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Los Angeles

Early Predictors of Emotional Knowledge and Expression in Atypical Development

A thesis submitted in partial satisfaction

of the requirements for the degree Master of Arts

in Education

by

Hilary Margret Gould

2013

ABSTRACT OF THESIS

Early Predictors of Emotional Knowledge and Expression

in Atypical Development

by

Hilary Margret Gould

Master of Arts in Education

University of California, Los Angeles, 2013

Professor Connie Kasari, Chair

Many studies have documented the importance of emotional knowledge for later social competence in typical children (e.g., Denham, 1986; Dunn & Cutting, 1999; Schultz, Izard, Ackerman, & Youngstrom, 2001). However, less is known about the factors that lead to the development of these skills, or the growth trajectories of these skills in children with developmental disabilities. The aims of this longitudinal study were: (1) to examine the specificity and uniqueness of emotional understanding and expression in atypical populations, and (2) to identify if joint attention skills in early development are predictive of greater emotional understanding and increased positive reported expression of emotions at an older age. The initial sample consisted of 135 children: 37 with a diagnosis of an autism spectrum disorder (ASD), 66 with Down syndrome (DS), and 32 with other developmental delays (DD). At entry children were

rated on initiations and responses to joint attention at a mean age of 3.17 years. At follow-up, 122 of the original children were assessed again, at a mean age of 10.7 years, on emotional labeling, identification, expression, and empathy. The ASD group had a lower rate of responding to joint attention at entry. Diagnostic group differences were also found for the DD group, with more negative expressed emotions as rated by parents, but there were no difference in teacher report of negative expressed emotions in the classroom. The DS group performed significantly worse on a number of expressive measures: labeling of negative emotions, identification of both positive and negative emotions, and empathy to a positive vignette. However, when given the same tasks receptively, the DS group did not perform significantly different than the other two diagnostic groups. Early initiations of nonverbal joint attention gestures predicted greater parent reported positive emotional expression, holding diagnostic groups constant with a coefficient of determination equal to .224. These results suggest that improvements in joint attention at a young age may have long-term consequences for later expressive affect in children with developmental disabilities. These data are consistent with other research that has found concurrent associations between joint attention and positive affect (Kasari et al., 1990) and increases in positive affect due to joint attention training (Lawton & Kasari, 2012).

The thesis of Hilary Margret Gould is approved.

Sandra Graham

Jeffrey Wood

Connie Kasari, Committee Chair

University of California, Los Angeles

2013

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Emotional competence is comprised of the abilities to understand one's own emotions and the emotions of others, to appropriately express emotions, and to regulate these emotions when needed (Saarni, 1990). Current research from typical development shows children that have greater emotional knowledge score higher on measures of friendliness, empathy, prosocial behavior, and popularity (Cassidy, Parke, Butkovsky & Braungart, 1992; Denham, 1986; Dunn & Cutting, 1999, Denham et al., 2003; Garner, 1996). Although many studies have documented the importance of emotional knowledge for later social functioning, less is known about the factors that lead to the development of these skills, or the abnormal progression in atypical populations. Children with developmental delays often have difficulties with all three prongs of emotional competence, which have lifelong implications. Individuals with an autism spectrum disorder (ASD) and Down syndrome (DS) differ in their sociability, but both populations have demonstrated unique patterns in emotional expression (ASD: Yirmiya, Kasari, Sigman, & Mundy, 1989, DS: Kasari, Freeman, Mundy, & Sigman, 1995), and deficits in emotion recognition (ASD: Rump, Giovanelli, Minshew, & Strauss, 2009; DS: Wishart & Pitcairn, 2000. The purpose of the current study is to examine early predictors of later emotional knowledge and expression in children with an autism spectrum disorder, Down syndrome, and developmental delay.

Importance of Emotional Knowledge

Emotion labeling and recognition have repeatedly been found to be a correlate of multiple social and behavioral outcomes. For typically developing children, greater emotional knowledge and affective perspective taking are positively correlated with higher ratings on peer reports of popularity and more frequent observations of empathic and prosocial behaviors (Cassidy et al, 1992; Denham, 1986; Dunn & Cutting, 1999, Denham et al., 2003; Garner, 1996).

In addition to correlations with positive social outcomes, studies have shown that lower emotional knowledge predicted concurrent teacher-reported social withdrawal and behavior difficulties (Schultz, Izard, Ackerman, & Youngstrom, 2001). These findings suggest that understanding and comprehension of basic emotions can influence externalizing behaviors and social status in the peer group. Considering the importance of emotional knowledge for many different behaviors and contexts, it is imperative to understand factors that lead to the development of these skills.

Emotion Theories

In order to assess the development of emotion understanding and expression, differential emotions theory (DET) will be used to provide a broad framework. DET posits that emotions are discrete, innate, and congruent with subjective experience (Izard & Abe, 2004). This theory is rooted in Darwinism and suggests that experiencing emotions is both an automatic and universal process; and that facial affect matches internal representations of emotions. DET also examines the interplay of cognition, behavior, and emotions and proposes that emotional experiences are independent of cognitive ability (Izard, 1991). For the current study sample, this suggests that regardless of disability type, mental age, or cognitive skills there should be intact emotional systems including recognition and expression.

Although DET recognizes that social context plays a role in emotion recognition, other theorists have suggested a more primary function of socialization on emotional development (e.g., Saarni, 1999). In particular, studies have found that parent's labeling and modeling of emotions affect the child's understanding and expression (Saarni, 1999; Baker & Crnic, 2009). This study aims to explore if early social skills have an influential role in affective development. Therefore, this paper will use both a DET approach and Vygotsky's social development theory

(1978), which posits that the child's social world is constructed, in order to see if behaviors in early development, such as joint attention gestures, are related to emotional outcomes for the child.

Emotional Understanding and Expression in ASD

From the earliest descriptions of autism, abnormal emotional expression was considered a primary deficit. In his seminal paper in 1943, Leo Kanner described individuals with ASD as having an "innate inability to form the usual, biologically provided affective contact with people, just as other children come into the world with innate physical or intellectual handicaps." This notion is still present and the current diagnostic criterion for ASD includes substantial impairments in the emotional domain including the "lack of social or emotional reciprocity" (APA, 1994). Although the history of the disorder characterized individuals with ASD as having flat or blunted affect, more current research has found that this population does exhibit a wide range of facial emotions (Yirmiya et al., 1989). Research has instead supported that lack of affect may be context dependent. Children with ASD have less outward expression of affect during social sharing and joint attention episodes compared to children that are typically developing or have intellectual impairment (Kasari, Sigman, Mundy, & Yirmaya, 1990).

The pattern of emotional knowledge in ASD has been debated in the literature. Traditionally, social functioning deficits in ASD were thought to result from failures of recognizing and understanding others emotions and intentions (e.g., Hobson, 1993). Supporting that research, some studies have found impaired skills in emotion recognition for even basic emotions such as happiness, sadness, fear, and anger (e.g., Rump, Giovanelli, Minshew, & Strauss, 2009; Ashwin, Chapman, Colle, & Baron-Cohen, 2006). However, other studies have found that recognition tasks are performed with accuracy equal to the typically developing

group, and are likely not a primary deficit in ASD (e.g., Ozonoff, Pennington, & Rogers, 1990; Piggot et al., 2004). A recent meta-analysis suggested that there is an emotion recognition difficulty in autism, particularly for negative emotions, but since happiness was only marginally impaired it rules out theories that claim emotion recognition difficulties are primary and universal in ASD (Uljaveric & Hamilton, 2012). Instead it may be important to distinguish specific emotions from one another particularly related to whether the valence was positive or negative, which was done for all emotion measures in the current study.

Emotional Understanding and Expression in DS

In contrast, children with Down syndrome are often perceived as having high positive affect and sociability (e.g., Fidler, 2005). Although individuals with Down syndrome display more positive affect than typical children (Kasari et al., 1995), they also have a number of challenges related to negative behaviors and emotional regulation (Jahromi, Gulsrud, & Kasari, 2008). Parent and teacher reports show that children with DS have more noncompliance behavioral issues when compared to typical children (Coe et al., 1999; Cuskelly & Dadds, 1992). In addition to expression of highly positive and negative emotions, studies have found that when children with DS reach a developmental age equivalent to 4 years they perform worse than typical peers and children with intellectual disabilities from other etiologies, on measures of emotion recognition, labeling and understanding (Kasari, Freeman & Hughes, 2001). Abnormal emotional development may exacerbate the social challenges faced by these children.

Relationship between Joint Attention and Emotions

Some studies have demonstrated a relationship between joint attention and affective display (e.g., Kasari, Sigman, Mundy & Yirmiya, 1990). Joint attention (JA) is a shared focus between two individuals. JA behaviors involve an exchange between two individuals (e.g., child

and adult) around an object, event, or symbol (Adamson, 1995; Tomasello, 1995). For this study, only JA gestures were examined, not JA language. Initiating Joint Attention (IJA) behaviors include pointing, showing or giving objects, as well as triadic referential looks between the object and individual for the purpose of sharing. Responding to Joint Attention (RJA) consists of following a head turn, pointing gesture, and/or gaze of another person. For typically developing children knowledge from these shared moments of attention with an adult provides feedback about the socio-emotional environment (Hornick, Risenhoover, & Gunnar, 1987; Walden & Ogan, 1988; Phillips, Wellman, Spelke, 2002). This suggests that individuals who have deficits in joint attention may be missing out on opportunities to learn from emotional cues.

Current research has established that responding to attention and spontaneously seeking to share has implications for social-emotional development. Typical infants at 6 months of age that respond to their mother's gaze have better emotion regulation abilities at age two (Morales, Mundy, Crowson, Neal, & Delgado; 2005). In addition, higher scores on IJA and RJA for typically developing infants were associated with externalizing behavior and social competence scores as rated by parents (Vaughan Van Hecke et al., 2007). Moments of joint attention and engagement create an environment where children are attending to, and learning from, a social partner. In fact, McClure and Nowicki (2001) suggest that gaze aversion may explain many of the social deficits in socially anxious children since they are not acquiring as many emotional cues from the environment. Social-approach theorists propose that initiating joint attention represents social desire and leads to more opportunities of acquiring socially transmitted skills such as language (Mundy et al., 1995) and other complex abilities such as pretend play and theory of mind (Bruner, 1983; Carpenter, Nagell & Tomasello, 1998; Meltzoff & Brooks, 2001). In developmentally delayed populations, joint attention skills are important predictors for

outcomes in language, cognition, engagement, peer interactions, and social skills (Lord, Floody, Anderson, & Pickles, 2003; Sigman & Ruskin, 1999). It is still unclear how certain gestures, or responses to joint attention, relate to emotional measures, which may have direct implications for behavior and social development**.**

Joint Attention in Atypical Development

Considering the relationship between joint attention and social interest, it is not surprising that JA skills are thought to be a pivotal deficit in children with an autism spectrum disorder. In fact, in the current diagnostic description of ASD, one of the primary social deficits includes "a lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing or pointing out objects of interest to other people)" (American Psychiatric Association, 1994). Children with ASD have demonstrated unique deficits in initiating joint attention and symbolic play as compared to children with Down syndrome, developmental delay and typically developing children (Sigman & Ruskin, 1999). Nonetheless, joint attention plays an important role in every child's development. Higher frequency of early nonverbal joint attention gestures and play in preschool aged children with either DS or ASD predicted the frequency of initiations with peers on the playground (Sigman & Ruskin, 1999). This suggests that joint attention may be important for fostering peer engagement for both diagnostic groups. For children with DS, early disturbances in other forms of nonverbal gestures, such as behavior regulation, or requesting, may explain primary deficits in language (Mundy et al., 1995).

Responding to and initiating joint attention are often combined with positive affective expression in typically developing children, emphasizing the sharing function of these gestures (Kasari et al., 1990). However, the same study found that children with ASD often had neutral

affect during a joint attention episode, while children with DS frequently expressed positive affect across contexts of both JA and requesting behaviors. This aligns with some of the current literature about general displays of expressed affect with these populations. Since typical children by 12 months of age not only share attention, but also change their behavior in reaction to an adult's facial expressive affect (Hornik et al., 1987; Phillips et al., 2002), this suggests that early on in development children are learning about the world by attending to others and identifying their social emotional cues.

In summary, the current literature suggests that both affective knowledge and joint attention are important for later emotional and social competence. The current study will contribute to the body of literature on emotional recognition and perspective taking for atypical development, and examine early critical factors that are important for later emotional development. Current evidence has suggests that individuals with Down syndrome have impairments in emotional recognition and understanding, while children with other types of intellectual impairments, excluding ASD, do not have significant differences compared to typically developing children (Williams, Wishart, Pitcairn & Willis, 2005).

The Current Study

Existing research studies have not yet examined early predictors of emotion recognition or emotional expression in atypical development. It is also unclear whether predictors are similar or different among the different disability groups. The current study has two primary goals. The first aim is to determine the specificity and uniqueness of emotion recognition, expression, and empathy in children diagnosed with an autism spectrum disorder, Down syndrome, and developmental delay. It was hypothesized that differences will be found between the three disability groups, in emotional understanding and expression, particularly related to the valence

of emotions. Based on previous literature, the ASD group was expected to have more negative affect and withdrawn behavior as rated by parents and teachers on measures of emotional expression. This is in contrast to the Down syndrome group who was expected to display both high positive and negative emotion. Both the ASD and DS groups were expected to have some trouble with emotional labeling and identification, and the ASD group was hypothesized to have the lowest scores on the measure of empathy. Children with global developmental delays were expected to have intact emotional understanding skills, and less expressed negative emotion compared to children with DS and ASD. This was expected for the DD group since the prior research has shown that this group tends to have less behavioral and emotional difficulties than children with other developmental disabilities (Pearson et al., 2006).

The second aim of the study is to assess if joint attention gestures as a young child are related to more positive emotional expression, less negative behaviors, and higher scores on measures of emotional labeling, identification and empathy. It was hypothesized that initiating and responding to joint attention will be predictive of positive emotional development for all three populations. These results would follow the literature for typically developing children and suggest that joint attention is an important skill for socio-emotional development including knowledge and externalizing indicators of emotions. Current literature has shown that JA is important for later social development; therefore it may be that emotional knowledge could be a moderator for explaining this relationship. Based on the current literature it was expected that the ASD group will have lower JA and more negative expressed emotions compared to DS and DD. Given the unique deficit that individuals with ASD have in joint attention (Sigman & Ruskin, 1999), it was speculated that JA may have a predictive relationship for ASD group but not the other two populations.

Method

Participants

Participants are children that were part of a larger 16 year longitudinal study aimed at understanding continuity and change in developmental disorders (Sigman & Ruskin, 1999). Secondary analysis approved by the UCLA Institutional Review Board was conducted on participants that have data for any interested measures at either time point. This resulted in a total of 135 children: 37 with a diagnosis of an autism spectrum disorder, 66 with Down syndrome, and 32 with developmental delay. Children with developmental delays were included in the sample to be used as matched comparisons on chronological and mental age. This will be useful in determining if emotion recognition deficits are syndrome specific or more a general developmental delay.

Some of the children received a diagnosis from only an outside clinician, while children recruited in the second half of the study also were screened in the lab. The sample of children with developmental delays includes children with intellectual impairments with unknown etiological cause, known neurological conditions such as Prader-Willi syndrome, and general language delays. It is possible that some of these children may have been rated as having an ASD diagnosis from an outside clinician but did not meet diagnostic criteria on the Autism Behavior Checklist (Krug, Arick, & Almond, 1980) or meet criteria on the Childhood Autism Rating Scale (Schopler, Reichler, & Renner, 1988) in the laboratory. In those cases they would have fallen into the DD group.

During initial entry children were recruited between the ages of 1 to 6 with a mean age of 3.17 years old. This original sample was a collection of subjects that participated in various cross-sectional studies at UCLA beginning in 1979. Participant characteristics including mean

age, mean mental age, gender, and ethnic background are listed in Table 1, presented separately for each diagnostic group. Groups were not significantly different regarding ethnicity with the majority of the sample being Caucasian. The ASD and DS groups did significantly differ on gender though (p=.003), with more males in the ASD sample than the DS sample. The DD group was not statistically different than either group concerning gender. The larger proportion of males with ASD study may be diagnostically meaningful since the CDD currently estimates that the ratio of male to female in ASD is 5:1 (Baio, 2012), while in DS both sexes are affected equally. Recruitment for the initial Down syndrome study aimed for a younger sample that was pre-verbal but the assessments were still age appropriate. Additionally, at the time of the original studies the earliest age of autism diagnosis was 2.5 years which explains why the collective sample is significantly different on chronological age as compared to the Down syndrome group at intake. The developmentally delayed group was not significantly different in chronological age to either the autism or the Down syndrome groups. However, the Down syndrome group also had significantly lower mental ages than the developmental delayed group, but not the autism group.

Table 1
Characteristics of Participants by Diagnostic Group at Intake (Time 1)

	ASD *n = 37*	DS *n = 66*	DD *n = 32*
	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*
Chronological Age (months)	46.27(*11.90*) *	32.59 (*14.63*) *	39.88 (*11.68*)
Mental Age (months)	24.81 (*12.09*)	20.82 (*8.22*) *	28.00 (*11.92*) *
Gender (% male)	84%	55%	75%
Ethnicity (% Caucasian)	65%	59%	66%

*significantly different at p<.05

Children were assessed on the emotional measures, at an average of 7 and half years

later, although there were varying intervals in between testing times. The mean ages and the mean years since initial testing for the 122 participants are shown in Table 2, presented separately for each diagnostic group. At follow-up, children ranged from 6 to 19 years, with an average age of 10.7. There were no significant differences in chronological age or intelligence between the three groups and therefore they can all be used as matched comparisons. Finally, the mean time between first and follow-up visit was 7.6 years for the sample as a whole, however there are differences in diagnostic groups since these children participated in three different studies at intake. The developmentally delayed children were retested after a significantly shorter interval than the children in the DS group.

Table 2
Characteristics of Participants by Diagnostic Group at Follow-Up (Time 2)

	ASD *n = 33*	DS *n = 60*	DD *n = 29*
	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*
Chronological Age (years)	9.18 *(5.26)*	10.24 *(4.29)*	9.82 *(2.95)*
Mental Age (months)	61.27 *(39.61)*	53.37*(24.23)*	66.92*(32.79)*
Time between Assessments (years)	7.50*(2.58)*	8.16*(3.00)* *	6.50*(2.59)* *

*significantly different at p<.05

Procedures

At entry preschool aged children and their parents visited the lab and were assessed on response and initiations of joint attention and behavior regulation gestures. When children returned for follow up measures, on average 7 and half years later, they were given socio-emotional assessments to tap their knowledge and understanding of emotions and to measure their behavioral expressions of emotion through parent and teacher reports. To estimate the mental age of the children at intake, the Cattell Scales of Development (Cattell, 1940) or Stanford Binet (Thorndike, 1972) were administered because these were part of the assessment

procedure provided by the Department of Psychiatry at UCLA in 1979 when these studies begun. At follow-up in 1992 the children were administered the revised 4 subsets of the Stanford Binet: Vocabulary, Bead Memory, Pattern Analysis, and Quantitative Analysis (Thorndike, Hagen, & Sattler, 1986) or the Bayley Scales of Infant Development (Bayley, 1974) so each child would have a measurement of IQ.

Measures

Entry (Time 1) measures

The Early Social Communication Scales (ESCS; Seibert, Hogan, & Mundy, 1982) is a semi-structured assessment that uses a series of activities and adult prompts to elicit scores for initiations of joint attention (IJA), response to joint attention (RJA), social interaction frequency (SIF), and a score of requesting, or behavior regulation frequency (BRF). Previous studies on the ESCS have found good reliability, with kappa coefficients with a mean of .70 and Pearson reliability coefficients for the frequency of behaviors reported in this study ranged from .55 to .95 (Mundy, Sigman, Ungerer, & Sherman, 1987).

Follow-up (Time 2) measures

Denham's Affective Knowledge Test (AKT: Denham, 1986) uses puppets with detachable faces to assess children's receptive and expressive labeling of emotions, identification in emotion situation tasks, and empathy. The four faces depicted are happy, sad, angry, and afraid. Emotion situation knowledge, or understanding, is assessed through eight emotion-ladden vignettes with the puppet, while the puppeteer is using a standardized set of visual, facial, and vocal affective cues. For instance, the puppet will act out a scene that is affiliated with a certain emotion, such as getting ice cream (happy), or reacting to a block tower being destroyed (angry). Children are then asked how the puppet feels by putting on the corresponding faces (receptive)

and verbally responding (expressive). A score of empathy is given for children then responding to, “How does this make you feel?” Children receive one point if they correctly identified the targeted emotion in the vignette, and 0 points if they identified an incorrect emotion or had no response. For this study, the two vignettes that depict happiness will be averaged, and used for a measurement of positive emotional knowledge, and the other 6 vignettes of anger, fear, and sadness will be averaged for a total negative emotional knowledge score. Cronbach’s alpha for emotional labeling was .89, for identification in emotion situation task was .93. Although this measure has not previously been done in a sample including teenagers, other similar emotion recognition measures have been done up to age seventeen (Williams, Wishart, Pitcairn, & Willis, 2005).

The Emotion Behavior Checklist (EBC; Izard, Dougherty, Bloxton, & Kotsch, 1974) is a parent-reported measure that asks how often their child has experienced behaviors that are indicative in the past 2 weeks of the following emotions: interest, joy, surprise, sadness, anger, pride, disgust, fear, embarrassment, shyness, guilt, and self-directed hostility. Every emotion is considered separately and between 3-12 specific behaviors related to the emotion, such as facial affect, body language/posture, intonation, and actions are rated on a Likert scale. Ratings for both the overall emotion experienced in the past 2 weeks as well as the specific behaviors range from 1-10 (1-2: rarely or never, 3-4: hardly ever, 5-6: sometimes, 7-8: often and 9-10: very often). Occasionally parents left the question blank in how often their child experienced behaviors indicative of this emotion in the past 2 weeks. In those cases, an average was calculated based on their responses to the specific behaviors filled out. In the current sample, at least one emotion needed to be averaged for 14% of the participants. A score of positive expressed emotions was created from a summation score of joy and interest. A negative

expressed emotion score will be formed by averaging scores from: sadness, anger, and, fear. The positive and negative valenced emotions from the EBC were used to remain consistent with the other emotional measures.

Teacher measure of expressive emotion. Items were selected from the Teacher Rating of Child's Popularity and Peer Functioning that pertained to negative emotional behavior. Of the 18 questions on the original questionnaire that used a 7 point Likert scale, the following seven were selected: 1. Compared with other children in your classroom is the child easily upset if peer interferes with activity? 2. Compared to other children in your classroom, how frequently is the child responsible for disruption during academic instruction? 3. Compared to other children in your classroom, does the child boss and dominate other children? 4. Compared to other children in your classroom, does the child hit, push, or in other ways hurt other children? 5. Compared to other children in your classroom, the child reacts with anger if another child takes something that belongs to them. 6. Compared to other children in your classroom, the child is unable to share or take turns. 7. Compared to children in your classroom, the child withdraws from peer activity. The sum of these scores were used to create a measure of teacher reported negative expressive emotions of the child, that is expected to be congruent with parent reported negative emotions from the EBC.

Table 3
Constructs & Measures Across Timepoints

Constructs	*Measures*		*Time*
Joint Attention • Initating (IJA) • Responding (RJA)	Early Social Communication Scales (ESCS)		Entry (T1)
Emotional Labeling Emotional Identification Empathy	Affective Knowledge Task (AKT)		Follow-up (T2)
Emotional Expression	Parent reported Emotional Behavior Checklist (EBC)	Teacher report of behavior related to emotions	

Results

JA at Entry

The proposed study first examined the descriptive data of the ASD, DS and DD groups and measures. In order to examine similarities and differences on emotional and joint attention variables between groups, an ANOVA was conducted to compare the means on for the three diagnostic groups (ASD, DS, and DD). The analyses showed that the ASD group has significantly lower rate (p=.017) of responding to joint attention than both the DS group and the general DD group. There were no statistically significant differences in initiating joint attention between the three groups at intake.

Emotional Measures at Follow-Up

Diagnostic group differences were also found on parent and observational measures at follow up. Children with DD were reported to have more negative expressed emotions (p=.038). This reflects that parents of children with DD reported more expressive behaviors of their child that indicated feelings of sadness, anger, and fear. There were no significant group differences on the parent measure or positive expressed emotion. Regarding the teacher measure of negative expressed emotion in the classroom, no significant group differences were found.

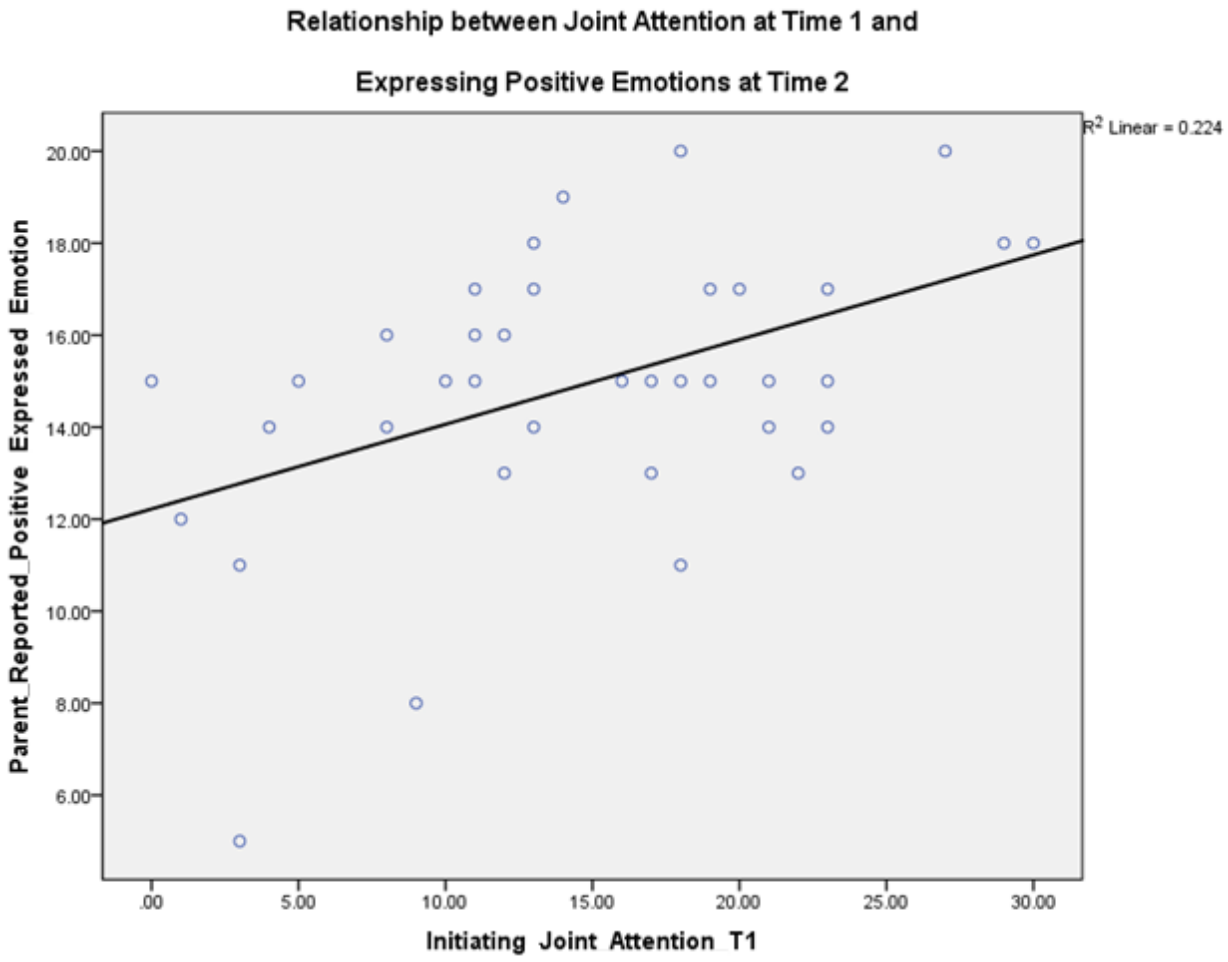
Regarding the affective knowledge task, children with Down syndrome performed significantly worse on a number of expressive measures: labeling of negative emotions, identification of both positive and negative emotions, and empathy to a positive vignette. However, when given the same tasks receptively, although the Down syndrome group maintained the lowest scores, they did not differ significantly than the other two diagnostic groups. Given that at follow-up all three groups were matched on chronological and mental age, the study results may reflect general language difficulties within this population. However it is important to note that children in all three diagnostic groups performed better on receptive rather than expressive tasks for all measures from the AKT. The ASD and DD group had no significant differences on any of the AKT measures. There were also no significant group differences for all three diagnostic categories on receptive or expressive labeling of positive emotions and empathy towards a negative vignette.

Predictors of Emotion Outcomes

The second aim of the study was to examine if early joint attention skills are predictive of later measurements of emotional functioning. In order to examine if IJA and/or RJA is predictive of later emotional variables a regression with a three-way interaction variable was conducted to determine if responses differed by group. For all of the variables measuring positive or negative emotional expression the interaction between IJA or RJA and diagnostic group was not significant. This suggests that neither initiating nor responding to joint attention differentially predicts emotion outcomes based on disability type. Therefore, another regression analysis was conducted that dropped the interaction effect from the analysis. Since the emotional labeling, understanding, and empathy measures from the affective knowledge task are dichotomous, a logistic regression in a generalized linear model was used for these measures.

The findings from all analyses found one positive predictor, that initiating joint attention at intake predicted parent reported positive emotional expression at follow-up, holding diagnostic groups constant. Graph 1 depicts this regression prediction, with an R-squared equal to 0.224. This suggests that 22.4% of the variance in parental report of positive expression at a mean age of 10.72 can be explained by the rate of initiated joint attention gestures at a mean age of 3.17.

Figure 1:
Graph of Predictive Correlation of Joint Attention at Entry and Positive Expressed Emotion at Follow-Up



Discussion

The main aims of this paper were to examine diagnostic group differences in emotional knowledge and expression and to determine if early joint attention skills predicted out to these emotional outcomes at an average of 7.6 years later.

Diagnostic Differences in Joint Attention at Entry

The current study found significant group differences in responding to joint attention at a mean age of 3.17 between the sample of children with ASD as compared with the other two groups. The uniqueness of joint attention within ASD has been well established in the literature (Sigman & Ruskin, 1999). Although the study did not find statistically significant differences in initiating joint attention within the ASD sample this is likely due to low power in the analyses due to a small sample size of children who had data on the JA variables.

Diagnostic Differences in Emotional Knowledge at Follow-up

Children with ASD and DD did not significantly differ on basic labeling of emotions, identification of emotions from vignettes, or empathizing with the character from the vignette. This suggests that differences in emotional knowledge are not unique or specific to ASD. Although there have been numerous studies on this topic, and over 20 years of research, findings have produced mixed results. This study adds to the literature by having other disability groups as matched comparisons and suggests that emotional difficulties may not be a defining feature of ASD. This corroborates a number of studies that have reported similar findings (e.g., Uljaveric & Hamilton, 2012; Ozonoeff et al., 1990).

Children with DS had significantly lower scores than the other two diagnostic groups on labeling of negative emotions, identification of both positive and negative emotions from puppet vignettes, and empathy to a positive vignette. A strength of the current study was the affective

knowledge task was given both expressively and receptively. Although it is appealing to say that there are diagnostic differences in emotional knowledge for children with DS, a different story emerges when children were asked to respond receptively. When children were not required the additional task of producing verbal output, there were no statistically significant group differences. Therefore, it may be the case that this finding is due to differences in language skills rather than emotional knowledge. In fact language skills have been found to be impaired in DS and a common profile for a child or adult with DS demonstrates stronger receptive rather than expressive language, and stronger vocabulary rather than syntax (Martin, Klusek, Estigarribia, Roberts, 2009). The current study does not reveal how children in the three diagnostic groups would have performed compared to typically developing children. Therefore it is possible that they may have all performed worse on emotional recognition tasks than typically developing children. Other studies using this same measure and given both expressively and receptively found that after the MA of 4 years, children with DS showed significantly lower accuracy than the typically developing group for emotional labeling and identification in emotion situation tasks (Kasari et al., 2001). The findings of this study suggest that there may not be greater deficits in emotional knowledge for children with DS compared to children with other developmental delays, but, instead, more deficits related to receptive language when compared to children with other developmental delays matched on chronological and mental age. This suggests that assessments given to children with DS should have less expressive demands and instead allow the child to respond receptively to tap into their true knowledge of emotions, or some other construct, rather than their language ability. In fact, one dissertation study found no differences in emotional knowledge in DS compared to typically developing children when the tasks were modified to require no language skills and made stimuli more engaging (Moore,

2012). Moore argues that using receptive tasks would more accurately depict the knowledge of individuals with DS. The current study supports this claim since there were no differences in scores on any of the same measures when asked receptively, rather than expressively.

Diagnostic Differences in Emotional Expression

Parents reported that children with general developmental delays had more expression of negative emotions than parents of the other two groups. Specifically, that their child exhibited more expressive behaviors that indicated feelings of sadness, anger, and fear. However, there were no significant group differences on teacher reported negative expressed emotion in the classroom, or on the parent measure or positive expressed emotion. Other studies have found that parents of children with developmental delays, specifically ASD and intellectual impairment report greater expressions of sadness than normal children (Capps, Kasari, Yirmiya, & Sigman, 1993), so this study would corroborate these findings to include children with general DD. However, it is still unclear as to why this sample would have scored higher than the other 2 diagnostic groups, and this may be a reflection of the fact that it is a parent given measure.

Since teachers did not report increased negative expression in the classroom for the DD group this finding in the analysis may be giving more insight into the parents rather than children. Parental perceptions of child expressed emotion are difficult to interpret whether it is a greater reflection of the child's actual inner state of feeling or a projection of the parent's own experience. For instance, a potential hypothesis is that since this group is most similar to typically developing children parents are comparing their own child's emotions to typically developing children more than parents of the other two groups. Additionally, some studies have reported findings that children who pay more attention to their parent's displays of emotion are more expressive themselves, and this includes negative emotions (Capps et al., 1993), so this is a

possible explanation for why the sample of DD children were reported higher on the EBC. It is important to further research emotional expression in a general developmentally delayed sample in order to unpack the child and parent factors that are contributing to increased parental reports of negative expression in this population.

Joint Attention as a Predictor

Current literature has demonstrated that joint attention is important for outcomes in language, cognition, and socio-emotional development in typical and atypical development (Mundy et al., 1995; Carpenter et al., 1998; Lord et al., 2003; Sigman & Ruskin, 1999). Mundy and Gomes (1998) found that IJA is a strong predictor of expressive language, while RJA predicted greater receptive language scores. There are only a few studies that have documented the connection of joint attention and social competence and behavioral outcomes (Mundy & Sigman, 2006; Sheinkopf et al., 2004; Sigman & Ruskin, 1999). Nonetheless, these studies show that even after controlling for language and cognitive abilities, joint attention has been found to be positively correlated with more social skills and less disruptive behaviors in typical children, children from disadvantaged backgrounds, and children with developmental disabilities. Although there is a lot of research on the connection between emotional and social outcomes, and some research on JA and social outcomes in typical development, to date, no studies have examined the important of IJA or RJA on emotional competence measures. The current study wanted to expand upon the current literature and determine if IJA and/or RJA are also important for emotional development in children with developmental disabilities.

Results of this study found that children who had greater responding to joint attention at 3 years of age were more likely to be reported as having greater positive expressed emotions 7 and half years later. These results are consistent with the hypothesis that the theoretical intention

of joint attention is for sharing experiences around an object or event between oneself and another. In typical development, joint attention is often paired with positive affect such as smiling (Kasari et al., 1990). This association is intact in children with an intellectual impairment, but not in children with ASD (Kasari et al., 1990). The current study suggests that across pervasive developmental disabilities, RJA is important for positive emotional expression, and this finding persists across many years with a moderate effect size.

Limitations and Directions for Future Research

Although the current study had a strong research design, was longitudinal, and used mixed measures that were observational and from multiple raters, there were some limitations that need to be noted. For joint attention at entry and our predictive regression there was a relatively small sample size of 41 for IJA, and 46 for RJA. This number became even smaller when split by group diagnosis so there may not have been enough power to detect all true diagnostic group differences. For example, the current study did not find diagnostic differences on initiating joint attention and empathy which was surprising considering the abundance of research on these topics that have found that individuals with ASD are more likely to have specific impairments on these constructs. This is likely due to the power of our statistical tests rather than a reflection of our measures or the diagnostic group. Another limitation is that since there was large amount of time between measures more variables should have been covaried such as language ability and other developmental processes that may also explain differences in emotional skills.

This study provides preliminary evidence for the importance of responding to joint attention at toddlerhood affecting later positive expressed emotions as rated by parents. This may have implications for improving trajectories and outcomes for children with ASD, DS, and DD

and their families. Although differential emotional theory (DET) does not stress the importance of socialization on emotional abilities, combining this approach with Vygotsky's social developmental theory may suggest that particularly for children with developmental delays, socialization skills (i.e., joint attention) are important for developing emotional competence skills. Another possible explanation is that children that are more jointly engaged with their parents get rated as having more positive expression. In order to determine and explain the mechanism of the results found, more research needs to be conducted on variables contributing to emotional outcomes for children with developmental delays. Nonetheless, these data are consistent with other research that has found concurrent associations between joint attention and positive affect for typically developing children (Kasari et al., 1990). The results from the current study suggest that there does not need to be different intervention targets for specific populations in order to increase expressed positive emotions. Existing research has already demonstrated that for children with ASD, joint attention training also increases positive affect (Lawton & Kasari, 2012; Whalen, Schreibman, & Ingersoll, 2006). The current research study suggests that extending these interventions to children with other types of developmental disabilities of different etiologies would prove to be beneficial. Considering that the behavior and emotions of children with developmental delays affect the mental health of their parents and entire family functioning qualities (Herring et al., 2006), the positive predictive relationship of joint attention skills and positive expressed emotion may have cascading effects for the entire family.

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