Nonverbal Processing and Social Competency in Children with Reactive Attachment Disorder

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Abstract

This study investigated decoding of facial and paralanguage expressions of emotion in children with and without reactive attachment disorder (RAD). Participants aged 5 to 19 years completed the Adult and Child Facial Expressions and Paralanguage subtests of the Diagnostic Analysis of Nonverbal Accuracy 2 (DANVA2; Nowicki, 1996). Groups included: 17 participants with RAD, 15 participants without RAD with foster care or adoptive histories, and 31 participants without RAD with typical histories. Multivariate analyses of variance were computed with group as the independent variable and subscale scores of the DANVA as the dependent variables. No statistically significant differences in decoding accuracy were found between the RAD group and either control group. The authors discuss implications of these findings.

Keywords

reactive attachment disorder, nonverbal processing, decoding, facial expressions, paralanguage

NONVERBAL PROCESSING AND SOCIAL COMPETENCY

Nonverbal processing refers to the ability to identify (i.e., decode) and express nonverbal behaviors, including facial expressions, paralanguage (e.g., voice/speech intonations), body movements and postures (DePaulo, 1991). The ability to accurately process nonverbal cues is important for normal development (Herba & Phillips, 2004), as the ability to decode others' nonverbal cues enables the understanding of their emotions and facilitates appropriate and successful social interaction (Russell, Stokes, Jones, Czogalik, & Rohleder, 1993). Without accurate decoding, individuals lack the necessary information to understand the experiences of others and for planning appropriate subsequent behaviors.

Salovey and Mayer (1990) posited that from an evolutionary standpoint, it is advantageous for individuals to be able to recognize emotions in others in order to ensure the most productive interactions. They stated that, "individuals who can't recognize emotions in others, or who make others feel badly, may be perceived as cloddish or oafish and ultimately be ostracized" (Salovey & Mayer, p. 201). A considerable amount of research has supported the association between nonverbal behavior and social competence and many of these studies have investigated the ability of participants to decode, or recognize, nonverbal cues (Bowen & Nowicki, 2007; Feldman, Tomasian, & Coats, 1999). Associations between accurate decoding and social competency have been found in samples ranging in age from pre-school to adult (Blair & Coles, 2000; Blair et al., 2005; Hall, Peterson, Webster, Bolen, & Brown, 1999; Nowicki & Duke, 1992; Philippot & Feldman, 1990; Stevens, Charman, & Blair, 2001).

Nowicki and Duke (1992) found that decoding errors for facial and paralanguage cues were associated with being less well-liked by peers for children in grades one to five. Nowicki and Duke (1994) proposed that children unable to accurately decode facial or paralanguage expressions of emotion would be socially disadvantaged. Similarly, Blair and Coles (2000) found decoding errors in adolescents were associated with behavior problems. They found that mainstream adolescents with behavioral problems, as reflected in elevated scores on the Psychpathology Screening Device (PSD), demonstrated decoding deficits in the ability to identify sad and fearful facial expressions, but did not demonstrate deficits in decoding other facial expressions (i.e., surprise, happiness, anger, and disgust). The researchers theorized that difficulties in decoding sad or fearful facial expressions may disrupt the opportunity for appropriate socialization and lessen the opportunity to receive important feedback regarding one's behaviors (e.g., aversive conditioning). These decoding deficits may also decrease the opportunity to experience and act on empathetic responses (Blair & Coles). For additional studies that support the link between decoding deficits and social competency difficulties, see Sheaffer, Golden, and Averett (2009).

NONVERBAL PROCESSING AND CHILDHOOD MALTREATMENT

In addition to understanding the link between nonverbal processing ability and social competency, researchers have studied the acquisition of this ability as a normal part of social and emotional development that may be adversely effected by early childhood experiences, such as maltreatment and poor attachment. For example, childhood maltreatment may result in emotion processing impairments, perhaps increasing children's risk for the development of emotional and/or behavioral problems (Pollak, 2005). Some children may be hypervigilant, searching for information to predict their parents' emotions and/or behaviors (.e.g. scanning adults' faces and/or listening to voice intonations for nonverbal indicators). Their experiences with abuse may then result in a bias in their interpretation of salient nonverbal cues.

Research studies involving children with histories of maltreatment (i.e., early neglect and/or abuse) have found associations between childhood maltreatment and impairments in emotion knowledge (Laible, 2004; Pears & Fisher, 2005; Pollak, Cicchetti, Hornung, & Reed, 2000; Shipman & Zeman, 1999; Schultz, Izard, & Ackerman, 2000).

Several researchers have also found associations between overall deficits in facial expression decoding and childhood maltreatment (Camras, Grow, & Ribordy, 1983; During & McMahon, 1991; Pears & Fisher, 2005; Pollak et al., 2000). Pollak et al. (2000) found that children reared in physically abusive home environments exhibited a particular anger bias (i.e., misattribution of anger) in facial expressions. Similarly, Dodge, Pettit, Bates, and Valente (1995) found that, compared to nonabused children, physically abused children more frequently made particular errors in processing social information. Physically abused children were more likely to attribute hostile intent, recalled a higher number of aggressive responses, and were more likely to view aggressive responses positively. Additionally, children reared in neglectful environments exhibited more difficulty decoding and differentiating emotions in facial expressions than did children reared in typical environments, or in physically abusive home environments. Pears and Fisher (2005) studied 3-to 5-year-old children and found that compared to children reared in typical environments, children reared in foster care with maltreatment histories, demonstrated pervasive deficits in emotional understanding, with overall difficulty discriminating, or decoding, emotions from facial expressions. According to Pollak (2003) "specific kinds of emotional experiences, rather than simply the presence of stress or maltreatment, differentially affect children's emotional functioning" (p. 105). For example, Schultz et al. (2000) found an increased likelihood of anger bias (i.e., misattribution of anger) in children reared in unstable home environments and with caregivers with depression.

To investigate the possible associations between maltreatment and children's emotional development, Shipman and Zeman (1999) studied children between the ages of 6 and 12 years and compared maltreating mother-child dyads to non-maltreating mother-child dyads. They found that maltreating mothers engaged their children in fewer emotional conversations, and that their children showed lower levels of emotional understanding compared to control children. Similarly, Camras et al. (1990) investigated the relationship between maltreating and non-maltreating mothers' facial expressions during interactions with their children and their children's emotional abilities. In a sample of 3 to 7 year olds, compared to children of non-maltreating mothers, children of maltreating mothers were less able to identify emotions in stories (i.e., by pointing to facial expressions of emotions). It seems clear that maltreatment is a risk factor for deficits in nonverbal processing and may differentially affect children depending on their specific types of experiences. Further investigations have also been conducted to determine if difficulties with attachment is an additional risk factor.

NONVERBAL PROCESSING AND ATTACHMENT

Attachment theory provides a framework for understanding the relationship between the infant and caregiver, whether it is one in which there is a close bond and the infant can rely on the caregiver for meeting his/her needs and reducing distress or one in which the infant experiences the caregiver as unavailable and insensitive to his/her needs. Attachment theory posits that infants' attachment interactions and the development of self-regulating strategies to manage affect and needs within the attachment relationship influence social and emotional development (Ainsworth et al., 1978; Bowlby, 1969, 1982; Main, 1981, 1996). For example, avoidant attachment styles have been associated with affect regulation strategies that limit affective experience, such as minimization (Main, 1981), and deactivation of the attachment system (Cassidy, 1994). Bowlby (1982) explained that defensive exclusion (i.e., the distorting of new information to prevent the awareness of overwhelming perceptions) may be learned as an adaptive strategy in infancy to manage distress related to the unavailability of the attachment figure. Infants with avoidant attachment tended to ignore their caregivers upon reunion, averting their eyes and focusing elsewhere (Ainsworth & Bell, 1070; Ainsworth, Blehar, Waters, & Wall, 1978). The consistent use of avoidant defensive strategies (i.e., defensive exclusion, minimization) limits the information the infant receives. These strategies may affect the acquisition of facial and paralanguage decoding abilities as they interfere with dyadic learning.

Few studies have examined the relationship between attachment and nonverbal processing abilities, such as decoding facial expressions and paralanguage cues (Cooley, 2005; Magai, Hunziker, Mesias, and Culver, 2000; Steele, Steele, & Croft, 2008). However, a study found significant associations between early infant-mother attachment in children's facial decoding accuracy 5 and 10 years later (Steele et al., 2008). Children with early insecure attachments (i.e., insecure-avoidant or insecure-resistant) were less accurate in decoding facial expressions than children with early secure attachments. Steele and his colleagues (2008) theorized that attachment experiences in the first year of life provide the basis for a mental template of the mother's facial expressions with associated messages about what these expressions mean for the child and the child's relationships with others. "This learning is preverbal from the first year of life, yet powerful enough to show itself 6 years and 11 years later in emotion recognition tasks" (Steele et al., p. 388). A possible relationship between attachment and nonverbal abilities has interested other researchers. For example, Magai, Hunziker, Mesias, and Culver (2000) proposed that early attachment relationships have an impact on childhood socialization, which in turn may have an effect on emotional intellect. Cooley (2005) examined the relationship between adult participants' attachment style and nonverbal processing abilities and found that, compared to individuals with secure or preoccupied attachments and positive views of others, individuals with dismissing or fearful attachments and negative views of others demonstrated deficits in decoding paralanguage cues.

In addition to the different classifications of attachment styles in research paradigms, Reactive Attachment Disorder of infancy and early childhood (RAD) is a diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision.* (DSM-IV-TR; APA, 2000). It would make sense that these children, having experienced both maltreatment and disturbances in attachment formation, would be at risk for deficits

in nonverbal processing and subsequent relationship difficulties.

REACTIVE ATTACHMENT DISORDER (RAD)

Children who have been diagnosed with RAD, raised in homes or institutions with inadequate or inconsistent care, exhibit attachment disturbances and difficulty with social interactions (DSM-IV-TR; APA, 2000). These children have significant disturbances in their relationships, and may manipulate others and act overly friendly toward strangers (Sheperis, Renfro-Michel, & Doggett, 2003). Individuals with RAD were found to more frequently exhibit aggression and delinquency, show less empathy, and have more deficits in emotional regulation than typical individuals (Hall & Geher, 2003). Additionally, individuals with RAD were more likely to have grandiose views of themselves causing these researchers to speculate that these individuals attempt to make more favorable impressions of themselves than what is supported by reality.

Children with RAD experienced early pathological caregiving that interfered with attachment processes. According to attachment theory, individual differences in the way people organize thoughts, emotions, and behaviors in relationships are tied to early interactions with caregivers (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). The cognitive processes underlying these differences may influence how information relevant to attachment concerns is perceived (Fraley, Garner, & Shaver, 2000). Levy and Orlans (1998) referred to a negative working model or a set of cognitive distortions that may have developed from years of abuse and neglect. This internal working model is likely to serve as a mediating mental mechanism through which children interpret emotional and social cues. Thus, this lack of secure attachment relationships may have deprived children with RAD of the context necessary to adequately develop accurate nonverbal emotional processing skills.

PURPOSE

The purpose of the current study was to explore the nonverbal emotional processing abilities of children with RAD. Specifically, the study was designed to assess the nonverbal ability to decode emotions from facial expressions and paralanguage, and to determine whether children with RAD exhibited deficits in nonverbal emotional processing as compared to other children. Based on the characteristics and history of children with RAD, it was hypothesized that children in the RAD group would demonstrate significantly more difficulty in their ability to decode emotions as measured by the Facial Expressions and Paralanguage subtest of the DANVA than children in either the foster care (FC) group, or the typical control (TC) group. The FC group consisted of children without RAD who had foster care and/or adoptive histories and the TC group consisted of typical children without foster care and/or adoptive histories.

METHOD

PARTICIPANTS

Sixty-three participants between the ages of 5 and 19 participated in the current study. Participants were assigned to one of three groups: 1) a RAD group, consisting of 17 participants with RAD and with histories of adoptive or foster care, 2) a FC group, consisting of 15 participants without RAD and with histories of foster care and/or adoption, and 3) a TC group, consisting of 31 participants with neither RAD nor histories of foster care or adoption. Participants in the RAD group were recruited from licensed providers (i.e., medical and social work) specializing in attachment disorders. These participants had been previously diagnosed with RAD and were receiving outpatient mental health treatment at the time data was collected. Participants in the FC group were recruited through local departments of social services (DSS), clinicians in private practice, and the psychology department of a local university, and did not have RAD diagnoses. Participants in the TC group were recruited through an after-school organization and the psychology department of a local university, and per parent reports, had no history of RAD diagnosis, foster care, or adoption. Although 71 participants were originally recruited, 8 participants were excluded from the study due to incomplete data sets.

INSTRUMENTS

Diagnostic Analysis of Nonverbal Accuracy (DANVA2). Participants' receptive ability to decode emotions in facial expressions and in voice tones was assessed using the following DANVA2 subtests: Child Facial Expressions (DANVA2-CF), Adult Facial Expressions (DANVA2-AF), Child Paralanguage (DANVA-CP, Nowicki & Duke, 1994), and Adult Paralanguage (DANVA-AP; Baum & Nowicki, 1998). Construct validity for the DANVA was reported in a study of 1,001 children (Nowicki & Duke, 1994). The DANVA 2, including revisions such as improved stimuli and an additional component of affect intensity (i.e., low and high), was tested with 1,141 individuals ages 4 to 55 years, and found to have acceptable internal consistency and reliability (Nowicki, 2010). Cronbach's Alpha was .88 (N = 1,002) and test-retest reliability (N = 123) was .84 over four weeks. Each of the DANVA subtests were constructed independently (see Nowicki, 1996, 2010 for additional reliability and validity information regarding specific subtests).

Each of the facial expressions subtests (i.e., DANVA2-CF and DANVA2-AF) consists of 24 photographs of facial expressions of emotion with an equal number of high intensity and low intensity expressions of four basic emotions: happy, sad, angry and fearful. There are a total of 48 photographs of facial expressions (i.e., 24 child and 24 adult), consisting of an equal number of happy, sad, angry, and fearful trials.

Each of the paralanguage subtests (i.e., DANVA-CP and DANVA-AP) consists of 16 recorded trials in which participants hear the sentence, "I am going out of the room now, but I'll be back later" with an equal number of high intensity and low intensity expressions of four basic emotions: happy, sad, angry and fearful. There are a total of 32 recorded trials (i.e., 16 child and 16 adult), consisting of an equal number of happy, sad, angry, and fearful trials.

PROCEDURES

Following approval by the East Carolina University Institutional Review Board, researchers met with staff members from the sites noted above to describe the study and collaborate on the most effective ways to implement the data collection proce-

dures. Data collection was conducted at the sites at times that were convenient for the participants. Parents and/or guardians of the children completed the informed consent documents as well as demographic and history forms and children provided assent for participation in the study. A guardian appointed by the DSS gave additional consent for the children in foster care. Participation was voluntary and the decision to participate or not participate did not influence any program and/or services being received by the caregivers or children. Trained research assistants (i.e., graduate and undergraduate students) individually administered the DANVA 2 facial expressions subtests (i.e., adult and child) and paralanguage subtests (i.e., adult and child) using a counterbalanced design.

For the RAD group, research assistants administered the DANVA 2 at the outpatient clinic sites at times conveniently scheduled for the family. For the FC group, research assistants administered the DANVA 2 at the DSS offices or at outpatient clinic sites, and for the TC group, they administered the DANVA 2 at the after school program or the local university. Upon completion of the forms and measures, parents of the participants in the RAD and FC groups were invited to attend an educational seminar provided by the principal investigator, and meals and/or refreshments were offered to participants and their parents, and small prizes (pencils, pens, stickers, etc.) were offered to participants.

RESULTS

DESCRIPTIVE STATISTICS

The sample of 63 participants consisted of 33 (52%) child/adolescent boys and 30 (48%) child/adolescent girls, ranging in age from 5 to 19 years (M = 9.0, SD = 3.4). The distribution of ethnicity was 28 (44%) Caucasian and 35 (56%) non-Caucasian (i.e., 25 African American, 5 Hispanic, 3 Bi-racial, and 2 Native American). Participants in the RAD group (n = 17) consisted of 8 child/adolescent boys and 9 child/adolescent girls ranging in age from 5 to 19 years, and most were of Caucasian ethnicity (i.e., 12 Caucasian, 5 non-Caucasian). Participants in the FC group (n = 15) consisted of 6 child/adolescent boys and 9 child/adolescent girls ranging in age from 5 to 19 years, and most were of Caucasian ethnicity (i.e., 9 Caucasian, 6 non-Caucasian). Participants in the TC group (n = 31) consisted of 19 child/adolescent boys and 12 child/adolescent girls ranging in age from 6 to 15 years, and most were of non – Caucasian ethnicity (i.e., 7 Caucasian, 24 non-Caucasian).

GROUP COMPARISONS

Two multivariate analyses of variances (MANOVAs) were conducted. The MANOVAs used the p = .05 level of significance, and effect sizes were used to evaluate the degree of association between an effect and the dependent variable in order to help determine the strength of the relationship. Eta squared was used as the measure of effect size, η^2**.** Effect sizes are considered small (.2), moderate (.5) or large (.8).

Group (RAD, FC, and TC) served as the independent variable for the first MANOVA with scores from the Adult and Child Facial Expressions subtests of the DANVA2 serving as the dependent variables. Statistically significant differences were not found among the three groups in terms of their ability to correctly decode emotions for either child or adult facial expressions measures, Wilks' Λ=.98, $F(4,118)$=0.35, p =.85, η^2 =.01.

Group also served as the independent variable (RAD, FC, TC) for the second MANOVA with the scores from the Adult and Child Paralanguage subtests of the DANVA2 serving as the dependent variables. No significant differences were found among the three groups in terms of their ability to correctly decode emotions for either child or adult paralanguage measures, Wilks' Λ=.86, $F(4,118)$=2.23, p =.07, η^2 =.07. The DANVA 2 means and standard deviations for the two paralanguage subtests and groups are shown in Table 1.

DISCUSSION

The present study investigated the relationship between the decoding of facial and paralanguage expressions of emotion and RAD in children. Specifically, it was hypothesized that a group of children with RAD, compared to two groups of children without RAD, would demonstrate poorer accuracy in the ability to identify facial and paralanguage expressions of four emotions: happy, sad, angry, and fearful. Group comparisons did not support the hypotheses; analyses did not find statistically significant differences in accuracy between the RAD group and either of the other groups (i.e., FC or TC). As far as the present authors are aware, this is the first study to investigate the facial and paralanguage decoding abilities of children with RAD by comparing group differences. However, these results appear inconsistent with findings from studies linking nonverbal processing deficits and disturbed social relatedness (e.g., childhood maltreatment, psychopathology, attachment).

Problems with social relationships are central to the diagnosis of RAD (DSM-IV-TR; APA, 2000), and it is believed that the basis for this failure of children with RAD to develop typical social relationships is the severe disruptions in early attachment relationships (Schneider, Tardif, & Atkinson, 2001). Strong support has been found for links between accurate emotional processing and appropriate social relatedness (Camras et al, 1990; Cicchetti, Rogosch, Maughan, Toth, & Bruce, 2003). If it is true that children with RAD are no less able than other children to decode emotions at this most basic level, then why do they may still have difficulties with social interactions? Perhaps disturbed social relatedness in children with RAD is unrelated to facial and/or paralanguage decoding impairments, but is instead related to disruption in how this emotional information is processed and subsequently used in responding to others. Information relevant to attachment concerns, after it is decoded, may be interpreted differently by children who have attachment problems (Fraley, Garner, & Shaver, 2000). Levy and Orlans (1998) hypothesized that cognitive distortions affect how children with RAD interpret emotional and social cues. As aforementioned, Dodge, Pettit, Bates, and Valente (1995) found physically abused children more frequently made particular errors in processing social information than nonabused children. However, these researchers presented videotaped vignettes of peer social interactions to the participants, which may have provided a more realistic context for recognition and labeling of emotions. In contrast, the static photos and brief voice recordings may not have elicited strong

Table 1. DANVA 2 Mean Scores and Standard Deviations by Group

	Facial Expression Subtests				Paralanguage Subtests			
	Adult		Child		Adult		Child	
Group	Mean	SD	Mean	SD	Mean	SD	Mean	SD
RAD (*N*=17)	17.00	3.71	19.24	3.23	8.94	2.11	10.82	2.98
Foster Control (*N*=15)	17.40	5.42	18.07	4.14	11.33	2.94	11.07	4.71
Typical Control (*N*=31)	17.39	3.20	18.81	3.27	9.90	3.06	10.52	3.99
Total	17.29	3.40	19.43	3.45	9.98	2.89	10.73	3.88

emotional reactions which could result in cognitive distortions and ensuing inaccurate interpretations of accurately decoded information. These children may be sensitized to cues that are related to negative emotions and, although they may accurately label the emotion, may inaccurately interpret the intentions and anticipated follow-up behaviors of the person expressing those negative emotions. Hall and Geher's (2003) speculation about children with RAD self-monitoring and presenting themselves in a socially desirable manner may help explain how children with RAD process emotional information. For survival reasons, they may distort decoded information to fit their own schema thereby preventing accurate interpretation and blocking the experience of psychological pain or distress. The authors of this article speculate that the true picture of decoding and subsequent processing of nonverbal emotional information by children with RAD is extremely complex and warrants further investigation.

LIMITATIONS

Methodological considerations that may have affected the results of this study include the type of instrumentation (i.e., stimulus) used, participant motivation effects and sample characteristics. For the current study, the stimuli were still photographs and audio recordings of strangers expressing one of four emotions. Although the instrument (i.e., DANVA2) has a strong research history as a standardized measure, the results reflect laboratory conditions, rather than situations encountered in realistic social interactions. Thus, participants had the opportunity to focus on the task, rather than being in a social situation with more information to process. Additionally, the stimuli were administered by strangers who, although trained to remain neutral, may have inadvertently served as reinforcers. This additional motivation to pay attention created by the demand of the experimental setting may differentially affect the research findings (Elfenbein, Marsh, & Ambady, 2002). In this demand situation, children with attachment difficulties may have had no difficulty identifying those emotions correctly. However, real-live situations of emotional expression with contextual cues that are threatening and may produce feelings associated with previous aversive experiences may produce very different results.

Another methodological issue concerns sample characteristics. The current sample was small, posing possible limitations on the capacity to discern statistically significant findings. In addition, all of the children in the RAD group were currently in treatment with a mental health professional, and some for a lengthy period of time (*M*=27.33 months, *SD*=12.29). In many cases, the treatment for these children specifically targeted emotion processing and social relatedness difficulties. Therefore, many of the children with a RAD diagnosis may have previously shown deficits in nonverbal information processing but, due to their time in therapy, may no longer have deficits severe enough to differentiate them from the control samples.

Control group sampling may have also contributed to the lack of statistically significant differences between the RAD group and the TC group. The children who served as the TC group may not truly represent a typical population in that they came from an after-school program that serves a low socio-economic population. Low socio-economic status has been associated with a delay in the ability to accurately label emotions and gain knowledge about situations (Fine, Izard, Mostow, Trentacosta, & Ackerman, 2003; Izard et al., 2001; Schultz, Izard, & Ackerman, 2000).

IMPLICATIONS FOR FUTURE RESEARCH

Research has suggested that the two RAD subtypes may not be mutually exclusive (Minnis, et al., 2007; Smyke, Dumitrescu, & Zeanah, 2002; Zeanah, Smyke, & Dumitrescu, 2002; Zeanah et al., 2004). Thus, future studies could investigate RAD in terms of subtype designation (i.e., inhibited, disinhibited) or by emotional and/or behavioral patterns. Researchers could provide behavioral descriptions of social relatedness disturbances/strengths exhibited by participants in each subgroup and analyze data from each subgroup separately (see Minnis et al., 2007). Children with RAD do not appear to be a homogeneous population, and the comparison of children's nonverbal processing abilities by subtypes or patterns may allow for examination of the specific kinds of processing patterns exhibited by individual children. As Pollak (2003) suggested, it may be specific emotional experiences rather than global environment factors that differentiate how children function emotionally.

Future research studies investigating nonverbal processing in children with RAD could benefit from increasing the sample sizes of groups, and from including examination of emotion-specific error rates to explore whether individual participants demonstrate particular deficits or biases. This would enable researchers to examine whether children with RAD have deficits or biases in the perception of particular emotions. For example, Denham and Couchoud (1990) and Stevens, Charman, and Blair (2001) found that children with behavioral and emotional disorders tended to make specific errors in decoding particular emotions. This type of information could have important clinical implications for the treatment of any possible social relatedness disturbances exhibited by children with RAD.

In sum, although the current researchers did not find statisti-

cally significant differences between processing abilities in RAD and non-RAD groups, the study's methodological difficulties, prior research findings with similar population groups, and known characteristics of children with RAD, make further investigation of the nonverbal processing abilities of this group of children warranted.

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