

## Brief Report: Differential Treatment Outcomes for Children with Autistic Spectrum Disorder Based on Level of Peer Social Avoidance

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Advances in early identification and intervention services for children with autism have significantly contributed to better long-term outcomes for this population (Campbell, Schopler, Cueva, & Hallin, 1996; Howlin, 1997). However, the fact remains that response to even the most effective treatment is characterized by a great variability (e.g., Lovass, 1987; Rogers, 1998; Schreibman, 1997; Smith, 1999). Thus, while some children may improve substantially, even achieving normal or near normal functioning, the majority improve to a lesser degree or not at all. This variability in treatment outcome suggests that there are variables affecting outcome that have not yet been identified. Given the heterogeneity in the autism population in terms of symptom presentation, it is likely that important child variables are operating.

Research identifying a goodness-of-fit between child characteristics and specific treatment models can help practitioners ascertain the most appropriate treatment program for an individual child. Despite the fact that the field has called for this type of research (Smith, 1999), to date only a few studies have used this approach (Layton, 1988; Pierce, Sherer, Schreibman, & Bitton, 1999). One study using this strategy has developed profiles of “responders” and “nonresponders” to a naturalistic teaching intervention called Pivotal Response Training (PRT) (Sherer & Schreibman, 1999). These profiles, based on the presentation of a variety of behaviors, may be used to predict responsiveness to

PRT for an individual child. Such an approach may be effective for a variety of treatment models.

The present study sought to identify a behavioral characteristic that may affect the outcome of a particular treatment model—an inclusive classroom setting. Advocates of this model see the presence of peers as important for several reasons. First, typical children can serve as intervention agents by modeling age-appropriate behavior (Cooke, Appolloni, & Clark, 1977). Second, the presence of peers offers opportunities for children with autism to practice appropriate social, play, and language skills (McGee, Daly, & Jacobs, 1994). Third, typical peers can be effectively used as active treatment agents (e.g., Pierce & Schreibman, 1997; Strain & Cordisco, 1994). Indeed, there is an extensive literature on the positive effects of inclusion on children with autism (e.g., McGee, Paradis, & Feldman, 1993; Odom, Hoyson, Jamieson, & Strain, 1985; Peck, Odom, & Bricker, 1993). Yet, like all interventions, there have been reports of significant variation in individual child outcome for the inclusive classroom model (McGee *et al.*, 1994; Strain & Cordisco, 1994). What might be a variable responsible for this variation?

One possibility is social functioning. Compared to typical children and children with developmental disabilities, children with autism exhibit severe and persistent deficits in social behavior. These deficits include joint attention (e.g., Sigman & Ruskin, 1999), emotional responsivity (Dissanayake, Sigman, & Kasari, 1996; Kasari & Bauminger, 1998; Sigman & Ruskin, 1999), peer interactions (Sigman & Ruskin, 1999), and development of friendships (Bauminger & Kasari, 2000). Despite the pervasiveness of social deficits in autism, individual differences in social functioning exist with better social abilities associated with better outcomes (Sigman & Ruskin, 1999). In an extensive longitudinal study of social competence in three disordered popula-

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tions, Sigman and Ruskin (1999) found a positive correlation between a variety of nonverbal social-communication behaviors and gains in expressive language 1 year later in preschool-aged autistic, developmentally delayed, and Down Syndrome subjects. In addition, children with autism who responded to bids for social interaction from an adult as a preschooler were more likely to be engaged with peers later in childhood. In a treatment study, Koegel, Koegel, Shoshan, and McNerney (1999) found that children who made more initiations, had better outcomes in a one-to-one, naturalistic language intervention. Finally, it has been demonstrated that typical children who exhibit extreme shyness or social withdrawal fair less well on tests of expressive language than their outgoing peers (Evans, 1993).

It appears that there is a relationship between early social functioning and language development in both autistic and nonautistic populations. A social behavior that may be critical to treatment response in an inclusive setting is peer social avoidance. Given the variation in social functioning and specifically social avoidance reported in children with autism (e.g., Buitelaar, 1995; Richer, 1976) it might be expected that this variable would offer an explanation of differential child outcome for programs that emphasize social interaction or use peers as intervention agents. It may be hypothesized that children who are peer avoidant spend less time in proximity, observing, imitating, and engaging in social interaction with peers, thus receiving less intervention. Therefore, children who are highly avoidant of peers may have less significant treatment outcomes in an inclusive model than children who are less avoidant.

The purpose of the present study was to determine the moderating effects of peer social avoidance on child response to an inclusive classroom treatment model. If variation in treatment response is related to level of avoidance, then this child characteristic should influence and predict treatment outcome. It was predicted that, regardless of initial level of functioning, children with low peer social avoidance would be better served by an inclusive model than children with high peer social avoidance. Treatment outcome was determined by child's language use as this is a critical focus in existing treatment programs for this population in the preschool years.

## METHOD

### Participants

Participants included six children with Autistic Spectrum Disorder (ASD) and three typically developing children ages 26 to 41 months who participated

in the Children's Toddler School at Children's Hospital of San Diego. Children were diagnosed with ASD using DSM-IV (APA, 1994) criteria by one independent professional with expertise in autism and the third author. At exit from the program, four of the six subjects with ASD met DSM-IV criteria for autism; the other two met criteria for PDD-NOS. Children were admitted to the program in the order they were referred and as space became available; thus not all subjects participated in the program at the same time.

ASD participants' behavior was analyzed for presentation of high or low social avoidance at program entry. The experimenter viewed videotapes of 15 at-risk children in the first 3 weeks of treatment and recorded percentage of peer social avoidance opportunities. The authors arbitrarily set an initial criterion for a child to be considered a high peer avoider (HPA) at 25% or more of avoidance opportunities because with no data available from previous research, it seemed reasonable that a 25% reduction in social opportunities would adversely affect child progress. For a child to be considered a low peer avoider (LPA), avoidance had to occur for less than 25% of opportunities. Once children were identified as high or low peer avoiders, they were matched on language and overall functioning level using the *Bayley Scales of Infant Development, 2nd Edition* (Bayley, 1993) and *MacArthur CDI* (Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, et al., 1993), and severity of autism using the *Gilliam Autism Rating Scale* (GARS) (Gilliam, 1995). To ensure the two groups exhibited a significant difference in avoidance behavior, each matched pair had to exhibit a 20% or more difference in this behavior to be included in this study. Since not all subjects participated in the program at the same time, subject identification and matching took place over the course of 1 year. Stringent matching criteria were possible due to the overall number of subjects (15) who were analyzed at program entry. In all, three pairs of children with ASD consisting of one high and one low social avoider were selected. There were no consistent differences in participation dates or session times (morning versus afternoon) across high and low peer avoiders. Three typical subjects were randomly chosen from typical peers participating in the classroom, yielding three groups of subjects: HPAs, LPAs, and typical peers (TPs) (see Table I).

### Setting

This study was conducted at Children's Toddler School, which provides an inclusive treatment program for young children with ASD and day care for typically

**Table I.** Subject Characteristics

Matched pair	Subject	CA (months)	Developmental age (Bayley) (months)	Language age		Severity of autism (GARS)
				(Bayley) (months)	(CDI) (months)	
HPA	Nate	28	15	9	14–15	87
LPA	Mike	27	16	12	15–16	96
HPA	Carl	41	24	19	22–23	94
LPA	Sara	32	26	20	19–20	76
HPA	Ben	26	14	9	8	106
LPA	Ron	28	11	8	8	107
TP	Andy	26	24	22	19–20	
TP	Vicki	27	26	26	19–20	
TP	Matt	31	27	29	24–25	

developing children. The classroom contained 12 children, consisting of two-thirds typical children and one-third children with ASD (four each in the morning and afternoon sessions). There was a high teacher to student ratio (1:3) in the classroom. The classroom offered a blend of early intervention and developmentally appropriate toddler classroom activities. Classroom treatment interventions utilized naturalistic teaching including Incidental Teaching and Pivotal Response Training.

**Measurement**

*Scoring Definitions*

Videotapes of the children obtained during program participation were scored for (a) peer social avoidance behavior (opportunities and attempts); and (b) the dependent measure, language (see Table II for scoring definitions of these behaviors).

*Observation and Recording Procedures*

Children were videotaped in 5-minute segments across activities. Videotape data were collected for each child over 3 weeks at intake and after 6 months of participation. For each time point, at least five 5-minute samples were obtained (Doll & Elliott 1994).

Videotapes were scored for the three scoring definitions. Avoidance opportunities and avoidance attempts were assessed by frequency data in 10-second intervals. The number of avoidance attempts was divided by the number of opportunities, yielding a percentage of avoidance opportunities score. Language use was assessed using occurrence/non-occurrence data in 10-second intervals.

*Observer Training and Interobserver Agreement*

Observers (undergraduate research assistants blind to participants' avoidance classification) were consid-

**Table II.** Scoring Definitions

Language:	Any reasonable attempt of a dictionary word, communicative in nature. Includes spontaneous and prompted language directed at adults or peers.
Peer social avoidance attempt:	Child turns head, shifts gaze away, moves away, or protests within 5 seconds after an avoidance opportunity has occurred. Does not include attempts to retain materials toys or refusing to share.
Avoidance opportunity:	Another child moves in proximity (within 3 ft) to the target child or the target child is moved or sees that s/he is being moved into proximity to another child (ex. teacher moves target child toward a group of children).
Percent of avoidance opportunities:	Peer social avoidance attempts divided by avoidance opportunities

ered trained when they reached an average of 80% reliability with the experimenter over three consecutive scoring trials. Interobserver reliability was obtained for 33% of the observations. Kappa coefficients were calculated for each behavior yielding .74 for avoidance opportunities, .80 for avoidance attempts, and .82 for language use.

**RESULTS**

Due to the predicted disparity in group performance, three separate comparisons were made using one-tailed *t*-tests. Paired *t*-tests were used to compare HPAs and LPAs, since subjects were matched at intake. Paired *t*-tests were also used to compare groups across time. TPs were compared with both autistic groups using nonpaired *t*-tests since TPs were not matched with autistic subjects at intake. Paired *t*-tests

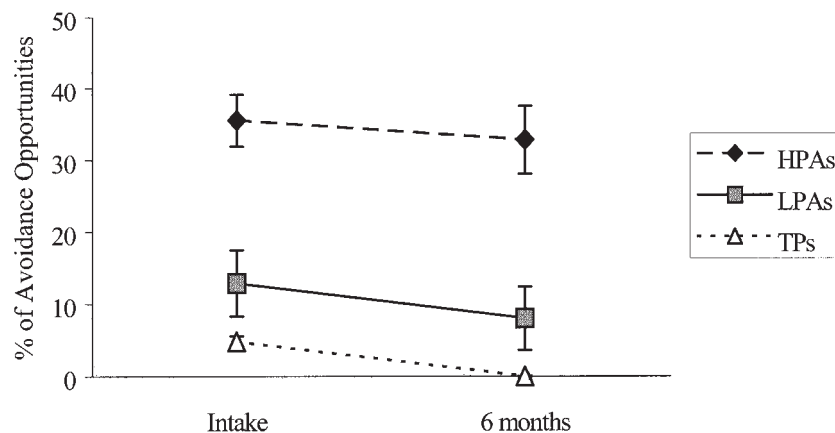


Fig. 1. Mean percentage of peer social avoidance attempts at intake and 6 months for each group. Error bars represent mean standard error.

were selected for comparing the autistic groups and all groups across time because of the small number of subjects and thus the extreme variability within groups (which was controlled by matching autistic subjects at intake). However, the authors acknowledge this statistic should be interpreted cautiously.

At intake, HPAs avoided their peers significantly more ( $M = 35.47$ ,  $SE = 3.60$ ) than both LPAs ( $M = 12.93$ ,  $SE = 4.65$ ),  $t(4) = 3.83$ ,  $p < .01$  and TPs ( $M = 4.77$ ,  $SE = 0.83$ ),  $t(4) = 8.30$ ,  $p < .001$  (see Fig. 1). This difference in behavior was expected as the two at-risk groups were selected based on level of avoidance. Interestingly, although the LPAs' mean was higher, they did not differ significantly in avoidance behavior from TPs. At 6 months, level of peer avoidance for HPAs remained significantly higher ( $M = 32.83$ ,  $SE = 4.67$ ) than LPAs ( $M = 8.03$ ,  $SE = 4.38$ ),  $t(4) = 3.86$ ,  $p < .01$ , and TPs ( $M = 0$ ,  $SE = 0$ ). Importantly, LPAs exhibited a significant decrease in avoidant behavior from intake to 6 months [ $t(2) = -3.05$ ,  $p < .05$ ] while HPAs did not. At six months, TPs did not exhibit this behavior. These results indicate that peer social avoidance remained relatively stable in the HPAs over treatment time.

Language use was considered the dependent measure of treatment response. At intake, TPs spoke significantly more ( $M = 18.20$ ,  $SE = 1.11$ ) than both at-risk groups [HPAs ( $M = 3.53$ ,  $SE = 1.90$ ),  $t(4) = -4.45$ ,  $p < .01$ ; LPAs ( $M = 2.57$ ,  $SE = 1.44$ ),  $t(4) = -5.03$ ,  $p < .01$ ] as was expected. LPAs and HPAs showed no evidence of differences in language use at intake. These data in combination with the language assessments indicate that the HPAs and LPAs were

truly matched on language use at intake. After 6 months in the program, however, LPAs had significantly more language ( $M = 14.20$ ,  $SE = 4.46$ ) than HPAs ( $M = 5.07$ ,  $SE = 2.51$ ),  $t(2) = 3.17$ ,  $p < .05$  (see Fig. 2).

The difference in language use between the two at-risk groups at 6 months suggests that LPAs had a better treatment response than HPAs. Results for individual children are represented in Table III.

## DISCUSSION

The children with ASD in this study demonstrated significant variability in outcome (see Table III). This variability could not be attributed to mental age equivalent or language level, since participants were matched for these criteria at intake. However, peer social avoidance appeared to predict outcome for subsequent peer avoidance and language use.

The high level of peer social avoidance exhibited by the HPAs at intake remained present after 6 months, while the LPAs demonstrated a considerable decrease in this behavior after intervention. This finding suggests that peer social avoidance may be a persisting behavior in some children with autism that is not substantially reduced simply by access or proximity to peers. The short duration of this study (6 months) prevents any long-term predictions of avoidance behavior in these subjects. Research that follows patterns of social avoidance in individual children over time will offer a better understanding of social development in children with autism.

All children showed some increases in language, although at the group level these increases were only sta-

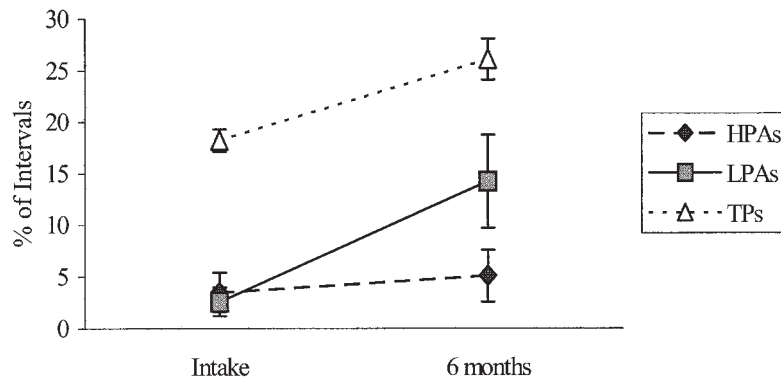


Fig. 2. Mean percentage of language use at intake and 6 months for each group. Error bars represent mean standard error.

Table III. Subjects' Behavioral Data at Intake and 6 Months

Matched Pair	Subject	Peer social avoidance <sup>a</sup>		Language use <sup>b</sup>	
		Intake	6 months	Intake	6 months
HPA	Nate	33	39	4	5
LPA	Mike	5	3	3	19
HPA	Carl	31	36	6	11
LPA	Sara	13	5	5	15
HPA	Ben	43	24	0	1
LPA	Ron	21	17	0	5
TP	Andy	6	0	17	26
TP	Vicki	3	0	20	30
TP	Matt	6	0	18	23

<sup>a</sup>In percentage of avoidance opportunities.

<sup>b</sup>In percentage of interval occurrence.

tistically significant for the LPAs and TPs. This finding is consistent with research suggesting that peer engagement may enhance cognitive and language development (Sigman & Ruskin, 1999). Thus peer social avoidance may affect language acquisition as LPAs may learn language during engagement with typical peers, which the HPAs avoid. Another possibility is that HPAs exhibited certain language difficulties (i.e., word finding) that are related or contribute to social avoidance. It has been demonstrated that expressive language-delayed toddlers exhibit significantly higher levels of social withdrawal than language-normal children (Carson, Klee, Perry, Muskina, & Donaghy, 1998).

A third possible explanation is that those children who are more avoidant may be less likely to engage in spontaneous and peer-directed verbal behavior, thus creating fewer language opportunities and getting less practice. Extreme shyness in typical children has been

linked to lower rates of verbal behavior in general and lower performance on tests of expressive language (Evans, 1993). Due to the low overall rates language observed, this project did not differentiate between spontaneous and prompted language or adult- and peer-directed language. Future research, which looks at spontaneous and prompted language separately and language targets (adults versus peers) for children with high and low peer avoidance, would offer a more comprehensive picture of the link between peer social avoidance and language. Finally, it is possible that another underlying behavior, such as joint attention, contributes to both avoidance behavior and language use.

This study indicated that HPAs showed substantially less improvement in language and social avoidance on behavioral measures than did LPAs for this treatment model. High rates of peer avoidance may be used as a screening variable for identifying children

who may need specific support and additional intervention in an inclusive classroom. Despite evidence of peer social avoidance in some children with autism (Richer, 1976), current treatments do not specifically target peer avoidance for intervention. Future research aimed at developing methods of reducing peer avoidance and documenting the relationship between this reduction and child outcomes in an inclusive model should be conducted.

Although this study looked at treatment response to an inclusive model, it is possible that social variables play an important role in child outcome for a variety of intervention methods. Early social behaviors such as joint attention and social responsiveness were predictive of future social and language abilities (Sigman & Ruskin, 1999). Previous research has suggested that poorer treatment response to Pivotal Response Training, a one-to-one, naturalistic treatment intervention, may be related to low initiations (Koegel *et al.*, 1999) and avoidance of therapist (Sherer & Schreibman, 1999). Thus, it is possible that peer social avoidance may suggest poor prognosis in any treatment model. Future research that investigates whether peer avoidance is associated with poor outcome in general should be conducted.

Since this study was conducted in a natural environment, direct manipulation of social antecedents and consequences was not possible. Future research that exerts greater control of social antecedents and consequences would likely offer additional information about avoidance behavior, its maintenance, and possible reduction.

It should be noted that the participants in this study were very young, and thus generalizations to older populations must be made with care. Finally, it is acknowledged that the small number of subjects colors any strong interpretation of the data. These results should be replicated across additional children, ages, and inclusion settings in order to determine the generality of these findings.

In conclusion, this study offers at least initial support for an interaction between a child characteristic and a specific treatment model. Further research that continues to investigate interactions between different child characteristics and treatment models will offer practitioners tools for individualizing treatment and maximizing effectiveness.

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