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The correspondence between temperament and peer interactions for normally developing and mildly delayed preschool children

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Summary The correspondence between temperament characteristics based on the Behavioural Style Questionnaire and the peer relations of normally developing and mildly developmentally delayed preschool-age children was examined in this study. Measures of the peer relations of 64 3- and 4-year-old boys were obtained through an analysis of children's social interactions in a series of specially designed playgroups. Maternal temperament ratings were found to be similar for the younger (3-year-olds) and older (4-year-olds) normally developing children as well as for the mildly delayed group (4-year-olds). Multiple regression analyses indicated that maternal-rated temperament dimensions of persistence and activity level were associated in a logical pattern with both the positive and negative aspects of children's peer relations. Issues related to the construct validity and situation-specificity of the temperament measure were discussed.

The extent to which children's temperament or behavioural style corresponds in a predictable manner with interactions occurring in different situations has important theoretical and clinical implications for this construct (Bates 1986). One cross-situational relation that is particularly significant during the preschool years concerns children's interactions with their peers. However, only two studies have examined this temperament–peer interaction correspondence directly. Both Billman & McDevitt (1980) and Hinde *et al.* (1985) did obtain some predictable patterns (e.g. parent-ratings of high withdrawal were

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associated with less peer interaction), but significant correlations occurred infrequently and were modest in magnitude. Moreover, parent-rated temperament was related primarily to negative or hostile aspects of peer relations.

One concern is that many of the peer interaction measures in these studies have tended to be highly discrete and narrowly focused, a factor that may have prevented correlations involving more extended social exchanges from becoming apparent. This may be especially the case for the temperament dimensions of adaptability or persistence since these dimensions may be linked to more elaborated group play or to some composite measure of peer interactions that includes assessments of more complex aspects of peer interactions.

Assessing the relationship between temperament and the peer relations of developmentally (cognitively) delayed children may be especially important in view of the unusual difficulties delayed children have in establishing effective relationships with their peers; difficulties which are more substantial than expected in relation to their developmental levels (Guralnick & Weinhouse 1984, Guralnick & Groom 1985, 1987). Characteristics of child temperament may well suggest a basis for these deficits. Temperament ratings of delayed children do yield a range of variation similar to that of non-delayed children (Greenberg & Field 1982, Gunn & Berry 1985, Heffernan *et al.* 1982, Marcovitch *et al.* 1986).

However, compared with the standardization sample on the Behavioural Style Questionnaire (BSQ; McDevitt & Carey 1978), although delayed children appear to be similar for most temperament characteristics, lower ratings on persistence are consistently obtained (Gunn & Berry 1985, Heffernan *et al.* 1982, Marcovitch *et al.* 1986). Although most of the items on the BSQ in the persistence category focus on cognitive tasks, this characteristic may also apply to the repeated efforts usually required of children to establish and maintain social interactions with their peers (Corsaro 1979).

Despite this possible link between persistence and peer interactions for delayed children, comparisons of temperament characteristics of delayed children with the normative sample are difficult to interpret since it is uncertain whether the proper reference group for delayed children should be those who are similar in chronological age or in developmental level. Moreover, although the BSQ was not designed for delayed children, and many problems arise in the proper assignment of ratings to children with significant disabilities

(Greenberg & Field 1982), assessment of temperament is not likely to be compromised for children with mild developmental delays. Therefore, evaluations of possible differences in temperament between delayed and non-disabled preschool children can be informed by more precise matching of comparison groups in relation to a mildly delayed sample.

Accordingly, in this study comparisons will be obtained across three groups: (1) normally developing 3-year-olds, (2) normally developing 4-year-olds, and (3) mildly developmentally delayed 4-year-olds matched in terms of developmental level to the normal younger group and in chronological age to the normal older group. Expanding upon previous work, assessments of peer interaction will consist of composite measures based on more elaborate and extended indices of child–child social exchanges. These measures will be obtained in an analogue playgroup setting consisting of children from each of the three groups. Temperament ratings will be compared across the groups and the correspondence between temperament and peer interactions will be examined.

METHOD

Overview

As part of a larger study (Guralnick & Groom 1987), previously unacquainted groups of normal and mildly developmentally delayed preschool-age boys were brought together to form a series of mainstreamed playgroups. Each playgroup met daily for a 4-week period (20 sessions). Eight such playgroups were formed, each composed of three normally developing 3-year-olds, three normally developing 4-year-olds, and two mildly developmentally delayed 4-year-olds. As noted, the delayed children were selected to achieve a chronological age match with the normally developing 4-year-olds and a developmental age match with the normally developing 3-year-olds. The Behavioural Style Questionnaire (BSQ; McDevitt & Carey 1978) was completed by mothers during the time their child participated in the playgroup. During the 4-week period, the social and play interactions of each child were videotaped from an adjacent observation room during a designated free play period. Finally, at the conclusion of each playgroup, peer sociometric ratings were completed by each of the eight children.

Subjects

Recruitment of normally developing children was accomplished through advertisements in local newspapers and newsletters and through contact with administrators and teachers of public and private nursery schools. Delayed children were recruited from the rosters of community-based service programmes. Specific chronological age (CA) and intelligence test (IQ) score ranges were established as part of the inclusion criteria for each of the three groups of children constituting the playgroups. Children were screened through individual administrations of the Stanford-Binet Intelligence Scale (Terman & Merrill 1973). For the older group of non-handicapped children, the CA range was established at 40–60 months and the IQ range from 90 to 125. For the younger non-handicapped group, established ranges were 30–42 months for CA and 90–125 for IQ. For children with mild disabilities, the CA range also was set at 48–60 months but with IQs ranging between 55 and 80.

The categorization of children as mildly delayed was generally in accord with the classification scheme of the American Association on Mental Deficiency (Grossman 1983), and conformed to community practice.* Other criteria for participation were that children had no prior experience in mainstreamed programmes, had no handicapped siblings, and exhibited no major sensory, motor or behavioural impairments. Children meeting the inclusion and exclusion criteria were assigned to playgroups on a random basis. Additional details of the recruitment procedures, other criteria for participation, and assignments to playgroups can be found in Guralnick & Groom (1987).

Table 1 presents the characteristics of the sample for each group summarized across the eight playgroups. Although each of the playgroups was not identical, the established ranges as part of the inclusion criteria and the sampling procedure minimized across playgroup variability. Within each of the three groups, mean differences across playgroups averaged less than 2 months for both CA and MA,† and IQ varied by less than an average of 6 points. Socioeconomic status did not differ across groups ($P > 0{\cdot}05$).

*One child did exceed the IQ cut-off of 80 but was included due to the existence of a syndrome (Williams) consistent with the developmental pattern of the other children in the sample.

†Corrected MAs, designed to restore a mental age–chronological age equivalence for the average child on the revised Stanford-Binet Intelligence Scale (see Shorr *et al.* 1977) yielded the following for the non-handicapped older, non-handicapped younger, and mildly delayed groups, respectively: 59·88 months (range 48–68); 38·92 months (range 32–52); and 37·31 months (range 31–47). Corrected MAs were used for all analyses.

TABLE 1. Characteristics of the sample for each group across playgroups

Measure	Group		
	Non-handicapped older (n = 24)	Non-handicapped younger (n = 24)	Mildly delayed (n = 16)
Chronological age	53·75 (3·31)	36·54 (2·72)	52·25 (3·28)
Mental age	65·50 (5·08)	44·83 (5·31)	43·25 (3·61)
Intelligence quotient*	110·83 (8·25)	106·50 (8·62)	71·56 (6·42)
Socioeconomic status†	49·15 (14·88)	47·25 (10·12)	39·98 (16·37)

Standard deviations are in parentheses.
*Based on individual administrations of the Stanford-Binet Intelligence Scale (Terman & Merrill 1973).
†Based on the Seigel Prestige Scale (Hauser & Featherman 1977).

Playgroup setting and procedure

Each playgroup operated 2 hours per day, 5 days per week for a minimum of 4 weeks (20 sessions) in either a morning or afternoon. Across the 4-week period, each child was videotaped for a total of 100 minutes during regularly-scheduled free play activities. Playgroups were supervised by a teacher and a graduate assistant in a spacious university-based laboratory school classroom designed specifically for preschool-age children. Details of the classroom environment and recording procedures can be found in Guralnick & Groom (1987).

Peer interaction measures

Videotaped recordings were analysed using two separate scales. The first focused on more global measures of social participation originally developed by Parten (1932). For this scale, coders recorded the quality of social participation for 11 mutually exclusive and exhaustive categories during each 10-second interval using a slightly modified version of the scale developed by Rubin and his colleagues (Rubin *et al.* 1976, 1978). Each videotape was reviewed a second time in order to examine specific peer-related social behaviours. For this purpose, an individual social behaviour scale was developed based on the work of White & Watts (1973) and adapted in a manner similar to Doyle *et al.*

(1980) and to Guralnick & Groom (1985, 1987). Specifically, observers recorded continuously the occurrence of individual social behaviours organized within 14 major categories. Finally, at the end of the playgroup each child was individually presented with colour photographs of each playgroup participant to obtain peer sociometric measures following the approach established by Asher *et al.* (1979). Detailed definitions and rationales for these measures, coding protocols and reliability estimates can be found in Guralnick & Groom (1987).

To reduce the large number of outcome measures from the social participation, individual social behaviour, and peer sociometric rating scales, eight key measures were selected to enter into a factor analysis. Criteria for selection of the eight measures included: (1) representation from each of the scales, (2) inclusion of both positive and negative interactional characteristics, and (3) a previously established association with important aspects of peer-related social competence. Measures selected from the social participation scale consisted of the frequencies of parallel play, playing alone (a composite measure consisting of the solitary, reading and exploration categories), social play (a composite measure consisting of the group, rough and tumble and conversation categories) and unoccupied play. The total number of individual social behaviours and the percentage of those interactions that were negative (a composite of negative leads, refuses to follow or ignores, hostility and competes for equipment) were selected from the individual social behaviour scale. Data were summed across the 100 minutes of observation for each child to obtain these measures. The final two measures were taken from the peer sociometric ratings and consisted of the frequency of negative nominations and the overall sociometric score.

Based on the sample of all 64 subjects, a principal components factor analysis using the varimax rotation method was carried out (SAS Institute Inc. 1985). The rotated solution yielded two orthogonal factors with eigen values greater than 1·0. These two factors accounted for 79·9% of the variance. Factor 1 consisted of loadings on a 'social interaction' dimension. Positive loadings were obtained for social play, total individual social behaviours, and parallel play, whereas negative loadings for that factor were obtained for unoccupied behaviour and playing alone. The second factor, a 'negative relationship' dimension, loaded highest on the number of negative sociometric nominations and the percentage of negative interactions. Positive sociometric ratings

loaded negatively on this factor. Factor scores were obtained by multiplying the score for each child on each of the eight measures by the factor loading and summing. Accordingly, a high factor score on the first factor reflects a socially interactive child whereas a high factor score on the second factor reflects children who interact negatively and are perceived by their peers as being disliked. Scores for each factor were then entered into the regression analyses with the temperament dimensions.

Temperament ratings

The Behavioural Style Questionnaire (McDevitt & Carey 1978) was given to mothers of children entering the playgroups to complete before the end of the 4-week period. Consisting of 100 items randomized across nine content areas, raters are asked to judge how characteristic each item on the BSQ is of their child as evaluated on a 6-point scale ranging from 'almost never' to 'almost always'. Ratings are weighted and averaged to obtain scores for the following nine temperament categories: (1) activity, (2) rhythmicity, (3) approach/withdrawal, (4) adaptability (to new routines and places), (5) intensity (response to stimulation), (6) mood, (7) persistence, (8) distractibility, and (9) threshold.

RESULTS

A MANOVA carried out on the scores for the nine temperament dimensions of the BSQ across the three groups of children was not significant ($P > 0{\cdot}05$; Wilks' criterion). The only strong trend in the data indicated that the mildly delayed children adapted more slowly to new situations, $F\ (2,61) = 3{\cdot}37$, $P < 0{\cdot}05$.

To determine the correspondence between temperament ratings and peer interactions, a multiple regression (maximum R^2 improvement method; SAS Institute Inc. 1985, p. 765) for mothers' temperament ratings for the two peer interaction factors was carried out.*

*As noted earlier, a deficit in the peer interactions of the mildly delayed children was previously observed in this sample based on the complete set of social participation and individual social behaviour measures (Guralnick & Groom 1987). This held true for the factor scores as well. Mean scores for the social interaction factor were: non-handicapped 4-year-olds, 251·81; non-handicapped 3-year-olds, 169·52; and mildly delayed 4-year-olds, 36·33. For the negative interaction factor mean scores were as follows: non-handicapped 4-year-olds, −15·71; non-handicapped 3-year-olds, −15·73; and mildly delayed 4-year-olds, 3·14.

Chronological age, MA and IQ were entered first and accounted for 24% of the variance for the social interaction factor, $F(3,60) = 6{\cdot}40$, $P < 0{\cdot}001$. For the negative relationship factor, CA, MA and IQ accounted for 23% of the variance, $F(3,60) = 5{\cdot}83$, $P < 0{\cdot}01$. After partialling out the variance due to those three variables, only maternal ratings of persistence and activity contributed unique variance that was statistically significant. This held for both factors (social interaction factor: persistence, $F[1,59] = 12{\cdot}32$, $P < 0{\cdot}001$, activity, $F[1,58] = 10{\cdot}86$, $P < 0{\cdot}01$; negative relationship factor: persistence, $F[1,59] = 12{\cdot}23$, $P < 0{\cdot}001$, activity, $F[1,58] = 4{\cdot}87$, $P < 0{\cdot}05$).

Children rated by their mothers as more persistent and as having a higher activity level were found to be more socially interactive with their peers. Correspondingly, children who were less persistent and less active were more negative in their peer relationships. These relations could not be attributed simply to the inclusion of the mildly delayed group since when the delayed group was removed before carrying out the regression analyses, virtually identical results were obtained.

DISCUSSION

As rated by mothers using the Behavioural Style Questionnaire, the temperament characteristics of 3- and 4-year-old non-handicapped children were found to be similar to each other and to a group of 4-year-old mildly developmentally delayed children on all dimensions. It is important to note that these similarities in temperament patterns for the delayed children existed when matched both in terms of chronological age and developmental level to groups of non-handicapped children. This finding contrasts with those previous studies in which delayed children were rated as less persistent (Gunn & Berry 1985, Heffernan *et al.* 1982, Marcovitch *et al.* 1986). However, this difference in ratings may be related to the fact that subject samples in those previous studies were generally more delayed and younger than those participating in the present investigation. The use of different temperament measures may have been a factor as well.

Subsequent research evaluating maternal temperament ratings of delayed children should consider these variables as well as that of aetiology (Marcovitch *et al.* 1986).

Alternatively, the absence of differences in persistence, and perhaps

other temperament dimensions as well, may be a reflection of long-standing adjustments by parents. It is possible, for example, that parents of 4-year-old mildly developmentally delayed children have learned to delimit and guide the interactions of their children to minimize difficulties in persisting on selected tasks. Ratings by independent observers (e.g. teachers) focusing on children in situations likely to engage them in more demanding tasks (e.g. unstructured play) should provide insight into this possibility (see Keogh & Burstein 1988).

The analysis of the correspondence between temperament ratings and peer interaction in the playgroups revealed that children rated as more persistent and more active by their mothers were those who engaged in more extensive social interactions with their peers in the playgroups. In contrast, children considered less persistent and less active interacted more negatively with other children and were not well regarded by their peers. These patterns were obtained after partialling out CA, MA and IQ and were maintained when only the two non-handicapped groups were considered. Clearly, a tendency to persist in tasks (presumably social as well as cognitive ones) is a characteristic that is likely to lead to more effective peer relations where repeated efforts to gain entry or to reinstate an interaction are commonly required (see Corsaro 1979). A higher activity level is also associated with positive peer relations, but can result in more negative exchanges as well (Billman & McDevitt 1980).

It is certainly the case that many possible associations between temperament and peer interactions could have been expected to occur. However, the pattern of correlations obtained in this study with composite peer interaction measures, and the fact that positive as well as predominantly negative aspects of peer interactions were linked with temperament characteristics, suggest the potential value of the temperament construct. These correlations between temperament and peer interactions may simply reflect the direct expression of a child's fundamental behavioural style in different situations, i.e. home and playgroup.

An alternative pathway mediating this association may reside in the nature of parent–child interactions established at home; interactions that may have been influenced by a child's temperament. Such interaction patterns (e.g. lack of persistence or low activity level leading to problematic parent–child social interactions) may then generalize from home to playgroup settings (see Hinde *et al.* 1985). In

any event, these findings argue for the cross-situational validity of the temperament construct and suggest further that it may be valuable to consider children's tendencies toward persisting at tasks as well as their activity level when therapeutic intervention programmes are being planned (Guralnick 1986).

Finally, a number of issues must be considered in interpreting these results. Although the selection of subjects was designed to yield a representative sample with well-defined characteristics the fact is that, for reasons related to questions addressed in the larger study (Guralnick & Groom 1987), only boys were included. Moreover, it is important to recognize that only the concurrent validity of the temperament construct was evaluated in this investigation. Equally interesting and potentially more instructive are those associations that might emerge between preschool temperament and later behaviour or development. Although existing studies have found such correlations for later academic achievement (Carey *et al.* 1977, Palasin 1986), the link between preschool temperament and subsequent social development, particularly peer relationships, remains to be explored.

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