other than happy, sad, angry, or afraid (for example, the child says "funny" or "excited"), their response is recorded but is coded as an incorrect response.

The AKT has extensively reported psychometric reliability and validity. Based on the evaluation of measures according to NICHD/ACF/ASPE criteria, validity has been found to be good with children from low and middle-income families, and there is good internal consistency and one-year test-retest reliability (Denham, Caverly et al., 2002; Denham & Couchoud, 1990). Scores on the AKT have been found to be slightly to moderately related to other indicators of social-emotional competence such as predicting later emotion knowledge and social competence (Brown and Dunn, 1996; Cutting and Dunn, 2002; Kuersten-Hogan, 1998; Miller, Gouley, Seifer, Dickstein, & Shields, 2004; Smith, 2001) and social competence (Denham, 1986; Denham et al., 2003). The AKT has also been used with children of many different ethnicities and levels of socioeconomic status and is easy to learn and administer.

Recoding Scores on the AKT. As previously discussed, responses to the AKT vignettes were originally given a score of 0, 1, or 2. A score of 0 indicated that the response was incorrect and on the wrong valence, a score of 1 indicated that the response was incorrect but on the correct valence (ex. the correct answer was 'sad' but they said

'angry'), and a score of 2 indicated that the response was correct. For the purposes of this research, variables were recoded so that an incorrect answer received a score of 0 regardless of valence and a correct response received a score of 1.

Recoding for Specific Emotions. Because a total summed score of emotion knowledge is normally used for the AKT, scores were originally entered with only a score of 0, 1, or 2 for each vignette. Because knowledge of specific emotions was of interest, scores were re-entered through dummy coding in which the correct answer for each vignette was indicated and the specific emotion that was given for each vignette was also indicated.

Scores of Specific Emotion Knowledge – Stereotypical Vignettes. Because knowledge of each individual emotion is an important component of this research, participants received emotion knowledge scores for each individual emotion (happy, sad, angry, afraid) on the AKT. For the eight stereotypical vignettes, every participant was shown the same number of vignettes for each emotion (two). Emotion knowledge scores were computed by summing the number of correct responses for each emotion resulting in four separate emotion knowledge scores (one for each emotion) in which participants received a score of 0 (no correct responses), 1 (one correct response), or 2 (two correct responses).

Scores of Specific Emotion Knowledge – Non-Stereotypical Vignettes. For the AKT, participants were shown 12 non-stereotypical vignettes that were tailored to each individual based on answers given on a parent questionnaire. Consequently, unlike the stereotypical vignettes, the number of non-stereotypical vignettes that children were

shown for each emotion varied by child. Because of this variation, solely summing the correct responses for each emotion, as was done for the stereotypical vignettes, would not accurately reflect emotion knowledge for non-stereotypical vignettes. To accurately assess emotion knowledge for non-stereotypical vignettes, a ratio was calculated for the total number of correct responses for each emotion to the total number of non-stereotypical vignettes for each emotion. This breakdown of responses results in four separate emotion knowledge scores (one for each emotion) with a range of 0 – 1 for each participant; this coding method also ensures that children's emotion knowledge scores are not affected by the disproportionate number of vignettes they were shown for each emotion.

Computing Error Type – Stereotypical Vignettes. Scores for the type of errors participants made on the AKT were desired. A total of 12 error types were possible for this research (sad response for happy vignette; angry response for happy vignette; afraid response for happy vignette; happy response for sad vignette; angry response for sad vignette, afraid response for sad vignette; happy response for angry vignette; sad response for angry vignette; afraid response for angry vignette; happy response for afraid vignette; sad response for afraid vignette; angry response for afraid vignette). For stereotypical vignettes, scores for each error type were calculated based on the total number of times each error was made in the overall sample. This overall score was then separated into two categories based on age (three year-olds and four year-olds).

Computing Error Type – Non-Stereotypical Vignettes. Because the number of non-stereotypical vignettes that children were shown for each emotion varied by child on

the AKT, scores for each error type were calculated using a ratio, similar to what was done previously for the emotion knowledge scores for non-stereotypical vignettes. To calculate the ratio, the number of errors made for each error type was divided by the total number of non-stereotypical vignettes the participant received for that specific emotion, resulting in 12 separate scores (one for each error type) that range from 0 - 1. For example, if a participant was shown four sad vignettes and they incorrectly answered 'happy' for one of those vignettes, their score for the sad/happy error ratio would be .25 because out of the four opportunities that they had to make an error on a sad vignette, they only made that specific error (happy) once.

Combined Emotion Knowledge Scores. For certain analyses using the AKT, a single emotion knowledge score for each emotion was desired for combined stereotypical and non-stereotypical vignettes. Taking into consideration the unequal number of non-stereotypical vignettes for each emotion, a ratio was once again used for this score. To create the ratio, a total number of vignettes (stereotypical and non-stereotypical) for each emotion was calculated; this total was calculated by taking the previously calculated total number of non-stereotypical vignettes for each emotion and adding 2 to the total (because there were two vignettes for each emotion for the stereotypical portion), creating a total overall number of vignettes for each emotion. Then, the previously calculated total correct responses for each emotion (stereotypical) were added to the previously calculated total correct responses for each emotion (non-stereotypical) to create a total overall number of correct responses. Lastly, the total number of correct responses was

then divided by the total number of vignettes for each emotion, creating four overall emotion knowledge ratios (one for each emotion) that range from 0 - 1.

Total Emotion Knowledge Score. For comparison purposes for the fourth research question, a total summed score was calculated for emotion knowledge on the AKT. This score was calculated by summing the total number of correct responses (stereotypical and non-stereotypical vignettes combined). Unlike the rest of the data used for these analyses, the total emotion knowledge score uses the original scoring system for vignettes in which children receive a 0 (incorrect response, incorrect valence), 1, (incorrect response, correct valence), or 2 (correct response)

Social Competence and Behavior Evaluation: The Short Form (SCBE-30; LaFreniere & Dumas, 1996). Teachers filled out a preschool socioaffective profile known as the SCBE-30 for each participant in the spring of 2007 (Time 2). The SCBE-30 is a 30-item, five-point Likert rating scale that was constructed to "assess patterns of social competence, emotion regulation and expression, and adjustment difficulties in children ages 30 to 78 months" (LaFreniere & Dumas, 1996, p. 369). Teachers filled out the evaluation form by indicating on a scale of one to five how much each description best described the child, with a 1 indicating that the description is not much like the child and a 5 indicating the description is very much like the child. Specific content for each question on the SCBE-30 can be found in Table 4. The responses were then separated into three scales identified by the measure's author (anger/aggression, sensitive/cooperative, and withdrawn/anxious) for the purpose of analyses.

As with the AKT, the SCBE-30 has extensively reported psychometric reliability and validity (LaFreniere & Dumas, 1996; LaFreniere at al., 2002). LaFreniere & Dumas (1996) found all three of the 10-item scales to have high test-retest and interrater reliability, internal consistency, and temporal stability over a period of six months; they found that these scales also correlated highly with the scales of the original SCBE. Previous studies have also found that several aspects of preschoolers' emotional competence predicted SCBE scores in kindergarten (Denham et al., 2003) and Cronbach's alphas for the current sample were .74 and .82 for stereotypical and non-stereotypical vignettes, respectively.

SCBE-30 Scale Composites. Scores on the SCBE-30 were used for several analyses. Because the SCBE-30 has three different scales (anger/aggression; cooperative/sensitive; anxious withdrawn), composites for each of those scales were calculated. To calculate a composite for each scale, the scores for the 10 items on each scale were summed, creating a score for each scale with a range of 10-50.

Age Variable. The age variable for the analyses represents the age of each participant at the start of data collection in fall of 2006. For the analyses, participants were placed into two categories: three year-olds and four year-olds.

RESULTS

Exploratory Data Analysis

All relevant variables were examined using the Explore and Descriptives commands in SPSS No impossible values were found and all missing values were compared with the original assessment packets to ensure that the data were in fact missing. Overall N's and sub-sample N's for various analyses can be found in Table 1.

Research Question 1

This question examined preschoolers' knowledge of specific emotions on the Affect Knowledge Test (AKT) overall, as well as by sex, preschool type, and age. For stereotypical vignettes, variables measuring knowledge of specific emotions included the number of correct happy responses, the number of correct sad responses, the number of correct angry responses, and the number of correct afraid responses. All of these variables were compared to each other. For non-stereotypical vignettes, variables included the ratio of correct happy responses to the number of happy vignettes, the ratio of correct sad responses to the number of sad vignettes, the ratio of correct angry responses to the number of angry vignettes, and the ratio of correct afraid responses to the number of afraid vignettes. All of these variables were compared to each other.

Overall Sample – Stereotypical Vignettes

Descriptives for correct responses on stereotypical vignettes can be found in Table 5. Overall, participants were significantly better at correctly identifying happy

vignettes than sad vignettes, as indicated by a sign test, $\chi^2(1, N = 322) = 18.00, p < .01$. Based on additional sign tests, participants were also significantly better at correctly identifying happy vignettes than angry vignettes ($\chi^2(1, N = 322) = 30.03, p < .01$) and afraid vignettes ($\chi^2(1, N = 322) = 83.98, p < .01$). The results of these sign tests indicate that participants were significantly better at correctly identifying happy vignettes than they were at correctly identifying any of the negative emotion vignettes. Sign tests for the remaining emotion knowledge scores found that participants were significantly better at correctly identifying sad vignettes than they were at identifying angry vignettes ($\chi^2(1, N = 322) = 4.10, p < .05$), participants were significantly better at correctly identifying sad vignettes than afraid vignettes ($\chi^2(1, N = 322) = 37.00, p < .01$), and participants were significantly better at correctly identifying angry vignettes than afraid vignettes ($\chi^2(1, N = 322) = 18.00, p < .01$).

Specific Emotion Knowledge by Sex – Stereotypical Vignettes

The same stereotypical vignette variables that were used for the overall analysis above were compared by participant sex (male and female) using chi-square (median) tests; descriptives for sex differences for these variables can be found in Table 5. One significant difference between male participants and female participants was found. Males were significantly better at correctly identifying angry vignettes than females ($\chi^2(1, N = 322) = 5.14, p < .05$).

Specific Emotion Knowledge by Preschool Type – Stereotypical Vignettes

The same stereotypical vignette variables that were used for the stereotypical analyses above were compared by participant preschool type (Head Start and private

care) using median tests; descriptives for preschool type differences for these variables can be found in Table 6. No significant differences were found between Head Start participants and private care participants on any of the four emotion knowledge variables.

Specific Emotion Knowledge by Age – Stereotypical Vignettes

Emotion knowledge variables for the stereotypical vignettes were compared by participant age (three year-olds and five year-olds) using median tests; descriptives for age differences for these variables can be found in Table 7. Four year-olds were significantly better at correctly identifying sad vignettes than three year-olds ($\chi^2(1, N = 322) = 23.13, p < .01$). Four year-olds were also significantly better at correctly identifying angry vignettes ($\chi^2(1, N = 322) = 27.06, p < .01$) and afraid vignettes ($\chi^2(1, N = 322) = 3.53, p < .05$).

Overall Sample – Non-Stereotypical Vignettes

Descriptives for non-stereotypical emotion knowledge variables were examined and can be found in Table 8. Paired-samples t-tests were performed for all six combinations of correct emotion ratios. Participants were significantly better at correctly identifying happy vignettes than sad vignettes ($t(271) = 4.74, p < .001$), angry vignettes ($t(271) = 8.40, p < .001$), and afraid vignettes ($t(274) = 17.66, p < .001$). For the remaining paired-sample t-tests, participants were significantly better at correctly identifying sad vignettes than angry vignettes ($t(311) = 4.20, p < .001$) and afraid vignettes ($t(314) = 13.76, p < .001$), and participants were significantly better at correctly identifying angry vignettes than afraid vignettes ($t(314) = 10.12, p < .001$).

Specific Emotion Knowledge by Sex – Non-Stereotypical Vignettes

Non-stereotypical vignette variables were compared by participant sex; descriptives were examined and can be found in Table 9. A MANOVA was conducted to compare participants' average number of correct responses for each emotion type based on sex; there were no significant differences between male participants and female participants in the average number of correct responses for each emotion, $F(4, 264) = 1.20$, $p > .30$. Follow-up one-way ANOVA's for each correct emotion ratio were conducted, also revealing no significant sex differences for each emotion knowledge ratio; results for each one-way ANOVA can be found in Table 10.

Specific Emotion Knowledge by Preschool Type – Non-Stereotypical Vignettes

Non-stereotypical vignette variables were compared by participant preschool type. Descriptives for non-stereotypical emotion knowledge variables were examined and are shown in Table 11. A MANOVA was conducted to compare participants' average number of correct responses for each emotion type based on each participants' preschool type; there were no significant differences between private care participants and Head Start participants in the average number of correct responses for each emotion, $F(4, 264) = .76$, $p = .56$. Follow-up one-way ANOVA's were conducted, also revealing no significant sex differences for each emotion knowledge ratio; results for each one-way ANOVA can be found in Table 12.

Specific Emotion Knowledge by Age – Non-Stereotypical Vignettes

Non-stereotypical vignette variables were compared by participant age. Descriptives for non-stereotypical emotion knowledge variables were examined and

results can be found in Table 13. Because Levene's Test of Equality of Error Variance was significant for analyzing the data by participant age, the Kruskal-Wallis test was conducted to compare participants' average number of correct responses for each emotion type based on each participants' age. The average number of correct responses on vignettes for each emotion was significantly greater for four year-olds, including happy vignettes ($\chi^2(1, N = 275) = 9.41, p < .01$), sad vignettes ($\chi^2(1, N = 316) = 20.60, p < .01$), angry vignettes ($\chi^2(1, N = 315) = 10.16, p < .05$), and afraid vignettes ($\chi^2(1, N = 318) = 16.87, p < .01$).

Research Question 2

This question examined the types of errors that preschoolers made on the stereotypical and non-stereotypical vignettes of the Affect Knowledge Test (AKT) overall and comparing three year-olds to four year-olds. There are a total of 12 possible errors that a child could make (sad, angry, or afraid responses for happy vignettes; happy, angry, or afraid responses for sad vignettes; happy, sad, or afraid responses for angry vignettes; and happy, sad, or angry responses for afraid vignettes). For analyses of stereotypical vignettes, total error counts were used for each error type. For non-stereotypical vignettes, error ratios for each error type were used. These variables are explained in more depth in a previous section.

Overall Sample – Stereotypical Vignettes

Table 14 shows means for stereotypical vignette error counts for each emotion. Paired samples t-tests were conducted for each combination of error types (Table 15). For happy vignettes, there were no significant differences for the type of error made. For sad

vignettes, children made a significantly greater number of angry errors than afraid errors. For angry vignettes, children made a significantly greater number of sad errors than happy errors, and children made a significantly greater number of sad errors than afraid errors. For afraid vignettes, on average, children made a significantly greater number of sad errors than happy errors, and children made a significantly greater number of sad errors than angry errors.

Error Type by Age – Stereotypical Vignettes

Table 16 shows frequencies of errors for each emotion by age. Chi-square analyses revealed that when an error was made on happy vignettes, sad vignettes, and angry vignettes, the type of error that was made was not significantly different by age ($\chi^2(2, N = 80) = .23, p > .05$), ($\chi^2(2, N = 137) = 2.92, p > .05$), and ($\chi^2(2, N = 166) = 2.88, p > .05$), respectively. For afraid vignettes, Chi-square analysis revealed that when an error was made, the type of error that was made was significantly different by age ($\chi^2(2, N = 237) = 7.60, p < .05$). More specifically, when an error was made on afraid vignettes, three year-olds were more likely to incorrectly choose 'angry' as the correct answer and four year-olds were more likely to incorrectly choose 'sad' as the correct answer.

Overall Sample – Non-Stereotypical Vignettes

Table 17 shows means for non-stereotypical vignette error counts for each emotion. Paired samples t-tests were conducted for each combination of error types (Table 18). For happy vignettes, the mean number of sad errors that were made was significantly greater than the mean number of afraid errors made. For sad vignettes, no significant mean differences were found for error type ratios. For angry vignettes, the

mean number of sad errors that were made was greater than the mean number of happy errors made, and the mean number of sad errors made was greater than the mean number of afraid errors made. For afraid vignettes, the mean number of sad errors made was greater than the mean number of happy errors made, the mean number of angry errors made was greater than the mean number of happy errors made, and the mean number of sad errors made was greater than the mean number of angry errors made.

Error Type by Age – Non-Stereotypical Vignettes

Table 19 shows means for the number of errors for each emotion by age. Because Levene's Test of Equality of Error Variances was significant for the age*error ratios, separate Kruskal-Wallis analyses were used instead of ANOVAs for each error type combination (12 total). Results for each Kruskal-Wallis analysis can be found in Table 20. For happy vignettes, four year olds made significantly fewer sad errors than three year olds, and significantly fewer afraid errors than three year olds. For sad vignettes, four year olds made significantly fewer angry errors than three year olds. For angry vignettes, four year olds made significantly fewer happy errors, and fewer sad errors than three year olds. For afraid vignettes, four year olds made significantly fewer happy errors and significantly fewer angry errors than three year olds.

Research Question 3

Whether preschoolers' knowledge of specific emotions in fall of 2006 (Time 1) was associated with scores on the SCBE-30 in spring of 2007 (Time 2) was examined in a correlational analysis. For the AKT scores, four separate ratios were used that each represented how many times a child correctly responded to vignettes (stereotypical and

non-stereotypical combined) for each specific emotion. For example, if a child correctly answered 'happy' for a total of eight vignettes, their emotion knowledge ratio for 'happy' would be the number of correct happy answers (8) divided by the total number of happy vignettes they were given on the AKT. Because the SCBE-30 has three different scales (anger/aggression; cooperative/sensitive; anxious withdrawn), composites were used.

Associations with Anger/Aggression

Correlations were conducted for each of the four emotion ratios discussed previously with scores on the SCBE-30 anger/aggression scale. As shown in Table 21, emotion knowledge scores for happiness, sadness, anger, and fear were not significantly correlated with scores on the SCBE-30 anger/aggression scale at Time 2.

Associations with Withdrawal/Avoidance

Correlations were conducted for each of the four emotion ratios discussed previously with scores on the SCBE-30 withdrawal/avoidance scale. As shown in Table 21, only the ratio of correct sad responses was significantly correlated with scores on the withdrawal/avoidance scale, $r = -.12$, $N = 294$, $p < .05$.

Associations with Sensitivity/Cooperation

Correlations were conducted for each of the four emotion ratios discussed previously with scores on the SCBE-30 sensitive/cooperative scale. As shown in Table 21, emotion knowledge for happiness on the AKT was significantly correlated with scores on the sensitive/cooperative scale of the SCBE-30, $r = .11$, $N = 295$, $p < .05$. Emotion knowledge for sadness on the AKT was also significantly correlated with scores

on the sensitive/cooperative scale of the SCBE-30, $r = .16$, $N = 295$, $p < .01$, as was emotion knowledge for anger on the AKT, $r = .13$, $N = 295$, $p < .05$.

Research Question 4

Whether emotion knowledge scores for each emotion (stereotypical and non-stereotypical combined) on the AKT in fall of 2006 (Time 1) predicted scores on the three scales of the SCBE-30 in spring of 2007 (Time 2) above and beyond using a total score of emotion knowledge was examined using regression analyses.

Predicting Anger/Aggression

As shown in Table 22, the total score of emotion knowledge did not significantly predict anger/aggression scores on the SCBE-30, and the addition of emotion knowledge scores for specific emotions did not significantly predict anger/aggression scores when added to the regression.

Predicting Withdrawal/Avoidance

As shown in Table 23, the total score of emotion knowledge did not significantly predict teacher ratings of withdrawal/avoidance on the SCBE-30, and the addition of emotion knowledge scores for specific emotions did not significantly predict withdrawal/avoidance scores when added to the regression.

Predicting Sensitivity/Cooperation

As shown in Table 24, the total score of emotion knowledge significantly predicted teacher ratings of sensitivity/cooperation on the SCBE-30, and the addition of emotion knowledge scores for specific emotions did not significantly predict

sensitivity/cooperation scores above and beyond using a total score of emotion knowledge.

DISCUSSION

My research examined preschoolers' knowledge of specific emotions (happy, sad, angry, and afraid) as assessed through the Affect Knowledge Test (AKT) and had several goals. As previously stated, the first goal was to determine whether preschoolers' emotion knowledge varied by emotion type and valence, overall and by age, sex, and preschool type. Results supported my hypothesis and previous findings that preschool children have significantly higher emotion knowledge for happiness than all three of the negative emotions (Denham & Couchoud, 1990b). This finding also supports previous findings that emotional competence for negative emotions develops later and/or more slowly than positive emotions, specifically happiness (Camras & Allison, 1985; Camras & Fatani, 2008).

My hypothesis that preschoolers' emotion knowledge for sadness was greater than emotion knowledge for anger, and emotion knowledge for anger was greater than emotion knowledge for fear, was also supported by the current findings and by previous research by Denham and Couchoud (1990b) and Camras and Allison (1985). That older preschoolers' had significantly more knowledge of negative emotions for stereotypical vignettes and all emotions for non-stereotypical vignettes also supports previous research findings that older preschoolers are better at correctly identifying emotions (Borke, 1971; Denham & Couchoud, 1990a; Michalson & Lewis, 1985).

For emotion knowledge differences by child sex, the only significant finding was that males were better at correctly identifying angry vignettes, but only for stereotypical scenarios. This finding did not support my hypothesis that females would have higher emotion knowledge for negative emotions. Male preschoolers' may be better at correctly identifying angry vignettes due in part to male preschoolers having more exposure to anger through interactions with peers, as male preschoolers are more likely to have verbal and physical aggression problems in the classroom (Kupersmidt, Bryant, & Willoughby, 2000) and are more likely to engage in rough-play with same-sex peers (Halliday & McNaughton, 1982). Contrary to my hypothesis, no significant emotion knowledge differences were found for preschool type.

These findings have several implications. First, preschool-age children appear to be in a significant stage in their development of emotion knowledge, specifically for negative emotions. It is also apparent that emotion knowledge for individual emotions does not necessarily develop at the same time, or at the same rate. This difference could be due in part to the amount of exposure that children have to each emotion, specifically through interactions with parents and caregivers. Parents play a key role in the development of emotion knowledge and influence the amount of exposure that their children have to emotional expressions and emotionally arousing situations (Saarni, 1999). Another factor to consider is the complexity of each emotion. It is not surprising that emotions that are more equivocal (such as anger, fear, shame and guilt) develop later or more slowly than less equivocal emotions (such as happiness or sadness). This delay in the development of emotion knowledge of equivocal emotions has been supported in past

research (Brechet, Baldy, & Picard, 2009; Russell & Paris, 1994). This also could indicate that preschool-age children are in a significant stage in their development of emotion knowledge for equivocal emotions in general and not just negative emotions, because there are equivocal positive emotions (such as pride) that also develop later than simple emotions such as happiness and sadness (Brechet, Baldy, & Picard, 2009).

Taking these issues into consideration, to increase emotion knowledge in preschoolers, parents and teachers should be encouraged to use more emotion knowledge language and emotional expressions with children, specifically for negative and equivocal emotions. This emphasis could be incorporated into social-emotional curriculums such as the Head Start REDI (*RE*search-based, *D*evelopmentally *I*nformed) Program, which already aims to promote emotional understanding in preschool children. The more exposure and learning opportunities that children have for equivocal emotions, the more familiar and aware they can become of these emotions, increasing their emotion knowledge and emotional competence.

Using more emotion knowledge language and emotional expressions can become tricky in regards to negative emotions. When I say that parents and teachers should increase these types of interactions with children, I do not mean that they should yell or get upset more, but that they should open up a line of communication to discuss how they (and their child) are feeling during emotionally arousing situations, and use those instances as teaching and bonding opportunities with the child. Even watching the television or reading a book can become a teaching opportunity for emotion knowledge; a parent or teacher can ask the child how they think a certain character is feeling, and why

they think the character feels that way. Instead of shying away from showing or discussing negative emotions, displaying and discussing them in an appropriate manner and in a safe environment gives the child a chance to learn and develop their emotion knowledge, which is especially important for the emotions that are more difficult to understand.

The second goal of my research was to determine whether preschoolers varied in the type of errors that they made on vignettes, overall and by age. Previous research by Denham and Couchoud (1990a) found that on the AKT, sad errors were common for happy and angry vignettes, but afraid errors were not common for either emotion; the most common error for afraid vignettes was sad. Denham and Couchoud (1990a) also found that three year-olds in their sample were almost entirely responsible for confusing sad with happy, and older children were less likely to make happy or sad errors on angry vignettes.

The results of the current study were similar to Denham and Couchoud's (1990a) findings, and indicated that, for stereotypical vignettes, preschoolers made a significantly greater number of angry errors than afraid errors for sad vignettes, and for angry vignettes, preschoolers made a significantly greater number of sad errors than happy and afraid errors. For afraid vignettes, preschoolers made a significantly greater number of sad errors than happy and angry errors. Significant age differences were found for afraid vignettes in that older children were more likely to make a sad error and younger children were more likely to make an angry error.

For non-stereotypical vignettes, the results of the current study indicated that children made significantly more sad errors than afraid errors for happy vignettes, and for angry vignettes, the number of sad errors was significantly greater than the number of happy and afraid errors. Older children made significantly fewer happy errors for all negative vignettes, and made fewer sad and afraid errors for happy vignettes. Additionally, older children made fewer angry errors for sad vignettes, fewer happy and sad errors for angry vignettes, and fewer happy and angry errors for afraid vignettes.

Not surprisingly, emotion knowledge for fear was the lowest, but children made significantly fewer erroneous choices of the afraid face than they did for the sad and angry faces. At first this seems contradictory, but it makes sense that when children were unsure about which emotion was correct, they would pick an emotion that they are more familiar with, such as happiness, sadness, or anger. I hypothesized that fear would be most often confused with sadness or anger, but this finding was only significant for stereotypical vignettes.

These findings could indicate that when children are faced with an emotionally arousing situation in which they are uncertain about how the other person feels, they interpret the other's emotion to be an emotion that they are more familiar with. This could lead to the misinterpretation of emotions and cause problems in social interactions. For example, a child who is approached by a peer who is frightened may react to that peer differently depending on how they interpret the peer's emotional expressions; if they think the peer is sad, they may try to comfort them, but if they think the peer is angry, they could react negatively, such as pushing the child or running away and not providing

comfort. The social ramifications of misinterpreting others emotions is further support for the need for parents and teachers to increase their use of emotional expressions and language, particularly for negative and equivocal emotions.

The third goal was to determine whether emotion knowledge scores assessed in fall of 2006 (Time 1) were associated with teacher ratings on the Social Competence and Behavior Evaluation – The Short Form (SCBE-30) in spring of 2007 (Time 2). Contrary to my hypothesis that children who had lower emotion knowledge scores for anger would have higher ratings of anger/aggression, no emotion knowledge scores were significantly correlated with anger/aggression scores on the SCBE-30. Emotion knowledge for sadness was significantly negatively correlated with withdrawal/avoidance, indicating that the more accurate children were at correctly answering sad vignettes at Time 1, the lower teachers rated them as withdrawn/avoidant at Time 2. Results also indicated that emotion knowledge for happiness, sadness, and anger were all significantly correlated with sensitivity/cooperation. In other words, the more accurate children were at correctly answering happy, sad, and angry vignettes at Time 1, the higher teachers rated them as sensitive/cooperative at Time 2. This finding was hypothesized for emotion knowledge of happiness.

These results indicate that emotion knowledge in the fall of the preschool year is significantly associated with teacher ratings of social competence and behavior in the spring of that same preschool year. These findings were significant for specific emotions, providing some support for my argument that knowledge of specific emotions is important to consider when assessing preschool children.

Based on these results, teachers and researchers could look at preschoolers' knowledge of each specific emotion to determine where each child's emotion knowledge deficits lie, and can work on strengthening knowledge for those specific emotions. Increasing emotion knowledge for sadness could significantly reduce ratings of withdrawal/avoidance and increasing emotion knowledge for all four emotions could significantly increase ratings of sensitivity/cooperation.

The fourth and last goal was to determine whether emotion knowledge scores assessed in fall of 2006 (Time 1) predicted teacher ratings on the SCBE-30 in spring of 2007 (Time 2) above and beyond using a total score for overall emotion knowledge. Using an overall score of emotion knowledge did not significantly predict teacher ratings of anger/aggression or withdrawal/avoidance, and contrary to my hypotheses, the addition of emotion knowledge scores for specific emotions did not significantly predict scores on either scale when added to the regression. However, using an overall score of emotion knowledge did significantly predict teacher ratings of sensitivity and cooperation, though the addition of emotion knowledge scores for specific emotions did not add to the prediction.

These results indicate that using knowledge scores for each individual emotion did not increase the prediction of scores of social competence and behavior compared to using a total summed score. Taking this into consideration, and because using a summed score is easier and takes less time, using emotion knowledge scores for specific emotions may be unnecessary for many analysis purposes.

That being said, emotion knowledge scores for each emotion may still be helpful under certain circumstances, specifically when looking at individual differences. Although it wouldn't hurt for a child to gain more exposure and learning opportunities for all emotions, being able to identify emotion knowledge deficits on the individual level can help teachers tailor learning and intervention efforts to the needs of each child, drawing more focus to where they need help.

Limitations

The current study had several limitations that are important to note. First, as can be seen by the various sample sizes reported in various Tables, there were issues with sample size being reduced when specific variables were used together in analyses. For example, although most participants had data for stereotypical vignettes, non-stereotypical vignettes, and the SCBE-30, some children only had data for one or two of those three measures. Therefore, when different combinations of data for those three measures were used in the same analyses, sample size reduction occurred. However, the sample is still large and there should have been sufficient power for the statistical tests.

Additionally, some participants had data for all three measures but also had apparently randomly missing data within groups. For example, a child may have only answered 7 out of 8 of the stereotypical vignettes, or a teacher may have accidentally skipped over a question on the SCBE-30 on occasion. This missing data also added to sample size reduction. Future analysis could reduce data reduction by changing the calculation method for variables. For example, the current study calculated the total number of correct responses for each emotion. If a participant had missing data for one or

more vignettes, their emotion knowledge score for that emotion was not calculated because they had not answered all of the vignettes that they were given for that emotion. For future research, ratio scores could be used in which scores are calculated so that they represent how many correct answers were given for each emotion out of the number of vignettes that were answered for that emotion as opposed to out of the number of vignettes that were given for that emotion.

Another limitation is that the SCBE-30 is a teacher-report measure and report biases could have occurred. As previously discussed, the SCBE-30 is an extremely well-validated measure and report biases should not be a large issue, but future research could expand the amount of information gathered and reduce possible biases by asking assistant teachers to fill out evaluations in addition to the lead teacher, when available. Also, although the SCBE-30 is relatively short and does not take much time to complete, teachers are very busy and time constraints as well as the number of evaluations that the teacher had to fill out could have affected the amount of time, thought, and effort that teachers put into their responses. For the data used in the current study, teachers also completed other measures, though they were not used in the current research study, and that data could be added to future analyses.

The biggest limitation for this study was most likely in the regression analyses. There were collinearity issues for many of the variables. The Variance Inflation Factor (VIF) for the majority of the regressions was greater than 1. While Myers (1990) and Bowerman and O'Connell (1990) state that a VIF lower than 10 is not cause for concern, Bowerman and O-Connell (1990) also state that if the average VIF is substantially greater

than one, the regression may be biased. Also, emotion knowledge scores for separate emotions were highly correlated with the total summed score that was used. For my analyses, the emotion knowledge score for happy vignettes was correlated highly with the overall emotion knowledge score, $r = .55$, $N = 285$, $p < .01$, as were emotion knowledge scores for sadness, anger, and fear, $r = .68$, $N = 285$, $p < .01$; $r = .70$, $N = 285$, $p < .01$; $r = .71$, $N = 285$, $p < .01$, respectively.

General Conclusions and Areas for Future Research

It is apparent that preschoolers' knowledge of emotions varies by specific emotions. The current study supports previous research by Denham and Couchoud (1990), Camras and Allison (1985), and Camras and Fatani (2008) that overall, preschool children have higher emotion knowledge for happiness than negative emotions, and for negative emotions, preschoolers' have higher emotion knowledge for sadness, followed by anger and then fear. The current research also supported previous research that older preschoolers have higher emotion knowledge than younger preschoolers, especially for negative emotions (Denham & Couchoud, 1990).

Although the current research supported that emotion knowledge scores for specific emotions in the fall were significantly associated with teacher ratings of sensitivity/cooperation in the spring of the same school year, it did not support that this association was greater than when an overall score for emotion knowledge is used. Calculating an overall score is more widely used (Brown & Dunn, 1996; Cassidy, Werner, Rourke, Zubernis, Balaraman, 2003; Denham, 1986; Denham et al., 2003; Denham, Blair, Schmidt, & DeMulder, 2002; Denham, Bouril, & Belouad, 1994;

Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Domitrovich, Cortes, & Greenberg, 2007; Izard et al., 2008; Miller et al., 2006; Miller et al., 2005) and takes less time, making it a more appealing and efficient method, but using emotion knowledge scores for specific emotions could be useful in certain circumstances. As previously discussed, collinearity was an issue for regression analyses and residualized scores could be used to reduce collinearity issues in future research.

Fear appears to be a very interesting emotion during the preschool years. Results of the current study indicated that preschoolers' knowledge of fear was lower than for happiness and the other negative emotions. Additionally, where significant differences were found for error type, fear errors were consistently fewer than angry and sad errors. Emotion knowledge scores for fear were not associated with teacher responses on the SCBE-30 for anger/aggression, withdrawal/avoidance, or sensitivity/cooperation, making it the only emotion that did not have any significant associations. This finding is especially surprising for teacher ratings of sensitivity/cooperation because all three of the other emotions were significantly associated with that scale. Past research has also suggested that fear develops later than other negative emotions (Denham & Couchoud, 1990b; Herba et al., 2006; Widen & Russell, 2003) and the current study's finding that fear was the only emotion that was not associated with any scores on the SCBE-30 could suggest that its lack of association is due to emotion knowledge for fear not being developed enough at the preschool age.

Research by Widen and Russell (2004) found that when preschool children were asked to describe emotionally eliciting events (surprise, fear, anger, disgust, sadness)

with emotions presented as either their facial expressions, labels, or as behavioral consequences, facial expression for emotions was not the strongest cue for any of the five negative emotions, and performance for fear was least accurate when given its facial expression. Widen and Russell (2004) also found that although there were age differences between three and four year-olds for which cues were the strongest for emotions, facial expression for emotions was not the strongest cue for either age.

This finding is important to consider in that preschoolers' emotion knowledge for fear is not only lower than for other emotions, but that using facial expressions to assess emotion knowledge of fear may not be the best method to use. Although this method is still useful, other methods, such as assessing emotion knowledge of fear based on emotion labels and behavioral consequences, may be more accurate or give researchers a better idea of the underlying mechanisms behind lower emotion knowledge for fear.

Although sex and preschool type effects were predicted for several of my hypotheses, only one significant sex difference was found (emotion knowledge for anger) and no preschool type differences were found for emotion knowledge. Future analyses could include analyses of interaction effects between sex and preschool type, age and preschool type, and sex and age, not only for emotion knowledge differences but also for predicting scores on the SCBE-30. In addition, it would be interesting to see whether scores for error type predict scores on the SCBE-30, as scores for error type give specific information as to which emotions children are confusing with each other as well as which emotions children are over-identifying. It may be that children who over-identify anger

on the AKT have higher scores for anger/aggression on the SCBE-30, or children who over-identify sadness have higher scores for withdrawal/avoidance on the SCBE-30.

In conclusion, this research lays a solid foundation for more in-depth research in the future, and has important implications for preschoolers' development of individual emotions. Future research could also include analyzing specific emotion knowledge scores on the AKT with other measures, such as the Challenging Situations Task (CST; Denham, Bouril, & Belouad, 1994) and the Minnesota Preschool Affect Checklist (MPAC; Sroufe et al., 1984).

APPENDIX: Tables

Table 1. Overall N's and sub-sample N's for Various Analyses

Type of Sample	N
Overall	364
Valid	322
Head Start Sample	146
Private Care Sample	176
Males	158
Females	164
Three Year-olds	112
Four Year-olds	210
Affect Knowledge Test - Stereotypical	322
Affect Knowledge Test – Non-Stereotypical	315
Social Competence Behavior Evaluation – 30	297

Table 2. Stereotypical Vignettes from the Affect Knowledge Test

Scores: 0 = Incorrect Response; 1 = Correct Response

1) HAPPY [siblings]:
NANCY/JOHNNY: *"Hi! I'm Nancy/Johnny. Here is my brother/sister. Ah! He/she just gave me some ice cream. YUM, YUM!"* (HAPPY)

2) SAD [siblings]:
NANCY/JOHNNY: *"We are walking home."*
Sibling: *"I am going to push you down!!"*
NANCY/JOHNNY: *"Ow!! It hurts!! OWW!!"* (SAD)

3) MAD [siblings]:
NANCY/JOHNNY: *"I just finished building this tower, and I feel really good about it. Doesn't it look good?"*
Sibling: *"No! I think it looks yucky. I am going to knock it down!"* CRASH!! (Nancy/Johnny behaviorally expresses the emotion) (MAD)

4) SCARED [child]: Shhhh!! Nancy/Johnny is asleep.
NANCY/JOHNNY: *"Ooh, I am dreaming. There is a tiger chasing after me!! OH NO!!"* (SCARED)

5) HAPPY [siblings]:
NANCY/JOHNNY: *"Here comes Mommy. Mommy is going to take me to the zoo. Come on, Nancy/Johnny. Let's go see the animals. Oh, I love the elephants. Here we go! Bye, bye!"* (HAPPY)

6) SAD [child]:
NANCY/JOHNNY: *"I am going to go ride my Big Wheel. Where is it? Someone took it! It's gone! Someone stole it."* (SAD)

7) SCARED [child]: Nancy/Johnny is all alone.
NANCY/JOHNNY: *"It's really dark in here. There's no one around. OOOOOOO."* (SCARED)

8) MAD [child and mom]:
NANCY/JOHNNY: *"I don't like to eat cabbage!"*
Mom: *"You have to eat it, and that's that!"*
NANCY/JOHNNY: *"Ugh! No! No!"* (MAD)

Table 3. Non-Stereotypical Vignettes from the Affect Knowledge Test

Scores: 0 = Incorrect Response; 1 = Correct Response

1) [child and mom] Here come Nancy/Johnny and her/his Mommy.

A. HAPPY: NANCY/JOHNNY: *"We are coming to school, I like it here – We have so much fun!"*

B. SAD: NANCY/JOHNNY: *"We are coming to school, I don't like it here – I miss my mommy. Don't go, Mommy!"*

2) [child and mom]

A. HAPPY: NANCY/JOHNNY: *"We're going to the airport. Mommy is going on a trip. It's really fun to see all the planes. WOW!"*

B. SAD: NANCY/JOHNNY: *"We're going to the airport. Mommy is going on a trip. I don't want mommy to go. Don't go!!"*

3) [child and mom] NANCY/JOHNNY: *"Hi Mommy. What are you cooking?"*

A. MAD: Mom: *"[favorite food]"*
NANCY/JOHNNY: *"Ugh! Yuck! I won't eat it!"*

B. HAPPY: Mom: *"[least favorite food]"*
NANCY/JOHNNY: "*Yum, yum. That sounds great!!"*

4) [child and mom]: Mom: *"Come in for dinner Nancy/Johhny!"*

A. HAPPY: NANCY/JOHNNY: *"I am swinging but I'm hungry and Mommy's food is good. I will go in. Okay, Mommy."*

B. MAD: NANCY/JOHNNY: *"I am swinging. I wanna swing. I wanna stay outside!! No, no I won't come in!"*

5) [child]

A. SCARED: NANCY/JOHNNY: *"Here comes a big dog. He looks mean; his teeth are big."*

B. HAPPY: NANCY/JOHNNY: *"Here comes a big dog. He looks nice; his big teeth are smiling at me."*

6) [siblings]

A. HAPPY: NANCY/JOHNNY: *"We are going to the swimming pool; it's a hot day. The pool is so much fun! The water feels good!"*

B. SCARED: NANCY/JOHNNY: *"We are going to the swimming pool; it's a hot day. I don't like this water! It's too deep! I don't want it on my face – Let me out of here!"*

7) [siblings] NANCY/JOHNNY: *"We are playing blocks. We're building a house."*
Sibling: *"I'm going to play with Jimmy, and you can't come. POO POO on you!"*

A. MAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SAD: (Nancy/Johnny behaviorally expresses the emotion)

8) [child and mom] Mom: *"We are going to get some ice cream at the ice cream store, but you have to stay home. Bye, bye."*

A. MAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SAD: (Nancy/Johnny behaviorally expresses the emotion)

9) [siblings] Sibling: *"You are a bad brother/sister."* [punches] *"If you tell Mommy or Daddy I hit you, I will do it again, harder."*

A. MAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SCARED: (Nancy/Johnny behaviorally expresses the emotion)

10) [child and mom] Mom: *"You did a bad thing."* [mom gives child spanking]

A. MAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SCARED: (Nancy/Johnny behaviorally expresses the emotion)

11) [child and mom] Nancy/Johnny has Mother's pen and uses it.
Mom: *"Nancy/Johnny, I told you never to use my pen. If you do it again, I will have to punish you."*

A. SAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SCARED: (Nancy/Johnny behaviorally expresses the emotion)

12) [child and mom] Mom: *"Grandpa died and you won't ever be able to see him again."*

A. SAD: (Nancy/Johnny behaviorally expresses the emotion)

B. SCARED: (Nancy/Johnny behaviorally expresses the emotion)

Table 4. Relevant Items and Related Response Scales from the SCBE – 30

Item
Rating Scale: 5-item Likert: 1 (Not much like this child) - 5 (Much like this child)
1. Irritable, gets mad easily
2. Negotiates solutions to conflicts.
3. Remains apart, isolated from the group.
4. Easily frustrated.
5. Comforts or assists children in difficulty.
6. Inactive, watches others play.
7. Defiant when reprimanded.
8. Taken other children's viewpoint into account.
9. Sad, unhappy, or depressed.
10. Gets into conflicts with other children.
11. Works easily in a group.
12. Inhibited or uneasy in a group.
13. Screams or yells easily.
14. Cooperates with other children.
15. Doesn't talk or interact during group activities
16. Gets angry when interrupted.
17. Takes pleasure in own accomplishments.
18. Timid, afraid, avoids situations.
19. Hits, bites, or kicks other children.

20. Accepts compromises.

21. Goes unnoticed in a group.

22. Hits teacher when angry.

23. Attentive towards younger children.

24. Worries.

25. Forces other children to do things.

26. Takes care of toys.

27. Tired.

28. Opposes the teacher.

29. Helps with everyday tasks.

30. Neutral expression; doesn't smile or laugh.

Table 5. *Frequencies and percentages for correct responses on stereotypical vignettes overall and by sex*

		Sex	
	Overall	Males	Females
Correct Happy Responses	322	158 (49%)	164 (51%)
0 Correct	24 (7%)	8 (5.1%)	8 (4.9%)
1 Correct	48 (14.9%)	20 (12.7%)	29 (17.7%)
2 Correct	257 (79.8%)	130 (82.3%)	127 (77.4%)
Correct Sad Responses	322	158 (49%)	164 (51%)
0 Correct	39 (12.1%)	16 (10.1%)	23 (14%)
1 Correct	59 (18.3%)	28 (17.7%)	31 (18.9%)
2 Correct	224 (69.6%)	114 (72.2%)	110 (67.1%)
Correct Angry Responses	322	158 (49%)	164 (51%)
0 Correct	44 (13.7%)	18 (11.4%)	26 (15.9%)
1 Correct	78 (24.2%)	32 (20.3%)	46 (28%)
2 Correct	200 (62.1%)	108 (68.4%)	92 (56.1%)
Correct Afraid Responses	322	158 (49%)	164 (51%)
0 Correct	68 (21.1%)	30 (19%)	38 (23.2%)
1 Correct	103 (32%)	49 (31%)	54 (32.9%)
2 Correct	151 (46.9%)	79 (50%)	72 (43.9%)

Table 6. *Frequencies and percentages for correct responses on stereotypical vignettes by preschool type*

	Preschool Type	
	Private	Head Start
Correct Happy Responses	176 (54.7%)	146 (45.3%)
0 Correct	10 (5.7%)	6 (4.1%)
1 Correct	24 (13.6%)	25 (17.1%)
2 Correct	142 (80.7%)	115 (78.8%)
Correct Sad Responses	176 (54.7%)	146 (45.3%)
0 Correct	27 (15.3%)	12 (8.2%)
1 Correct	28 (15.9%)	31 (21.2%)
2 Correct	121 (68.8%)	103 (70.5%)
Correct Angry Responses	176 (54.7%)	146 (45.3%)
0 Correct	23 (13.1%)	21 (14.4%)
1 Correct	41 (23.3%)	37 (25.3%)
2 Correct	112 (63.6%)	88 (60.3%)
Correct Afraid Responses	176 (54.7%)	146 (45.3%)
0 Correct	39 (22.2%)	29 (19.9%)
1 Correct	58 (33%)	45 (30.8%)
2 Correct	79 (44.9%)	72 (49.3%)

Table 7. *Frequencies and percentages for correct responses on stereotypical vignettes by age*

	Age	
	3 year-olds	4 year-olds
Correct Happy Responses	112 (34.8%)	210 (65.2%)
0 Correct	10 (8.9%)	6 (2.9%)
1 Correct	18 (16.1%)	31 (14.8%)
2 Correct	84 (75%)	173 (82.4%)
Correct Sad Responses	112 (34.8%)	210 (65.2%)
0 Correct	29 (25.9%)	10 (4.8%)
1 Correct	24 (21.4%)	35 (16.7%)
2 Correct	59 (52.7%)	165 (78.6%)
Correct Angry Responses	112 (34.8%)	210 (65.2%)
0 Correct	26 (23.2%)	18 (8.6%)
1 Correct	38 (33.9%)	40 (19%)
2 Correct	48 (42.9%)	152 (72.4%)
Correct Afraid Responses	112 (34.8%)	210 (65.2%)
0 Correct	37 (33%)	31 (14.8%)
1 Correct	42 (37.5%)	61 (29%)
2 Correct	33 (29.5%)	118 (56.2%)

Table 8. *N-sizes, means, standard error of the means, and standard deviations for non-stereotypical vignettes overall*

Overall Responses	N	M	SE	SD
Correct Happy Responses	275	.91	.0151	.2501
Correct Sad Responses	316	.81	.0193	.3434
Correct Angry Responses	315	.71	.0204	.3625
Correct Afraid Responses	318	.47	.0206	.3665

Table 9. *N-sizes, means, standard error of the means, and standard deviations for non-stereotypical vignettes by participant sex*

Responses for Males	N	M	SE	SD
Correct Happy Responses	133	.91	.0221	.2552
Correct Sad Responses	157	.84	.0256	.3213
Correct Angry Responses	156	.73	.0277	.3459
Correct Afraid Responses	158	.49	.0294	.3699
Responses for Females	N	M	SE	SD
Correct Happy Responses	142	.92	.0207	.2460
Correct Sad Responses	159	.77	.0287	.3614
Correct Angry Responses	159	.69	.0300	.3782
Correct Afraid Responses	160	.45	.0287	.3635

Table 10. *Results of one-way ANOVA's for correct responses on non-stereotypical vignettes by participant sex*

	df	F	η^2	*p*
Correct Happy Responses	1	.15	.00	.70
Correct Sad Responses	1	3.41	.01	.07
Correct Angry Responses	1	.90	.00	.34
Correct Afraid Responses	1	.75	.00	.39

Table 11. *N-sizes, means, standard error of the means, and standard deviations for non-stereotypical vignettes by preschool type*

Responses for Head Start	N	M	SE	SD
Correct Happy Responses	126	.92	.0220	.2474
Correct Sad Responses	144	.84	.0277	.3326
Correct Angry Responses	143	.70	.0307	.3665
Correct Afraid Responses	143	.47	.0303	.3621
Responses for Private Care	N	M	SE	SD
Correct Happy Responses	149	.91	.0207	.2531
Correct Sad Responses	172	.78	.0268	.3513
Correct Angry Responses	172	.73	.0274	.3596
Correct Afraid Responses	175	.48	.0281	.3711

Table 12. *Results of one-way ANOVA's for correct responses on non-stereotypical vignettes by preschool type*

	df	F	η^2	*p*
Correct Happy Responses	1	.16	.00	.69
Correct Sad Responses	1	1.87	.01	.17
Correct Angry Responses	1	.56	.00	.46
Correct Afraid Responses	1	.07	.00	.79

Table 13. *N-sizes, means, standard error of the means, and standard deviations for non-stereotypical vignettes by participant age*

Responses for 3 year-olds	N	M	SE	SD
Correct Happy Responses	97	.85	.0316	.3114
Correct Sad Responses	111	.69	.0381	.4009
Correct Angry Responses	111	.61	.0384	.4044
Correct Afraid Responses	112	.36	.0328	.3467
Responses for 4 year-olds	**N**	**M**	**SE**	**SD**
Correct Happy Responses	178	.94	.0152	.2033
Correct Sad Responses	205	.87	.0202	.2887
Correct Angry Responses	204	.77	.0227	.3245
Correct Afraid Responses	206	.53	.0253	.3628

Table 14. *Means, N-sizes, standard deviations, and standard errors of the means for stereotypical vignette error ratios*

Error Type	Mean	N	SD	SE
Happy Vignette/Sad Response	.07	322	.2579	.0144
Happy Vignette/Angry Response	.10	322	.3158	.0176
Happy Vignette/Afraid Response	.08	322	.2948	.0164
Sad Vignette/Happy Response	.13	322	.4093	.0228
Sad Vignette/Angry Response	.18	322	.4609	.0257
Sad Vignette/Afraid Response	.11	322	.3384	.0189
Angry Vignette/Happy Response	.09	322	.3458	.0193
Angry Vignette/Sad Response	.31	322	.5673	.0316
Angry Vignette/Afraid Response	.11	322	.3529	.0197
Afraid Vignette/Happy Response	.13	322	.3917	.0218
Afraid Vignette/Sad Response	.41	322	.6316	.0352
Afraid Vignette/Angry Response	.19	322	.4651	.0259

Table 15. *Paired sample t-tests for stereotypical vignette error ratios*

Error Type		t
Pair 1	Happy Vignette/Sad Response Happy Vignette/Angry Response	-1.09
Pair 2	Happy Vignette/Afraid Response Happy Vignette/Sad Response	-.47
Pair 3	Happy Vignette/Angry Response Happy Vignette/Afraid Response	.65
Pair 4	Sad Vignette/Happy Response Sad Vignette/Angry Response	-1.57
Pair 5	Sad Vignette/Happy Response Sad Vignette/Afraid Response	.44
Pair 6	Sad Vignette/Angry Response Sad Vignette/Afraid Response	2.15*
Pair 7	Angry Vignette/Happy Response Angry Vignette/Sad Response	-5.99**
Pair 8	Angry Vignette/Afraid Response Angry Vignette/Happy Response	-.78
Pair 9	Angry Vignette/Sad Response Angry Vignette/Afraid Response	5.23**
Pair 10	Afraid Vignette/Happy Response Afraid Vignette/Sad Response	-6.51**
Pair 11	Afraid Vignette/Angry Response Afraid Vignette/Happy Response	-1.66
Pair 12	Afraid Vignette/Sad Response Afraid Vignette/Angry Response	4.70**

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

Table 16. *Number of errors made for each error type overall and by age for stereotypical vignettes*

		Age	
Error Type	Overall	3 year-olds	4 year-olds
Happy Vignette/Sad Response	23	10	13
Happy Vignette/Angry Response	31	14	17
Happy Vignette/Afraid Response	26	13	13
Sad Vignette/Happy Response	41	29	12
Sad Vignette/Angry Response	59	33	26
Sad Vignette/Afraid Response	37	20	17
Angry Vignette/Happy Response	29	19	10
Angry Vignette/Sad Response	101	54	47
Angry Vignette/Afraid Response	36	16	20
Afraid Vignette/Happy Response	43	28	15
Afraid Vignette/Sad Response	133	55	78
Afraid Vignette/Angry Response	61	31	30

Table 17. *Means, N-sizes, standard deviations, and standard errors of the means for non-stereotypical vignette error ratios*

Error Type	Mean	N	SD	SE
Happy Vignette/Sad Response	.04	275	.1568	.0095
Happy Vignette/Angry Response	.03	275	.1290	.0078
Happy Vignette/Afraid Response	.02	275	.1000	.0060
Sad Vignette/Happy Response	.05	272	.1906	.0116
Sad Vignette/Angry Response	.07	272	.2192	.0133
Sad Vignette/Afraid Response	.07	272	.2127	.0129
Angry Vignette/Happy Response	.06	272	.1804	.0109
Angry Vignette/Sad Response	.18	272	.2860	.0173
Angry Vignette/Afraid Response	.04	272	.1375	.0083
Afraid Vignette/Happy Response	.07	275	.1568	.0095
Afraid Vignette/Sad Response	.32	275	.3385	.0204
Afraid Vignette/Angry Response	.13	275	.2312	.0139

Table 18. *Paired sample t-tests for* non-*stereotypical vignette error ratios*

Error Type		t
Pair 1	Happy Vignette/Sad Response Happy Vignette/Angry Response	1.04
Pair 2	Happy Vignette/Afraid Response Happy Vignette/Sad Response	2.04*
Pair 3	Happy Vignette/Angry Response Happy Vignette/Afraid Response	.92
Pair 4	Sad Vignette/Happy Response Sad Vignette/Angry Response	-1.73
Pair 5	Sad Vignette/Happy Response Sad Vignette/Afraid Response	-1.17
Pair 6	Sad Vignette/Angry Response Sad Vignette/Afraid Response	.58
Pair 7	Angry Vignette/Happy Response Angry Vignette/Sad Response	-6.68**
Pair 8	Angry Vignette/Afraid Response Angry Vignette/Happy Response	1.37
Pair 9	Angry Vignette/Sad Response Angry Vignette/Afraid Response	8.18**
Pair 10	Afraid Vignette/Happy Response Afraid Vignette/Sad Response	-10.70**
Pair 11	Afraid Vignette/Angry Response Afraid Vignette/Happy Response	-3.94**
Pair 12	Afraid Vignette/Sad Response Afraid Vignette/Angry Response	7.08**

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

Table. 19. *Mean number of errors made for each error by age for non-stereotypical vignettes*

Error Type	3 year-olds	4 year-olds
Happy Vignette/Sad Response	.07	.02
Happy Vignette/Angry Response	.02	.03
Happy Vignette/Afraid Response	.04	.00
Sad Vignette/Happy Response	.08	.03
Sad Vignette/Angry Response	.14	.04
Sad Vignette/Afraid Response	.08	.05
Angry Vignette/Happy Response	.10	.04
Angry Vignette/Sad Response	.23	.15
Angry Vignette/Afraid Response	.05	.04
Afraid Vignette/Happy Response	.10	.05
Afraid Vignette/Sad Response	.34	.31
Afraid Vignette/Angry Response	.19	.10

Table 20. *Kruskal-Wallis (Chi square) analysis on non-stereotypical vignette error ratios by age*

Error Type	χ^2	df
Happy Vignette/Sad Response	8.20**	1
Happy Vignette/Angry Response	.04	1
Happy Vignette/Afraid Response	9.13**	1
Sad Vignette/Happy Response	.2.65	1
Sad Vignette/Angry Response	21.88**	1
Sad Vignette/Afraid Response	1.46	1
Angry Vignette/Happy Response	5.65*	1
Angry Vignette/Sad Response	5.00*	1
Angry Vignette/Afraid Response	.95	1
Afraid Vignette/Happy Response	6.44*	1
Afraid Vignette/Sad Response	.30	1
Afraid Vignette/Angry Response	6.89*	1

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

Table 21. *Pearson correlations, Significance, and N-sizes of correlation analyses for SCBE-30 scale variables and ratios of correct emotion responses*

Correlation Variables	Pearson Correlation	N
Anger/Aggression Scale (SCBE-30) and Correct Happy Response Ratio (AKT)	-.01	297
Anger/Aggression Scale (SCBE-30) and Correct Sad Response Ratio (AKT)	-.00	297
Anger/Aggression Scale (SCBE-30) and Correct Angry Response Ratio (AKT)	-.07	297
Anger/Aggression Scale (SCBE-30) and Correct Afraid Response Ratio (AKT)	-.04	297
Withdrawal/Avoidance Scale (SCBE-30) and Correct Happy Response Ratio (AKT)	-.00	294
Withdrawal/Avoidance Scale (SCBE-30) and Correct Sad Response Ratio (AKT)	-.12*	294
Withdrawal/Avoidance Scale (SCBE-30) and Correct Angry Response Ratio (AKT)	-.00	294
Withdrawal/Avoidance Scale (SCBE-30) and Correct Afraid Response Ratio (AKT)	-.00	294
Sensitive/Cooperative Scale (SCBE-30) and Correct Happy Response Ratio (AKT)	.11*	295
Sensitive/Cooperative Scale (SCBE-30) and Correct Sad Response Ratio (AKT)	.16**	295
Sensitive/Cooperative Scale (SCBE-30) and Correct Angry Response Ratio (AKT)	.13*	295
Sensitive/Cooperative Scale (SCBE-30) and Correct Afraid Response Ratio (AKT)	.08	295

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

Table 22. *Emotion knowledge predicting anger/aggression*

Model	Unstandardized Coefficients		Standardized Coefficients	95% Confidence Interval for B			
	B	Std. Error	β	Lower Bound	Upper Bound	ΔR^2	ΔF
1 Total Emotion Knowledge	-.15	.10	-.09	-.43	.04	.008	2.33
2 Correct Happy Responses	2.02	3.20	.05	-4.28	8.31	.001	2.33
1 Total Emotion Knowledge	-.15	.10	-.09	-.35	.04	.008	2.33
2 Correct Sad Responses	2.93	2.78	.09	-2.54	8.40	.004	1.11
1 Total Emotion Knowledge	-.15	.10	-.09	-.35	.04	.008	2.33
2 Correct Angry Responses	-1.64	2.66	-.05	-6.88	3.61	.001	.38
1 Total Emotion Knowledge	-.15	.10	-.09	-.35	.04	.008	2.33
2 Correct Afraid Responses	.80	2.67	.03	-4.45	6.06	.000	.09

Table 23. *Emotion knowledge predicting withdrawal/avoidance*

Model	Unstandardized Coefficients		Standardized Coefficients	95% Confidence Interval for B			
	B	Std. Error	β	Lower Bound	Upper Bound	ΔR^2	ΔF
1 Total Emotion Knowledge	-.10	.06	-.09	-.22	.03	.008	2.27
2 Correct Happy Responses	1.63	2.09	.06	-2.48	5.74	.002	.61
1 Total Emotion Knowledge	-.10	.06	-.09	-.22	.03	.008	2.27
2 Correct Sad Responses	-3.01	1.85	-.13	-6.65	.63	.009	2.65
1 Total Emotion Knowledge	-.10	.06	-.09	-.22	.03	.008	2.27
2 Correct Angry Responses	2.11	1.79	.10	-1.41	5.63	.005	1.39
1 Total Emotion Knowledge	-.10	.06	-.09	-.22	.03	.008	2.27
2 Correct Afraid Responses	3.38	1.80	.16	-.17	6.92	.012	3.52

Table 24. *Emotion knowledge predicting sensitivity/cooperation*

Model	Unstandardized Coefficients		Standardized Coefficients	95% Confidence Interval for B			
	B	Std. Error	β	Lower Bound	Upper Bound	ΔR^2	ΔF
1 Total Emotion Knowledge	.19	.07	.16**	.05	.33	.025	7.19**
2 Correct Happy Responses	-.6	2.35	-.02	-5.22	4.01	.000	.07
1 Total Emotion Knowledge	.19	.07	.16**	.05	.33	.025	7.19**
2 Correct Sad Responses	1.48	2.08	.06	-2.61	5.57	.002	.51
1 Total Emotion Knowledge	.19	.07	.16**	.05	.33	.025	7.19**
2 Correct Angry Responses	.03	2.01	.00	-3.91	3.98	.000	.000
1 Total Emotion Knowledge	.19	.07	.16**	.05	.33	.025	7.19**
2 Correct Afraid Responses	-2.91	2.02	-.12	-6.88	1.07	.007	2.07

Note. ** = $p < .01$.

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