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Maternal supportive and interfering control as predictors of adaptive and social development in children with and without developmental delays

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Abstract

Background—Parents of children with developmental delays (DD) have been found to use more controlling behaviour with their children than parents of children with typical development (TD). While controlling behaviour is related to poorer developmental outcomes in TD children, there is little research on how it predicts outcomes in DD children. Furthermore, existing research tends to use inconsistent or non-specific definitions of controlling behaviour, often combining parent control which follows the child's goal (e.g. supportive direction) and that which interferes with the child's goal (e.g. interference).

Methods—Participants were 200 mother–child dyads observed at child age 3, with follow-up assessments of adaptive behaviour and social skills administered at child ages 5 and 6, respectively. We coded the frequency of both types of controlling behaviour based on mothers' interactions with their children with TD ($n = 113$) or DD ($n = 87$) at age 3.

Results—Mothers in the DD group used more interfering but not more supportive directive acts compared to mothers in the TD group. Adaptive behaviour was assessed at child age 5 and social skills were assessed at age 6. Higher frequency of supportive directive acts predicted better adaptive functioning for the TD group and better social skills for the DD group. Higher frequency of interfering acts predicted lower adaptive and social skills for children with DD but not with TD.

Conclusions—Results are discussed in terms of the differential developmental needs of children with and without DD as well as implications for early intervention.

Keywords

control; developmental disabilities; interference; parenting

Introduction

Parents of children with developmental delays (DD) tend to demonstrate more controlling parenting behaviours than parents of children with typical cognitive development (TD) (Herman & Shantz 1983; Marfo 1992; Laing *et al.* 2010; Nader-Gorsbois & Lefèvre 2012). While parental control has been reported to have negative effects on the development of social skills and adaptive behaviour of TD children (Ispa *et al.* 2004; McDowell & Parke

2005; Nader-Gorsbois & Lefèvre 2012), findings with DD children are mixed, with some studies finding a negative impact (e.g. Herman & Shantz 1983; Nader-Gorsbois & Lefèvre 2012) and others finding a positive impact (e.g. Cielinski *et al.* 1995). Inconsistent findings may be because of a failure to differentiate between supportive control related to the child's current focus or goal, and intrusive or interfering control unrelated to the child's goal (Flynn & Masur 2007).

Additionally, studies of controlling parenting tend to use differing coding methodologies. Many studies report global ratings of certain constructs of parental behaviour (e.g. sensitivity, responsiveness) on the basis of the appropriateness of such behaviour with regard to the child's needs (e.g. Leerkes *et al.* 2009; Baker *et al.* 2010; Warren *et al.* 2010). While these findings support the notion of parenting that considers a child's developmental needs predicting better child outcomes, they provide little information as to which specific parenting behaviours are developmentally appropriate.

This distinction between globally rated 'appropriate' parenting and specific parenting behaviours may be particularly important when evaluating the parenting of children with or without DD. The same parenting behaviour that might be considered developmentally appropriate for a child with DD, such as providing step-by-step instructions on a task, might be seen as less appropriate, or even intrusive, for a child with TD, who is unlikely to need the same level of support. For example, findings with TD children that parental control has a positive influence on child social skills at age 3 but a negative influence at age 4 ½ (Landry *et al.* 2000) suggest that children with DD, who function at a younger developmental level than TD children, are likely to benefit from higher levels of parental control. Measuring frequency of specific parenting behaviours independent of a child's developmental level provides an objective method of examining how these behaviours relate to developmental outcomes for children with and without DD.

In the present study we examined DD and TD group differences in the frequency of specific parenting control behaviours, distinguishing between supportive directive and interfering maternal behaviour. Furthermore, we examined whether the frequency of these two types of control differentially predicted future adaptive and social skills in the two groups.

Supportive directiveness and interference

Many studies of children with TD found that high levels of parent controlling behaviour related to negative child outcomes, ranging from increased aggression (Joussemet *et al.* 2008) to deficits in appropriate social-emotional responses (McDowell & Parke 2005) and decreased intrinsic motivation (Deci *et al.* 1993). Until recently, some researchers have concluded that since children with DD are exposed to more directive parenting, and high levels of directiveness relate negatively to the development of competence in TD children, parent directives must, at least in part, account for poorer developmental outcomes in children with DD (Marfo 1990). However, studies regarding outcomes of controlling parenting for children with, or at risk for, DD have reported inconsistent findings (Herman & Shantz 1983; Cielinski *et al.* 1995; Landry *et al.* 2000; Gilmore *et al.* 2009).

The mixed findings for children with DD may be accounted for in part by lack of specificity in the definition of parent controlling behaviours. For example, Herman & Shantz (1983) defined directiveness broadly as ‘the summed frequency of maternal directing, interfering, and restricting’, while Cielinski *et al.* (1995) defined control as ‘the parent attempts to lead the (child’s) behaviour’. Flynn & Masur (2007) took an alternative approach in a study with TD children by differentiating, as we do, between directives that follow the child’s focus of attention or ongoing activity (i.e. responsive utterances and supportive behavioural directives) and those that lead the child’s attention away from his or her current focus (i.e. intrusive attentional and behavioural directives). However, this study did not relate these parenting behaviours to child outcomes.

Comparing the relative influence of parenting behaviour on the basis of the child’s goal and focus of attention may be particularly important when studying outcomes of children with DD, as these children tend to be less active and responsive (Marfo 1990) and avert their gaze and their bodies more during interaction contexts than typically developing children do (Crnic *et al.* 1983). Thus, it is unclear whether redirecting the behaviour or attention of children with DD would positively or negatively influence their development. On the one hand, redirecting an otherwise unfocused child to the task at hand might increase productive play and encourage task mastery. Alternatively, providing too many directives for a child with DD might decrease the child’s ability to develop independent skills and self-efficacy.

The growing literature on maternal responsivity in young children with DD suggests that providing parental direction that coincides with the child’s ongoing interest will produce better developmental outcomes. Maternal responsivity is characterised by warmth, nurturance, and stability, as well as contingent responses to child behaviour (Warren *et al.* 2010) and has shown to predict language gains in children with various developmental delays (Yoder & Warren 2001; Siller & Sigman 2002; Warren *et al.* 2010). Siller & Sigman (2002) coded maternal responsive behaviours and verbalisations that were synchronous with the behaviour of young children with autism, distinguishing between maternal verbalisations that coincided with the child’s ongoing activity (‘undemanding’ verbalisations) and those that demanded a change in child activity (‘demanding’ verbalisations), and found that undemanding, synchronous maternal verbalisations were related to gains in child language and response to joint attention. Taken together, these studies suggest that maternal responsivity predicts language development for children with autism and other developmental delays.

In this study we aimed to build upon these previous studies of maternal responsivity by comparing the influence of different kinds of maternal controlling behaviours on a wider range of developmental outcomes. Furthermore, we compared the differential effects of maternal controlling behaviours on TD and DD children, to inform interventions targeted at children’s developmental level. Consistent with previous studies that have successfully distinguished between two kinds of maternal controlling behaviour (Siller & Sigman 2002; Flynn & Masur 2007), we differentiated between maternal controlling behaviours that coincide with ongoing child activities (defined here as ‘supportive directiveness’) and those that aim to shift the child’s activity or focus of attention (defined here as ‘interference’).

Adaptive behaviour

Understanding the development of independent skills is particularly important for children with DD, who show major deficits in adaptive behaviour (Sparrow *et al.* 1984). Adaptive behaviour is defined as ‘the performance of daily activities required for personal and social sufficiency’ (Sparrow *et al.* 2005). Specifically, parenting has been shown to be related to the adaptive behaviour domains of socialisation (Guralnick 1999) and daily living skills (Smith *et al.* 1996) in children with DD. Analyses of intelligence and adaptive behaviour scores have shown moderate to high positive correlations between the two (Keith *et al.* 1987; Liss *et al.* 2001; McIntyre *et al.* 2006). However, unlike intelligence, which is seen as relatively stable, adaptive behaviour is modifiable (Sparrow *et al.* 2005) and therefore early parenting practices that may enhance the development of socialisation and living skills should be evaluated.

Social skills

Children with DD often lack the social skills needed to establish relationships and foster peer acceptance (e.g. Baker *et al.* 2007). Two key factors influencing this relationship are these children’s significantly higher rates of behaviour problems (Baker *et al.* 2002, 2003), and less developed emotion-regulation strategies (Gerstein *et al.* 2011). Deficits in these areas might particularly limit the development of cooperation and self-control, which utilise emotion and behaviour regulation. Especially concerning is the finding that many of these difficulties with friendships in children with DD remain consistent over time (Guralnick *et al.* 2007). Interventions that target parent–child interactions may be crucial in breaking this pattern in children with DD, as several studies have demonstrated the relationship between parent–child interactions and peer-related social competence for both TD children (e.g. Carson & Parke 1996; McDowell & Parke 2005) and those with DD (Guralnick & Neville 1997; Guralnick *et al.* 2003).

As noted above, cognitive functioning and behaviour problems influence the adaptive behaviour and social skills children with DD display. Mental development is likely to influence the manner in which parents interact with their children, as children with DD vocalise and smile less frequently when interacting with their mothers, and their cues are harder to read than those of children with TD (Crnic *et al.* 1983). Brooks-Gunn & Lewis (1984) found that differences in maternal responsiveness on the basis of chronological age and handicapped group membership were actually accounted for by mental age, providing further evidence to take mental development into consideration when studying outcomes from parenting techniques. Moreover, behaviour problems have been linked to both the quality of parent–child interaction (Webster-Stratton & Eyberg 1982; Eisenberg *et al.* 2001) and child social outcomes (Newcomb *et al.* 1993; Eisenberg *et al.* 2001). In the present study, we controlled for both developmental level and behaviour problems when predicting child outcomes from parenting behaviour.

The present study

We aimed to evaluate the assumption that the greater use of parental control with children with DD predicts negative developmental outcomes for these children. To do this, we examined the frequency of two dimensions of maternal controlling behaviour, those that

followed the child's lead (supportive directiveness) and those that redirected the child's behaviour or focus of attention (interference). Our goal was to gain a better understanding of the specific types of control used with children with or without DD, and how the frequency of these kinds of control differentially predict adaptive and social skills for each group.

We investigated the following questions:

- 1 Are there differences in the number of supportive directive and interfering behaviours displayed towards children with or without developmental delays? We hypothesised that mothers of children with DD would display more controlling behaviours, and that the greater frequency of controlling behaviours in this group would be accounted for by higher rates of interfering behaviours.
- 2 Do maternal supportive directive and interfering behaviours differentially predict social and adaptive skills for children with and without developmental delays?
- 2a We expected that supportive directiveness used with children at age 3 would have a positive relationship with adaptive and social skills at age 5 and 6, but more strongly in the DD than TD group.
- 2b We expected that interference would be more predictive of adaptive and social skills for the DD group. We examined the following two competing hypotheses for the direction of this relationship: (a) Interference would have a more positive relationship with adaptive and social skills for the DD group, because children with DD have less ability to regulate themselves (Crnic *et al.* 2004) and might need more guidance to accomplish meaningful goals or activities; or (b) Interference would have a more negative relationship with adaptive and social skills for the DD group, given that this group needs extra support in developing autonomous skills.

Methods

Participants

Participants were families selected from a longitudinal study of children with or without developmental delays. Families were drawn from Southern California ($n = 155$) and Central Pennsylvania ($n = 45$). The study was conducted at three universities: the University of California, Los Angeles, the University of California, Riverside, and Pennsylvania State University. The Institutional Review Boards of each university approved the study procedures. Families were recruited either through agencies that provide diagnostic and intervention services for individuals with developmental disabilities (i.e. regional centres), or through local preschools and daycare programmes.

Of the original 238 children who participated in the first year of the study, at age 3, 200 had complete data at age 3 and age 5 and were thus included in the present analyses. The 38 families who were excluded from this study did not differ on any demographic variables or covariates [i.e. Bayley Mental Development Index (MDI), Child Behaviour Checklist (CBCL)] from the 200 families with complete data. Of these 200, 161 had social skills data at age 6 and were therefore included in the age 6 analyses ($n = 91$ TD; 70 DD). Here, too,

there were no significant differences in demographic variables, covariates, or independent or dependent variables between the 161 and the 39 who discontinued between ages 5 and 6 years.

Participants were classified as either having a DD or TD based on the child's age 3 MDI from the Bayley Scales of Infant Development (Bayley 1993). Children placed in the DD group ($n = 87$) scored in the moderate to borderline delay range on the Bayley (MDI between 40 and 84). Within the DD group, participants were identified as having Down Syndrome (11), autism spectrum disorders (8), Cerebral Palsy (10), another syndrome or multiple syndromes (6), or undifferentiated developmental delay (52). To meet criteria for the TD group ($n = 113$), children needed to display normative cognitive development (MDI greater than 84), not be born prematurely and lack any diagnosis of a developmental disability. Additionally, all children included in the study were ambulatory and none were diagnosed with autism at age 3.

Table 1 presents demographics for the TD and DD groups at child age 3. In the combined sample, 59.5% of mothers in the sample identified their children as white, non-Hispanic, 17.0% as Hispanic, 7.5% as African American, 2.5% as Asian, and 13.5% as 'other', usually mixed race. Slightly fewer than half (47.5%) of mothers in the sample had at least four years of college education and 51.8% of the families had an annual income of \$50 000 or above. Between-group analyses indicated differences in child sex, mother's level of education, and family income, with the TD group having more male children, mothers with more years of schooling, and higher family incomes. These variables were considered as covariates (see Data Analytic Plan).

Procedure

Age 3 assessment—Participants at age 3 received an in-home developmental assessment (the Bayley) to determine eligibility for the study and group-classification. Parents completed a packet of measures regarding their child's development, including a rating of their child's behaviour problems. Once classified, participants were immediately scheduled for an in-lab visit, during which children and their mothers participated in a 10-min free-play activity. Prior to the start of the activity, mothers were instructed to 'play with their children as they normally would at home.' Toys provided for the free play were age-appropriate (e.g. picture books, puzzles, blocks, crayons) and standardised across sites.

Follow-up assessments—Participants returned to the lab for a follow-up assessment at age 5, and then were seen in the home at age 6. During the 5-year visit, mothers were asked to participate in a semi-structured interview [*Vineland Adaptive Behavior Scales, Second Edition* (VABS-II); Sparrow *et al.* 2005] assessing their child's adaptive functioning. As part of the 6-year visit, mothers completed a battery of questionnaires, including the Social Skills Rating Scale (SSRS; Gresham & Elliot 1990).

Measures

Bayley Scales of Infant Development-II—The Bayley Scales of Infant Development-II (BSID-II; Bayley 1993) is a widely used assessment of mental and motor development in

children aged between one and 42 months. The BSID-II was administered in the child's home, with the mother present. There was a primary examiner and an assistant. Only mental development items were administered. The Mental Development Index (MDI) is normed with a mean of 100 and a standard deviation of 15. Bayley (1993) reported high short-term test-retest reliability for the MDI ($r = 0.91$).

Child Behaviour Checklist, ages 1.5–5 (Achenbach 2000)—Mothers completed the parent/caregiver form of the CBCL for ages 1.5–5 at the age 3 assessment. The CBCL demonstrates sound reliability and validity and is one of the most widely used parent-report measures of child internalising and externalising behaviour problems, as well as socio-emotional functioning. For the purposes of the present study, Total Problem T-scores were used to measure child problem behaviour at age 3. T scores have a mean of 50 and SD of 10. Alpha was 0.94 for mother ratings of Total Problems at age 3 years.

Social Skills Rating System (Gresham & Elliot 1990)—Social skills ratings were obtained through mother report on the Elementary Level SSRS-Parent Form. The Elementary Level SSRS is widely used to assess social skills, problem behaviours and academic competence in children grades kindergarten through sixth grade and demonstrates adequate reliability and validity (Gresham & Elliot 1990). On the form, parents are asked to rate each item based on how often their child performed a specific behaviour within the last month or two: 0 (never), 1 (sometimes) and 2 (very often). The SSRS contains four sub-scales measuring social skills: cooperation, self-control, assertion, and responsibility. For the purposes of this study, only the sub-scales of cooperation (e.g. doing household chores, getting along with others) and self-control (e.g. controlling anger, responding appropriately to others) were used. Each sub-scale contains 10 items and the internal consistencies reported by Gresham & Elliot (1990) for cooperation and self-control are $r = 0.68$ and $r = 0.80$ respectively.

Vineland Adaptive Behavior Scales, Second edition (Sparrow et al. 2005)—The VABS-II is a semi-structured interview used to measure individual adaptive behaviours. These behaviours are assessed within four domains: Communication, Daily Living Skills, Socialisation and Motor Skills. For the purposes of the present study, only scores for Daily Living Skills and Socialisation were computed to assess age 5 functioning. Examples of items for Daily Living Skills include: 'wipes or blows nose using tissue or handkerchief', 'puts away personal possessions', and 'counts at least 10 objects, one by one'. Items for Socialisation include: 'has a best friend or shows preference for certain friends (of either sex) over others', 'takes turns without being asked,' and 'says "please" when asking for something'. Sparrow *et al.* (2005) report high internal consistencies for Daily Living Skills ($r = 0.91$) and Socialisation ($r = 0.93$) as well as adequate validity.

Parenting Directiveness and Interference Coding System¹—Parent-child interactions were coded for two types of maternal controlling behaviour, supportive directiveness and interference, using a coding methodology adapted by the authors from

¹The coding manual can be obtained from the authors.

Flynn & Masur (2007). Supportive-directiveness was operationally defined as any parent behaviour, verbal (e.g. comments, questions) or non-verbal (e.g. orienting gestures, demonstrations, giving of objects) that is used supportively to direct, shape, or influence the child in the course of activities in which the child is already engaged or in pursuit of the child's goal. Examples of supportive-directiveness include holding a crayon box open for a child to put the crayons inside, throwing a ball to a child who puts his or her hands out, or narrating the child's play.

Interference was operationally defined as any behaviour, verbal (e.g. command, suggestion) or non-verbal (e.g. physical redirection), that constrains or redirects the child's behaviour or attention away from an ongoing activity, leading to the imposition of the maternal agenda. Examples of interference include the parent choosing toys for the child, directing the child where to sit or stand during play, or setting limits, such as preventing the child from leaving the room.

Coders viewed a selection of 5 min from each 10-min parent-child free-play interaction, including the first 2 min (to observe controlling behaviours in the context of initiating play), and minutes 5–8 (to observe controlling behaviours in the context of ongoing activities). Ratings of frequency (i.e. number of acts) were given for maternal supportive-directiveness and interference. Coders counted as separate any acts (verbalisations or actions) of the parent that were separated by at least three seconds or by a child verbalisation. Incomplete or unintelligible utterances were not coded.

Advanced undergraduate research interns coded videotapes of the free play sessions in two teams of two coders each, acknowledging instances of maternal controlling acts as they occurred and pausing after each minute to ensure equivalent frequency counts between coders. When raters did not agree on frequency counts, they re-watched the minute and re-coded to reach consensus. Coding teams initially met with a master coder weekly to train, discuss coding issues and establish reliability. Once coding teams reached a reliability with the master coder of 80% (the master coder's count plus or minus 20%), they were allowed to code independently. Teams continued to co-score 20% of tapes with the master coder to ensure maintenance of reliability. Reliability on these tapes was 88.5%.

Data analytic plan

First, *t*-tests were used to compare DD and TD groups on the Parenting Directiveness and Interference (PDI) codes. The parental control codes were also correlated to test whether supportive directive-ness related differently to interference in each group. Differences between correlations were calculated using a Fisher's *r*-to-*z* transformation.

The main hypotheses were tested using hierarchical regression. Regressions were conducted separately in each group, predicting the main outcome variables (Vineland Daily Living Skills and Socialisation scores and SSRS Cooperation and Self-Control scores). Age 3 CBCL total problem T-scores and Age 3 Bayley MDI were entered in the first and second steps as covariates to control for child problem behaviours and developmental level at age 3. Additionally, demographic variables that significantly differed between status groups, including family income, mother's education level, and child sex, were considered as

covariates if they correlated significantly with both an outcome and a parent control variable. Only family income met these criteria, as it correlated both with Interference ($r = 0.15$, $P = 0.03$), and with Self-Control ($r = 0.21$, $P = 0.007$). However, family income was not significant in any of the final models and was thus removed to conserve power.

Frequency of Supportive Directiveness or Interference was entered in the third step to determine the amount of variance in the outcome measures accounted for by each of these parenting variables beyond child problem behaviour and developmental level at age 3. To increase statistical power, potential covariates were removed when $P > 0.10$ in the final model.

Results

Descriptives

Descriptive statistics for the main study variables are displayed in Table 1. Mothers of children with DD had, on average, the same number of supportive directive acts as mothers of children with TD, but had a significantly greater number of interfering acts.

Correlations among Parenting Directiveness and Interference codes

In both groups, frequency of Supportive Directiveness and Frequency of Interference were moderately negatively correlated: $r = -0.44$ in the DD group; $r = -0.27$ in the TD group. The difference between correlations was not significant.

Correlations among outcome variables

Correlations among the four outcome variables are shown in Table 2. Correlations between the Vineland and SSRS measures were in the moderate range. The SSRS correlation between self-control and cooperation was also in the moderate range. Within the Vineland, Daily Living Skills and Socialisation were highly correlated. Despite the high correlation between the two domains of the Vineland, they were examined as separate outcome measures given the historical use of these scales as two related but different aspects of child adaptive behaviour.

Regressions predicting age 5 adaptive behaviour and age 6 social skills—

Regression models were used to examine mothers' Supportive Directiveness and Interference at age 3 as predictors of age 5 Vineland (Daily Living Skills and Socialisation) and age 6 SSRS (Cooperation, Self-Control) scores. Table 3 shows results of these 16 regressions, predicting to each of the four outcome variables from directiveness or interference, after controlling for age 3 behaviour problems and Bayley scores, and separately within the TD and DD groups.

Typical Development group relationships: For TD group families, the age 3 behaviour problems score was a significant predictor of all four outcomes variables in regressions including supportive directiveness and those including interference. Conversely, the Bayley MDI was not a significant predictor and thus was removed from all of the final models. Frequency of Supportive Directiveness significantly predicted Socialisation above and

beyond child problems, but did not significantly relate to any of the other three outcome variables (daily living skills, cooperation, self-control). Frequency of Interference did not relate significantly to any of the four social variables. Thus the controlling parenting variables at age 3 had little to no relationship with the domains of child behaviour at age 5 and 6.

Developmental Delays group relationships: For DD group families, the regressions revealed different relationships from those found for TD group families. Here, while behaviour problems entered significantly (all $P < 0.05$) in five of the eight regressions, these relationships were all weaker than the relationships in the TD group (all $P < 0.001$). Conversely, Bayley scores, which had no effect in the TD families, were significant at $P < 0.001$ for the two Vine-land scales (Daily living skills, socialisation); the Bayley scores did not relate to the SSRS scales and were thus removed from those models. Turning to the parenting domains, in the four models for Directiveness, one was significant above and beyond the covariates (self-control) and one was marginally significant (cooperation). Interference was a consistently stronger predictor of outcome scores, predicting significantly above the control variables in the three regressions predicting daily living skills, cooperation, and self-control, and marginally in the fourth, predicting socialisation.

To summarise, within the eight analyses in the TD group (Directiveness and Interference by four outcome variables), maternal control was a significant predictor in only one. Within the eight analyses in the DD group, maternal control was a significant predictor in four and borderline significant in an additional two. The stronger relationships in the DD group, especially for Interference, were found despite the lower sample size in the DD group.

Discussion

Past studies have found parents used more control and direction with children with developmental delays (DD) than those with typical development (TD), and it is often assumed that this greater control has a negative impact on children with DD (Marfo 1991), despite little empirical evidence to that effect. The effect of controlling behaviour on children with DD has been hypothesised to depend on whether or not it supports or interferes with the child's goal or focus of attention (Marfo 1991; Flynn & Masur 2007). Thus, the major aim of this study was to clarify the type and amount of control mothers use with DD vs. TD children, and to determine whether these types of controlling behaviour have similar relationships with developmental outcomes in children with DD vs. TD.

Our first question concerned group differences in maternal control during a free play interaction at child age 3 years. As hypothesised, mothers in both groups displayed equal frequencies of supportive directive behaviour, but mothers in the DD group displayed twice as much interfering behaviour as mothers in the TD group. These findings are consistent with previous research demonstrating that parents of children with DD use more control (e.g. Marfo 1990); however, it is notable that in this study, the greater use of control was fully accounted for by interfering control that did not follow the child's lead. Mothers were not providing a higher frequency of direction around the child's goal or focus of attention.

Our second question addressed whether maternal controlling behaviours predicted child adaptive and social functioning. We examined these relationships after controlling for child behaviour problems and developmental quotient. Age 3 child behaviour problems significantly predicted adaptive behaviour and social skills in the TD group, whereas developmental quotient was a more important predictor of adaptive behaviour (though not social skills) in the DD group.

First, we hypothesised that frequency of supportive directive acts would positively predict outcomes for both groups, but that it would be a stronger predictor for the DD group given previous findings that parenting ‘matters more’ for children with delays (e.g. Baker *et al.* 2007). We found that directiveness significantly predicted higher socialisation scores for the TD group, but did not predict greater adaptive skills in the DD group. It may be that age 3 developmental level was so highly predictive of adaptive skills in the DD group that there was little variance left to be predicted by parenting. Conversely, in the DD group, directiveness did predict self-control and (at the trend level) cooperation, but directiveness was not predictive of age 6 social skills in the TD group. Notably, parenting was more predictive of outcomes in the DD group despite a lower sample size and thus lower power in this group. This finding is consistent with previous findings that supportive parenting behaviours, such as scaffolding, have a greater effect on the development of social skills in children with DD than those with TD (Baker *et al.* 2007). It may be that supportive direction has a greater positive effect on the development of children at younger developmental stages (e.g. Landry *et al.* 2000), or, similarly, that supportive direction has a greater effect on early social skills, as by age 6 the DD group had a ‘younger’ range of social skills than the TD group.

We also expected that interference would be more predictive of adaptive and social skills for the DD group. This hypothesis was confirmed, as interference predicted lower adaptive and social skills for the DD group above and beyond child functioning at age 3, but did not predict any of the outcome variables in the TD group. Again, there was no support for the idea that interference would predict better outcomes for children with DD because of a greater need for redirection in this group. Rather, the alternative hypothesis was confirmed: that parents of children with DD who are less likely to redirect or interfere with their child’s focus may promote more autonomous and age-appropriate adaptive and social functioning in these children. Interference was not at all predictive of adaptive or social skills in the TD group, which may be because, on average, interfering behaviours in this group were fairly low-level (e.g. suggesting a different toy to play with but not insisting that the child change activities). Furthermore, the fact that developmental level was not predictive of outcomes in this group suggests that, as a whole, this group has greater resources with which to learn skills on their own, regardless of their parents’ interactive styles. This is consistent with the idea that parenting is a stronger predictor of outcomes for children with DD, who lack the resources to gain autonomous self-help skills if their parents complete tasks for them. It is possible that interfering parenting has a greater effect on self-efficacy for children with DD, thus decreasing their motivation to attempt to learn skills. There is also some evidence that maternal structure and support affects social skills of children with DD by decreasing their dys-regulation (Baker *et al.* 2007). Further research is necessary on such mechanisms that

may explain the stronger relationship between parent control and development of adaptive and social skills in children with DD.

This study had a number of methodological strengths, including a highly reliable, objective coding system to measure frequency of parent controlling behaviours without ascribing a valence (i.e. behaviours were coded with regard to whether or not they followed or interfered with the child's lead, rather than whether or not they appeared sensitive to the child's developmental level). Furthermore, this was a longitudinal study, showing that parent controlling behaviours predict child outcomes across two or three years after accounting for child problem behaviours and developmental level at time 1. There is some evidence that adaptive behaviour standard scores of children with DD tend to drop off sharply around age 5 (Fenton *et al.* 2003), which indicates a need for a greater understanding of variables present before age 5 that may predict better adaptive skill outcomes. However, it was a limitation of this study that we were not able to control for the specific outcome measures at time 1, given that these measures were not administered at child age 3. Future studies could examine the development of social and adaptive behaviour from earlier ages in children with DD. Another limitation of the study is that all outcome measures were based on parent report. However, the main predictor variables were observational measures, and this type of cross-measurement prediction limits shared method variance and potential rater biases.

Findings from this study have implications for early intervention that could improve the developmental trajectory of young children with DD. Notably, frequency of supportive directive acts at age 3 predicted the same amount of variance in age 6 social skills as maternal scaffolding at age 4 has previously been shown to predict (Baker *et al.* 2007). Scaffolding is a particular type of supportive directiveness which is very highly structured and specifically aimed to support the child in attaining the next higher level of functioning (Vygotsky 1978). However, results of this study indicate that simply the number of supportive acts following the child's lead is equally predictive of early social skills development in children with DD. Teaching parents to follow their children's lead, through programmes such as Parent–Child Interaction Therapy (PCIT; Eyberg 1988) may be simpler and easier than teaching the complex skill of scaffolding.

However, frequency of supportive directive acts was not predictive of adaptive daily living and socialisation skills in the DD group, and it may be that for children with lower cognitive ability, higher-quality directive parenting such as scaffolding is necessary to build specific skills such as self-care skills. However, the finding that interfering acts predict lower skills in all four social domains assessed indicates that it would likely be helpful to teach parents a balance between scaffolding and then giving the child space to attempt the skill on his or her own.

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Table 1

Descriptive statistics

	TD percentage or mean (SD)	DD percentage or mean (SD)	χ^2 (d.f.) or <i>t</i> (d.f.)	<i>F</i> (Levine's test for equality of variances)
Child gender (% male)	54%	68%	3.92 ⁺ (1)	
Child race (% minority)	39%	43%	0.61 (1)	
Family income (% <\$50k)	59%	43%	5.27 ⁺ (1)	
Bayley MDI	103.93 (11.70)	59.91 (13.15)	24.99 ^{***} (198)	1.02
Mother grade completed	15.74 (2.58)	14.38 (2.43)	3.81 ^{***} (198)	0.83
CBCL Total Problems T score	50.90 (9.71)	56.24 (10.69)	-3.69 ^{***} (198)	1.09
Frequency of supportive directiveness	30.55 (10.22)	29.36 (10.77)	0.80 (198)	0.70
Frequency of interference	4.61 (4.85)	8.34 (6.82)	-4.33 ^{***} (149)	15.08 ^{***}
Vineland Daily Living (age 5)	102.10 (15.75)	70.37 (18.78)	12.98 ^{***} (198)	2.50
Vineland Socialisation (age 5)	109.32 (14.96)	82.37 (16.23)	12.17 ^{***} (198)	0.68
SSRS – Cooperation (age 6)	11.91 (3.33)	10.30 (3.75)	2.89 ^{**} (159)	1.81
SSRS – Self-Control (age 6)	13.07 (3.35)	10.68 (3.62)	4.34 ^{**} (159)	0.06

⁺ $P < 0.10$,

^{*} $P < 0.05$,

^{**} $P < 0.01$,

^{***} $P < 0.001$.

Scores reported from child age 3 years except where otherwise noted. Child and mother variables had *n* of 113 TD and 87 DD except for age 6 SSRS scores, which had *n* of 90 TD and 71 DD. Appropriate *T* and *P* values are displayed based on whether or not Levine's test was significant.

TD, typical development; DD, developmental delays; MDI, Mental Development Index; CBCL, Child Behaviour Checklist; SSRS, Social Skills Rating Scale.

Table 2

Correlations among outcome variables

Variable	1	2	3
1. VABS Daily Living Skills	1		
2. VABS Socialisation	0.90 ^{***}	1	
3. SSRS Cooperation	0.42 ^{**}	0.40 ^{**}	1
4. SSRS Self-Control	0.44 ^{**}	0.48 ^{**}	0.65 ^{**}

⁺ $P < 0.10$,^{*} $P < 0.05$,^{**} $P < 0.01$,^{***} $P < 0.001$.

VABS, Vineland Adaptive Behavior Scales; SSRS, Social Skills Rating Scale.

Regression analyses examining frequency of mother control (directiveness and interference) as predictors of adaptive and social skills after covarying child behaviour problems (CBCL) and developmental level (MDI)

Table 3

	Model	TD Directiveness			TD Interference			DD Directiveness			DD Interference		
		β	R ²		β	R ²		β	R ²		β	R ²	
Daily Living Skills	CBCL	-0.41***	0.16***	-0.40***	0.16***	-0.22*	0.05*	-0.22*	0.05*	-0.17 ⁺	0.05*		
	MDI	-	-	-	-	0.54***	0.30***	0.50***	0.30***			0.30***	
Socialisation	Mother control	0.14	0.02	-0.01	0.00	0.05	0.00	0.05	0.00	-0.22*	0.04*		
	CBCL	-0.39***	0.14***	-0.38***	0.14***	-0.24*	0.06*	-0.20*	0.06*			0.06*	
Cooperation	MDI	-	-	-	-	0.52***	0.27***	0.48***	0.27***	-0.18 ⁺	0.03 ⁺		
	Mother control	0.18*	0.03*	-0.14	0.02	0.09	0.01	0.09	0.01				
Self- Control	CBCL	-0.39***	0.15***	-0.39***	0.15***	-	-	-	-				
	MDI	-	-	-	-	0.22 ⁺	0.05 ⁺	0.22 ⁺	0.05 ⁺				
Self- Control	Mother control	0.09	0.01	-0.01	0.00	0.21 ⁺	0.09 ⁺	0.21 ⁺	0.09 ⁺	-0.41***	0.17***		
	CBCL	-0.50***	0.25***	-0.50***	0.25***	-0.28*	0.11**	-0.28*	0.11**				
Self- Control	MDI	-	-	-	-	0.20 ⁺	0.04 ⁺	0.20 ⁺	0.04 ⁺				
	Mother control	-0.07	0.01	0.02	0.04	0.26*	0.07*	0.26*	0.07*	-0.24*	0.05*		

⁺ $P < 0.10$,

* $P < 0.05$,

** $P < 0.01$,

*** $P < 0.001$.

Betas are Standardised Betas in the final model. Significant Mother Control betas are bolded; trend level betas are italicised.

TD, typical development; DD, developmental delays; CBCL, Child Behaviour Checklist; MDI, Mental Development Index.