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Predicting maternal parenting stress in middle childhood: the roles of child intellectual status, behaviour problems and social skills

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Abstract

Background—Parents of children with intellectual disabilities (ID) typically report elevated levels of parenting stress, and child behaviour problems are a strong predictor of heightened parenting stress. Interestingly, few studies have examined child characteristics beyond behaviour problems that may also contribute to parenting stress. The present longitudinal study examined the contribution of child social skills to maternal parenting stress across middle childhood, as well as the direction of the relationship between child social skills and parenting stress.

Method—Families of children with ID ($n = 74$) or typical development (TD) ($n = 115$) participated over a 2-year period. Maternal parenting stress, child behaviour problems and child social skills were assessed at child ages six and eight.

Results—Child social skills accounted for unique variance in maternal parenting stress above and beyond child intellectual status and child behaviour problems. As the children matured, there was a significant interaction between child social skills and behaviour problems in predicting parenting stress. With respect to the direction of these effects, a cross-lagged panel analysis indicated that early parenting stress contributed to later social skills difficulties for children, but the path from children's early social skills to later parenting stress was not supported, once child behaviour problems and intellectual status were accounted for.

Conclusion—When examining parenting stress, child social skills are an important variable to consider, especially in the context of child behaviour problems. Early parenting stress predicted child social skills difficulties over time, highlighting parenting stress as a key target for intervention.

Keywords

behaviour problems; children; intellectual disability; middle childhood; parenting stress; social skills

Introduction

Parents of children with intellectual disabilities (ID) typically report more parenting stress than parents of typically developing children do (Friedrich & Friedrich 1981; Dyson 1991; Orr *et al.* 1993; Fidler *et al.* 2000; Hauser-Cram *et al.* 2001; Baker *et al.* 2003; Emerson 2003). Additionally, the stress experienced by parents of children with ID tends to be chronic (Glidden & Schoolcraft 2003). Parenting stress continues to be a focus of research because it has been associated with many negative outcomes, including parent depression (Hastings *et al.* 2006), marital conflict (Suárez & Baker 1997; Kersh *et al.* 2006), poorer physical health (Oelofsen &

Richardson 2006), less effective parenting (Baker & Heller 1996) and increased child behaviour problems (Baker *et al.* 2003). Therefore, it is important to identify predictors of parenting stress in order to inform interventions aimed at reducing and/or preventing these negative outcomes.

Although parents of children with ID repeatedly report heightened stress, there is significant variability in the degree of parenting stress experienced. Some parents adapt successfully and many report positive contributions of the child with the disability (Flaherty & Glidden 2000; Hastings & Taunt 2002; Blacher & Baker 2007). Therefore, a goal of research has been to explain the variation in parenting stress, examining family, parent and child variables that may moderate the relationship between child intellectual status and parenting stress. Parent and family positive factors, such as social support, coping skills and personality characteristics, have been shown to heighten or decrease the risk that parents of children with ID will become significantly stressed (Beresford 1994; Paczkowski & Baker 2007; Plant & Sanders 2007). However, research examining mediators, or variables that explain the relationship between intellectual status and parenting stress, typically has focused on problematic child characteristics that are viewed as primary stressors for parents.

Child behaviour problems have been shown to explain a significant amount of the variability in parenting stress. Children with ID exhibit elevated levels of behaviour problems compared with typically developing children (Einfeld & Tonge 1996; Baker *et al.* 2002, 2003), and many studies have shown that child behaviour problems mediate the relationship between child intellectual status and parenting stress (Stores *et al.* 1998; Hauser-Cram *et al.* 2001; Baker *et al.* 2002, 2003; Herring *et al.* 2006), indicating that behaviour problems are a more salient predictor of parenting stress than child intellectual ability. Additionally, longitudinal analyses suggest that the relationship between child behaviour problems and parenting stress may be bidirectional (Baker *et al.* 2003; Orsmond *et al.* 2003).

The present study considers another child characteristic – social skills – that may also contribute to parenting stress, perhaps independently of behaviour problems. Social skills are ‘socially acceptable learned behaviors that enable a person to interact effectively with others and to avoid socially unacceptable responses’ (Gresham & Elliot 1990). Sharing, helping, initiating relationships, requesting help, giving compliments, saying ‘please’ and ‘thank you’ are examples of social skills, and developing these skills enables children to have successful relationships. Relative to their typically developing peers, children with ID have been found to engage in more solitary play, exhibit poorer initiation and group entry skills, have more negative and less adaptive interaction styles, less reciprocal friendships and generally poorer social skills (Guralnick & Groom 1987a,b; Kopp *et al.* 1992; Guralnick *et al.* 1998; Baker *et al.* 2007; Guralnick *et al.* 2007a). Furthermore, difficulties with peer interactions appear to be highly stable, at least in early childhood (Guralnick *et al.* 2006a).

Social skills constitute a particularly important domain to examine in middle childhood, during the early school years. The school setting places new demands on children’s social abilities through increased emphasis on peer and teacher interactions. Children’s social skills at school entry have been found to be an important predictor of subsequent school adjustment outcomes such as the student–teacher relationship, social acceptance by peers, academic achievement and classroom participation (Ladd & Burgess 1999; Ladd *et al.* 1999). Children with ID have been found to have poorer student–teacher relationships, and findings from Eisenhower *et al.* (2007) suggested that child social skills may mediate, or explain, the relationship between child intellectual status and quality of student–teacher relationships. In turn, early relationships with peers and teachers have been found to predict children’s long-term behavioural, social, academic and psychological adjustment in school (Goetz & Dweck 1980; Rubin & Mills 1988; Cole 1990; Coie *et al.* 1990; La Greca *et al.* 1988; Hamre & Pianta 2001; Silver *et al.*

2005). Thus, it appears that social skills in middle childhood are associated with many critical outcomes for the child later in development. It is likely that children's social skills, or lack thereof, would also have a significant impact on parents. However, despite research highlighting the importance of social skills during this developmental stage, little research has examined the impact of social skills on parents.

Research with typically developing children has found social skills deficits to be associated with poor academic performance, peer victimisation and later social adjustment problems (Coie & Dodge 1983; Parker & Asher 1987; Conti-Ramsden & Botting 2004). It can be expected that social skills difficulties and their associated consequences, such as poor academic performance, would be particularly stressful for parents. However, few studies have examined the relationship between child social skills and parenting stress, especially with respect to child behaviour problems. One would expect an inverse relationship between a child's behaviour problems and his or her social skills. However, there is evidence from behaviour genetics research that the genetic and environmental mechanisms, being responsible for pro-social behaviour, are different from those underlying problem behaviours. Stevenson (1997) applied quantitative genetic research methods to a data set of child and adolescent twins, finding that there were independent genetic contributions to sociability, anti-sociality and pro-sociality. This research highlights the importance of examining child behaviour problems and social skills as independent predictors of parenting stress. Additionally, if child behaviour problems and social skills are significant and independent contributors to parenting stress, these variables may have a multiplicative effect on parenting stress in that parents of children with high behaviour problems and low social skills will have especially high parenting stress. Thus, it is important to examine both the independent contribution of behaviour problems and social skills as well as the interaction between these two predictor variables.

Much of the research, examining the relationship between characteristics of children with ID and parenting stress, has used cross-sectional designs; these highlight important associations between the variables but do not speak to the direction of the associations. A recent single-assessment study by Beck *et al.* (2004) found that pro-social behaviour, among a sample of children, adolescents and young adults with mild to profound ID, was predictive of lower parenting stress. The present study sought to build upon Beck *et al.* (2004) by (1) assessing a larger sample of families that have same-age children; (2) employing a longitudinal design; (3) including a control group of families of children without ID; (4) analysing for an interaction between child behaviour problems and child social skills in predicting parenting stress; and (5) investigating the temporal relationship between child social skills and parenting stress using multiple regression and cross-lagged panel analyses.

The present study assessed children at ages six and eight, during the early school period when demands increase for self-regulated behaviour and age-appropriate social skills. We addressed four primary questions: (1) Do child social skills and behaviour problems each account for unique variance in parenting stress? (2) Do child behaviour problems and social skills interact in predicting maternal parenting stress? (3) Are these relationships stable across this age period? and (4) What is the direction of influence between these child characteristics and parenting stress?

Methods

Participants

Participants were 189 families, recruited to take part in a longitudinal study of children ages three to nine, with samples drawn from Central Pennsylvania (20.8%) and Southern California (79.2%). The present study utilised data at child age six because this was the first time the social skills measure could be administered. We also examined data collected 2 years later,

when the children were 8 years old, in order to examine the stability of our findings and to test longitudinal hypotheses. All children in the study were classified as having TD ($n = 115$) or ID ($n = 74$). Children in the TD group were recruited primarily through pre-schools and day-care programmes. Children in the ID group were recruited through community agencies that provide services for people with developmental disabilities. In California, practically all families with young children with ID register for services with these local agencies. School and agency personnel mailed brochures, describing the study to families who met selection criteria, and interested parents phoned the research centre.

Children in the current study were classified as having ID according to the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (American Psychiatric Association 2000). The ID group children: (1) received a score of 40–84 on the Stanford-Binet Intelligence Scale-Fourth Edition (Thorndike *et al.* 1986); and (2) received a score of 40–84 on the Vineland Adaptive Behavior Scales (VABS, Sparrow *et al.* 1984). The children with ID met criteria for either Borderline (27.6%), Mild (46.1%) or Moderate Intellectual Functioning (26.3%). Children who had an autism diagnosis at the initial evaluation were excluded from the larger longitudinal study. Children were classified as having TD if they received a score of 85 or above on both Stanford-Binet and the VABS, and did not have a developmental disability or premature birth.

Table 1 shows the 6-year-old demographics for the children and the families by cognitive status (ID or TD). In the total sample, 59% were male and the racial composition of the children was 7.9% African American, 1.6% Asian, 59.3% Caucasian, 15.9% Hispanic and 15.3% other. Sixty-seven per cent of the mothers had a high school education. Most mothers (85%) were married and over half of the families (59%) had an annual income greater than \$50 000. There were some family and child characteristic differences between the two status groups. Children in the typically developing group were reported to have significantly better physical health than children with ID. As a result, child health was covaried in all analyses. With regard to family demographics, mothers in the typically developing group had significantly more years of education than mothers of children with ID. Family income also differed by status group. However, once maternal education was controlled for there was no longer a status group difference in family income ($F = 0.08$, $P = 0.78$). Therefore, maternal education was covaried in all analyses. Group differences in demographics were similar at child age eight with one exception. At age eight, there was a significant difference in maternal physical health in that mothers of typically developing children reported significantly better physical health than mothers of children with ID. Thus, maternal health was also covaried in all analyses along with child health and maternal education.

Procedures

Measures of the child's intellectual level were obtained at the third annual assessment when the children were 5 years of age. During this assessment, children and their mothers came into the child studying centre; children completed the Stanford-Binet, while their mothers completed the VABS. The remaining data used in this study came from assessments that were conducted in the family home, when the children were 6 and 8 years old. Demographic information was obtained through an interview with the mother and information regarding parenting stress, child behaviour problems and child social skills, was gathered as part of a packet of measures completed by the mother.

Measures

Child age five measures

Child intellectual status: Child intellectual status was evaluated with the Stanford-Binet Intelligence Scale-Fourth Edition (Thorndike *et al.* 1986), a widely used assessment instrument

that has high internal consistency (Glutting 1989) and good evidence of validity (Thorndike *et al.* 1986). This instrument is particularly well suited to the evaluation of children with delays, because the examiner adapts starting points, according to the child's developmental level. Eight sub-tests most appropriate for 5-year-olds were used (Vocabulary, Comprehension, Absurdities, Pattern Analysis, Copying, Quantitative, Bead Memory and Memory for Sentences). The Composite IQ scores was used for the present study and Table 1 shows the descriptive statistics for the Stanford-Binet by status group.

Child adaptive behaviour: Child adaptive behaviour (Sparrow *et al.* 1984) was examined, using the VABS. This is a semi-structured interview, assessing the adaptive behaviour of individuals with or without disabilities. In the present study, mothers were informants and reported on behaviours that their children usually do. Three sub-scales were used: *communication, daily living skills* and *socialisation*. These were combined to form an Adaptive Behavior Composite score with an alpha coefficient of 0.93.

Child age six and eight measures

Demographics: Child, parent and family demographics shown in Table 1 were obtained through an interview with the mother at child age six. Child and maternal health were rated by mother on the following scale: 1 = poor; 2 = fair; 3 = good; 4 = excellent.

Child behaviour problems: Child behaviour problems were assessed using maternal report on the Child Behavior Checklist for ages six to 18 (CBCL, Achenbach & Rescorla 2001). This is the most widely used parent-report measure of child socio-emotional and behavioural functioning and has sound reliability and validity (alpha for current sample, 0.95). The CBCL lists 113 behaviours that are rated by parents on a 3-point scale from 0 (not true) to 2 (very true or often true) of their child, and are summed for a total score.

Child social skills: Child social skills were assessed through mother reports on the Parent Form of the Elementary-level version of the Social Skills Rating System (SSRS, Gresham & Elliot 1990) which is used to assess social skills and problem behaviours for children in kindergarten through sixth grade. The SSRS is a widely used questionnaire that has adequate reliability and validity and provides a broad assessment of social skills, problem behaviours and academic competence. The present study used the 38-item Social Skills Scale, comprised of four sub-scales – responsibility, cooperation, self-control and assertiveness. This measure has high test-retest reliability ($r = 0.84$) and internal consistency ($r = 0.87$; Gresham & Elliot 1990). Cronbach's alpha for the current sample was 0.92.

Parenting stress: Parenting stress was measured, using the Family Impact Questionnaire (FIQ, Donenberg & Baker 1993). The FIQ is a 50-item questionnaire that asks about the 'child's impact on the family compared to the impact other children his/her age have on their families' (e.g. Item 1: 'My child is more stressful'). Parents endorse items on a 4-point scale from 0 (not at all) to 3 (very much). While the FIQ has six sub-scales, the present study used the Negative Impact score which is a sum score of two sub-scales – negative impact on feelings about parenting (nine items) and negative impact on social relationships (11 items). Alpha in the present sample was 0.88 for maternal reports of child negative impact.

Results

The distributions of the primary child behaviour problem, child social skill and parenting stress variables were examined at each of the two time points. Data points that were more than three standard deviations above or below the mean of a variable were considered to be outliers. Outlying data points were present on two of the three measures, the FIQ and the CBCL. Thirteen

data points were determined to be outliers and these data points were drawn from measures of nine participants. All of the outliers were extreme in the high direction. Therefore, as suggested by Cohen *et al.* (2002), all outliers were set equal to +3 standard deviations from the mean in order to reduce the influence of extreme data points on the results. Analyses included bivariate correlations, independent sample *t*-tests, hierarchical multiple linear regression analyses and a cross-lagged panel analysis.

Preliminary analyses

There were significant bivariate correlations between the primary independent and dependent variables at child age six. Child behaviour problems were related to child social skills ($r = -0.54, P < 0.001$), child behaviour problems to maternal parenting stress ($r = 0.73, P < 0.001$) and child social skills to maternal parenting stress ($r = -0.59, P < 0.001$). At child age eight, the strength of these relationships was similar (behaviour problems and social skills, $r = -0.62, P < 0.001$; behaviour problems and parenting stress, $r = 0.75, P < 0.001$; social skills and parenting stress, $r = -0.68, P < 0.001$). These relationships were also similar within the two status groups and at ages 6 and 8 years.

Additionally, independent sample *t*-tests revealed that there were significant status group (ID, TD) differences on measures of parenting stress, child behaviour problems and child social skills. Mothers of children with ID reported significantly more parenting stress ($t = 4.41, P < 0.001$), more behaviour problems ($t = 4.58, P < 0.001$) and lower social skills ($t = 6.97, P < 0.001$) at child age six. These findings were similar at child age eight (parenting stress, $t = 7.06, P < 0.001$; behaviour problems, $t = 4.58, P < 0.001$; social skills, $t = 6.41, P < 0.001$).

Child delay, behaviour problems, social skills and parenting stress: analyses at child age six

To examine if child social skills accounted for unique variance in parenting stress and to determine if there was a significant interaction between child social skills and behaviour problems, a hierarchical multiple regression analysis was conducted with age six data. The relative contributions of child cognitive status (ID,TD), behaviour problems (CBCL total score), social skills (SSRS total score) and the interaction between social skills and behaviour problems were considered as predictors of maternal parenting stress. To create the interaction term, the social skills and behaviour problems variables were standardised or transformed into z-scores, and the product of the standardised variables comprised the interaction term. In this analysis the covariates were entered in Step 1, group status in Step 2, behaviour problems z-score in Step 3, social skills z-score in Step 4, and the interaction term in Step 5. As shown in Table 2, these variables explained 61% of the variance in maternal parenting stress at child age six. Child intellectual status, child behaviour problems and child social skills each accounted for unique variance in maternal parenting stress; thus, social skills did account for unique variance in parenting stress even after controlling for child intellectual status and behaviour problems. Additionally, child intellectual status was a significant predictor of parenting stress even when child behaviour problems were accounted for. The interaction between social skills and behaviour problems at age six was marginally significant ($\beta = -0.10, P < 0.06$).

To examine these relationships further, analyses were conducted within the two status groups. As shown in Table 3, child social skills accounted for unique variance in maternal parenting stress in both the ID ($\beta = -0.22, P < 0.05$) and TD ($\beta = -0.24, P < 0.01$) sub-samples. Within the sub-samples, the interaction was non-significant for the ID group but marginally significant for the TD group ($\beta = -0.12, P = 0.08$).

Analyses at child age eight

In order to examine the stability of these findings across time, the same hierarchical multiple regression analyses were conducted with data collected 2 years later when the children were

8 years old. As shown in Table 2, all four predictors (child intellectual status, behaviour problems, social skills and the social skills by behaviour problems interaction) accounted for unique variance in the dependent variable, and together they accounted for 59% of the variance in maternal parenting stress. In order to highlight the nature of the interaction, a graphical representation of the interaction was created using the ModGraph-I programme (Jose 2003), which takes information from multiple regression analyses and computes the equations that yield cell means necessary for the graphical display of statistical interactions. As shown in Fig. 1, the interaction suggests that, at low levels of behaviour problems, there is little difference in maternal parenting stress regardless of the child's social skills. However, at high levels of behaviour problems, mothers of children with low social skills experienced heightened parenting stress compared with mothers of children with high social skills.

In within-group analyses, the interaction between social skills and behaviour problems in predicting maternal parenting stress was significant for the ID group ($\beta = -0.48, P < 0.05$) but not for the TD group. Within the ID group, once the interaction between social skills and behaviour problems was accounted for, the main effect of child behaviour problems was no longer significant and the main effect for child social skills became marginally significant ($\beta = -0.21, P = 0.057$). For the TD group, both behaviour problems and social skills were significant predictors of maternal parenting stress in the final model.

Predicting change over time

Two directions of influence, involving child social skills and parenting stress, were examined. The relationship between child characteristics and parenting stress over time was first examined using two sets of hierarchical multiple regression analyses. Change scores were created for behaviour problems, social skills and maternal parenting stress by subtracting the score of the variable at age six from the score of the variable at age eight. Table 4 shows the results of the first regression with FIQ total score at age eight (stress) as the dependent variable. Covariates were entered in Step 1; initial parenting stress (FIQ at age six) in Step 2; child intellectual status in Step 3; initial level of behaviour problems (CBCL total score at age six) and the change in behaviour problems (CBCL change score from six to eight) in Step 4; and initial level of social skills (SSRS total score at age six) and change in social skills (SSRS change score from six to eight) in Step 5. This model explained 79% of the variance in maternal parenting stress at age eight. All predictor variables accounted for unique variance in the final model. Step 2, age six parenting stress, accounted for 59% of the variance in parenting stress at age eight. Child intellectual status, initial level of behaviour problems, change in behaviour problems from age six to eight, initial level of social skills, and change in social skills from age six to eight all accounted for unique variance in parenting stress at age eight even after controlling for parenting stress at age six.

Within-group analyses revealed similar findings. In the final model for the ID group, after controlling for initial stress at age six, change in behaviour problems, initial level of social skills and change in social skills significantly predicted parenting stress at age eight. For the TD group, initial level of behaviour problems, change in behaviour problems and change in social skills significantly predicted maternal parenting stress.

An alternative explanation for the relationship between child characteristics and parenting stress is that parental stress contributes to the development and deterioration of children's social skills. A second set of hierarchical multiple regression analyses was conducted to examine this hypothesis. The dependent variable was children's social skills at age eight (SSRS total score at age eight). The covariates were entered in Step 1; initial social skills (SSRS total score at age six) in Step 2; child intellectual status in Step 3; initial level of behaviour problems (CBCL total score at age six) and the change in behaviour problems (CBCL change score from six to eight) in Step 4; and initial level of parenting stress (FIQ at age six) and change in parenting

stress (FIQ change score from six to eight) in Step 5. The total model accounted for 74% of the variance in children's social skills at age eight. Step 2, the initial level of children's social skills, accounted for 52% of the variance in children's social skills 2 years later at age eight. In this analysis, only initial parenting stress and change in parenting stress from age six to eight accounted for unique variance in social skills at age eight after controlling for initial levels of social skills at age six (Table 5).

Within-group analyses revealed similar findings. After controlling for initial social skills, for the ID group change in parenting, stress accounted for unique variance in the final model. For the TD group, initial parenting stress and change in parenting stress were significant predictors.

The regression analyses provided support for both directional explanations of the relationship between children's social skills and parenting stress. The first set of analyses indicated that child behaviour problems and child social skills may predict subsequent maternal parenting stress, even after accounting for prior stress. The second set of analyses indicated that parenting stress may predict subsequent declines in children's social skills. These results suggest that the relationship between children's social skills and parenting stress is bidirectional.

A cross-lagged panel design was used to simultaneously examine the bidirectional effects of maternal parenting stress, child intellectual status, child behaviour problems and child social skills over time. A cross-lagged analysis allowed us to examine the two pathways of interest (early social skills to later parenting stress and early parenting stress to later social skills) simultaneously. It differs from a regression analysis in that both dependent variables (parenting stress and social skills) are entered into the model and allowed to correlate. This is a more conservative analysis that accounts for the multicollinearity between the two dependent variables, leaving less variance in the dependent variables to be explained by the independent variables. A conceptual model is shown in Fig. 2. Cross-lagged models are often utilised in social science research and have been used in previous research with families of children with ID (Greenberg *et al.* 2006). Mplus 4.21 was used to test one two-wave cross-lagged model. The dependent variables, maternal parenting stress and children's social skills, were measured at child age eight. Predictor variables included initial levels (age 6) of parenting stress, social skills, behaviour problems and child intellectual status. As with previous analyses, child health, maternal health and maternal education were included as covariates in the cross-lagged model. All measures taken at the same time point were permitted to correlate, which resulted in a fully saturated model with zero degrees of freedom (d.f.). In other words, there were as many parameters estimated as there were d.f. and measures of goodness of fit are equal to 1.0. The cross-lagged results described below and reflected in Fig. 2 were generated from the complete model, which was the model of interest. However, in order to ensure that the model tested had appropriate fit indices, the model was trimmed by eliminating the non-significant paths, thereby creating four d.f.

Several criteria were used to evaluate overall model fit: chi-square to d.f. ratio under 3 (Carmines & McIver 1981), Comparative Fit Index (CFI) above 0.90 (Tanaka 1987), Root Mean Square Error of Approximation (RMSEA) under 0.05 and Standardized Root Mean Square Residual (RMSR) under 0.09 (Brown & Cudeck 1993). According to all these standards, the final model could be said to provide a good fit to the data, with a non-significant value for the chi-square likelihood ratio test, $\chi^2/d.f. = 3.42/4$, $P = 0.49$, the CFI was 1.0, the RMSEA was 0.00, and the RMSR was 0.01.

Figure 2 shows the results of the cross-lagged panel analysis. Both maternal parenting stress and children's social skills demonstrated significant stability effects across the two time points. The stability coefficients were 0.62 for parenting stress and 0.63 for children's social skills. Next, we examined cross-lagged effects between child intellectual status, early child behaviour

problems and early child social skills with later parenting stress. In this analysis, the association between children's early social skills and later parenting stress was not significant. However, both child intellectual status ($\beta = 0.19, P < 0.001$) and child behaviour problems ($\beta = 0.16, P < 0.01$) had significant cross-lagged associations with parenting stress at age eight. Finally, we examined cross-lagged effects between child intellectual status, early child behaviour problems and early parenting stress with later social skills. Here, there was a significant cross-lagged effect between parenting stress at age six and children's social skills at age eight ($\beta = -0.20, P < 0.01$), suggesting that early parenting stress is a significant predictor of poorer social skills over time.

Discussion

We examined whether, and how, child social skills relate to maternal parenting stress within families of children with or without ID. Our first question asked whether behaviour problems and social skills explain unique variance in parenting stress. Consistent with Beck *et al.* (2004), children's social skills, as well as behaviour problems, accounted for unique variance in parenting stress above and beyond child intellectual status. Our results suggest that these relationships are not specific to parents of children with ID, in that, similar relationships were found within groups of children with and without ID. Also, in this longitudinal sample, teachers' appraisals of the quality of their relationships with children were predicted, independently, by behaviour problems and social skills (Eisenhower *et al.* 2007). Our second question asked whether the interaction between behaviour problems and social skills is also a significant predictor of parenting stress. The interaction was almost statistically significant at age six, and was significant at age eight. Thus, there is some evidence for a multiplicative effect whereby high behaviour problems and low social skills relate to particularly high maternal stress. One possible explanation for why the interaction was a significant predictor of stress at age eight and not at age six, is that the importance of social skills increases as children mature and their peer groups become more prominent. Furthermore, our results suggest that this effect is particular to mothers of children with ID. It appears that the combination of numerous behaviour problems and a lack of social skills in the presence of ID is especially stressful for families, a finding that needs replication.

Our third question asked about the stability of these relationships across ages six through eight. The main effects of behaviour problems and social skills on parenting stress were stable across these early school years. It also appears that the contribution of social skills to parenting stress may be increasing over time. Social skills accounted for more variance in parenting stress at age eight than at age six, while child behaviour problems accounted for less variance at age eight than at age six. Additionally, as noted, there was a significant synergistic interaction between social skills and behaviour problems at age eight, providing further evidence of the importance of social skills later in childhood.

Our fourth question asked about the direction of influence in the relationships between child social skills and parenting stress, a question that must be addressed longitudinally. Multiple regression analyses supported a bidirectional effect: early social skills and increases in social skills predicted decreases in parenting stress over time, while early parenting stress and increases in parenting stress predicted a worsening of social skills over time. The path from early parenting stress to later child social skills was most supported by these analyses. These results are consistent with other findings that parent-child interactions and family stress and support were associated with subsequent peer interactions for children with developmental delays (Guralnick *et al.* 2006a; Guralnick *et al.* 2007b). Additionally, as changes in parenting stress were also a significant predictor of later social skills, parenting stress may have a cumulative deteriorating effect on children's social skills over time. These relationships were

particularly striking, given the high stability of parenting stress, child behaviour problems and child social skills.

In order to test these two directions of effect simultaneously, a cross-lagged panel analyses was utilised. In this analysis, the cross-lagged effect of early parenting stress and later social skills was significant, providing further support that early parenting stress may be an important risk factor for children's developing social skills. While early social skills were significantly related to later parenting stress in the regression analysis, in the cross-lagged analysis, this path was not supported. The difference in the results is likely due to differences in the statistical model. In the cross-lagged analysis, the two dependent variables (social skills at age eight and parenting stress at age eight) are allowed to correlate; thus, there is less independent variance in each of the dependent variables that remains to be explained by the predictor variables. Through the use of the cross-lagged analysis, we were able to test the two directions of effect simultaneously (social skills to parenting stress and parenting stress to social skills) and this analysis indicated that the strongest direction of effect was from early parenting stress to later social skills. It is possible that highly stressed parents may have difficulty providing their children with environmental situations that maximise their children's social skills development (i.e. organised play dates). Additionally, these parents may not model good social competence for their children. Parents and children may also share a biological vulnerability (i.e. neuroticism) that predisposes the parents to be more stressed and the children to have social skills difficulties. Furthermore, one should be cautious in interpreting the non-significant path from early social skills to later maternal parenting stress. Simply because the effect was not significant, not meaning that the effect does not exist, the two cross-lagged effects (early social skills to later parenting stress and early parenting stress to later social skills) were not significantly different from each other. Future research should further examine the direction of the relationship between child social skills and parenting stress over time.

Child intellectual status accounted for unique variance in maternal parenting stress even when child behaviour problems and child social skills were accounted for. This is inconsistent with previous research, showing that the relationship between child intellectual status and parenting stress is accounted for by child behaviour problems (i.e. Baker *et al.* 2003; Beck *et al.* 2004). In the present sample, overall parenting stress levels did not increase, but the relative contributions of the child's cognitive abilities and behaviour problems seemed to shift, with the former taking on increased influence. One possible explanation for these inconsistent findings is the developmental stage of the children in the current study, roughly equivalent to school grades kindergarten through second grade. This is a period when parents become increasingly aware of the child's ID – especially borderline or mild ID. The academic and social demands at school become more stringent, and parents' initial expectations for their child may be challenged by his or her performance in the face of these demands. Moreover, accompanying this heightened awareness of the child's ID are increased demands on these parents, such as coping with the service delivery system, attending educational planning meetings, accommodating related services and participating in parent groups. Thus, during a time when parents may be becoming somewhat acclimated to the child's behavioural challenges, the inescapable role of 'parent of a child with ID' itself may contribute more to parenting stress.

One limitation of the current study is that many of the critical measures are self-report questionnaires and, therefore, are subject to response bias. While parenting stress is a subjective perception, future investigators could take more objective measures of child behaviour problems and social skills. Additionally, future investigators might examine these relationships with fathers. Mothers' and fathers' ratings of their child's behaviour problems have been shown to have both a shared component and an individual view component, suggesting that parents may experience their child's behaviour problems differently (Rowe & Kandel 1997). Previous

research has shown that father's stress is also affected by the child's behaviour problems (Baker *et al.* 2003), but the contribution of children's social skills to fathers' parenting stress has yet to be examined.

Implications for intervention

The robust methodological design and longitudinal nature of the data allowed us to examine the direction of the relationship between child social skills and parenting stress, which is critical in determining targets for intervention. Additionally, through the examination of the interaction between social skills and behaviour problems, this study helps to identify an important risk group: mothers of children with high behaviour problems and low social skills. These findings have clear implications for early intervention programmes. Consistent with other studies, the relationship between children's behaviour problems and parenting stress suggests incorporating behaviour management strategies into early intervention programmes.

Moreover, the present study suggests that interventions targeting children's early social skills may also decrease parenting stress. Little research has examined the effectiveness of interventions aimed at developing social skills in children with ID and especially for young children. A few studies using a multiple baseline designs show an increase in appropriate social initiations and interactions among adolescents and young adults with mild ID, following social skills training interventions (O'Reilly & Glynn 1995; O'Reilly *et al.* 2004). Additionally, a recent randomised clinical trial found modest effects for an intervention aimed at increasing peer-related social competence among children with mild delays (Guralnick *et al.* 2006b). Guralnick *et al.* (2006b) conducted peer-related social development intervention and found that children with ID who participated in the intervention did not show an increase in the negativity of their interpersonal interactions over a 2-year period compared with control children with ID who demonstrated an increase in the number of negative interaction with peers over time. Perhaps, most importantly, the results of the present study suggest that the most critical target for intervention may be early parenting stress, in order to promote social skills development as well as behaviour problem management. It is encouraging that a recent review by Hastings & Beck (2004) found that interventions to remediate stress in parents of children with ID are generally effective, with cognitive behavioural group interventions showing the strongest evidence for their effectiveness, especially with mothers.

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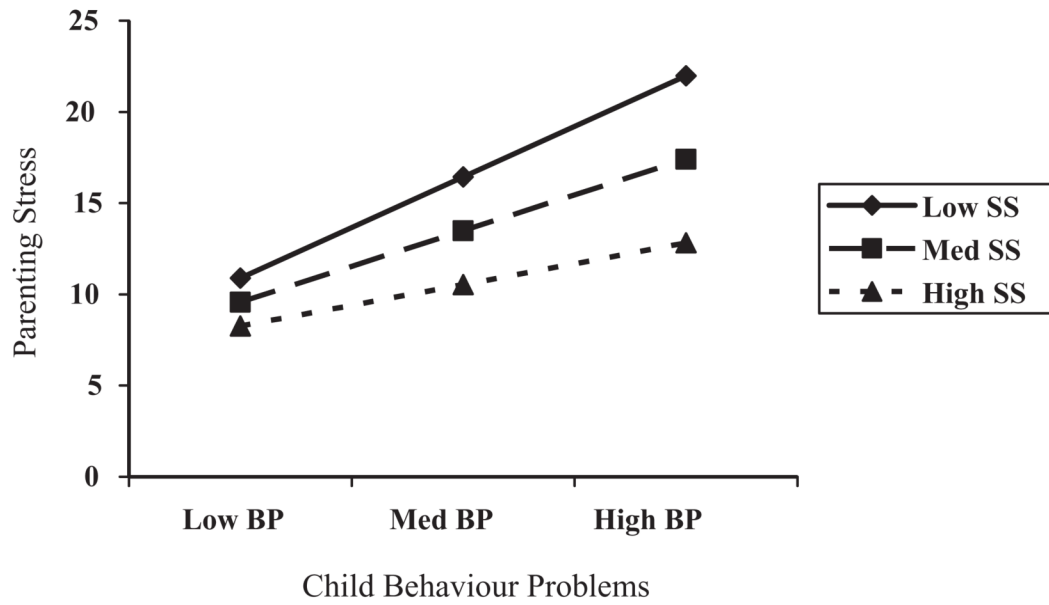


Figure 1. Interaction between child behaviour problems and social skills in predicting parenting stress at age eight. SS, social skills; BP, behaviour problems.

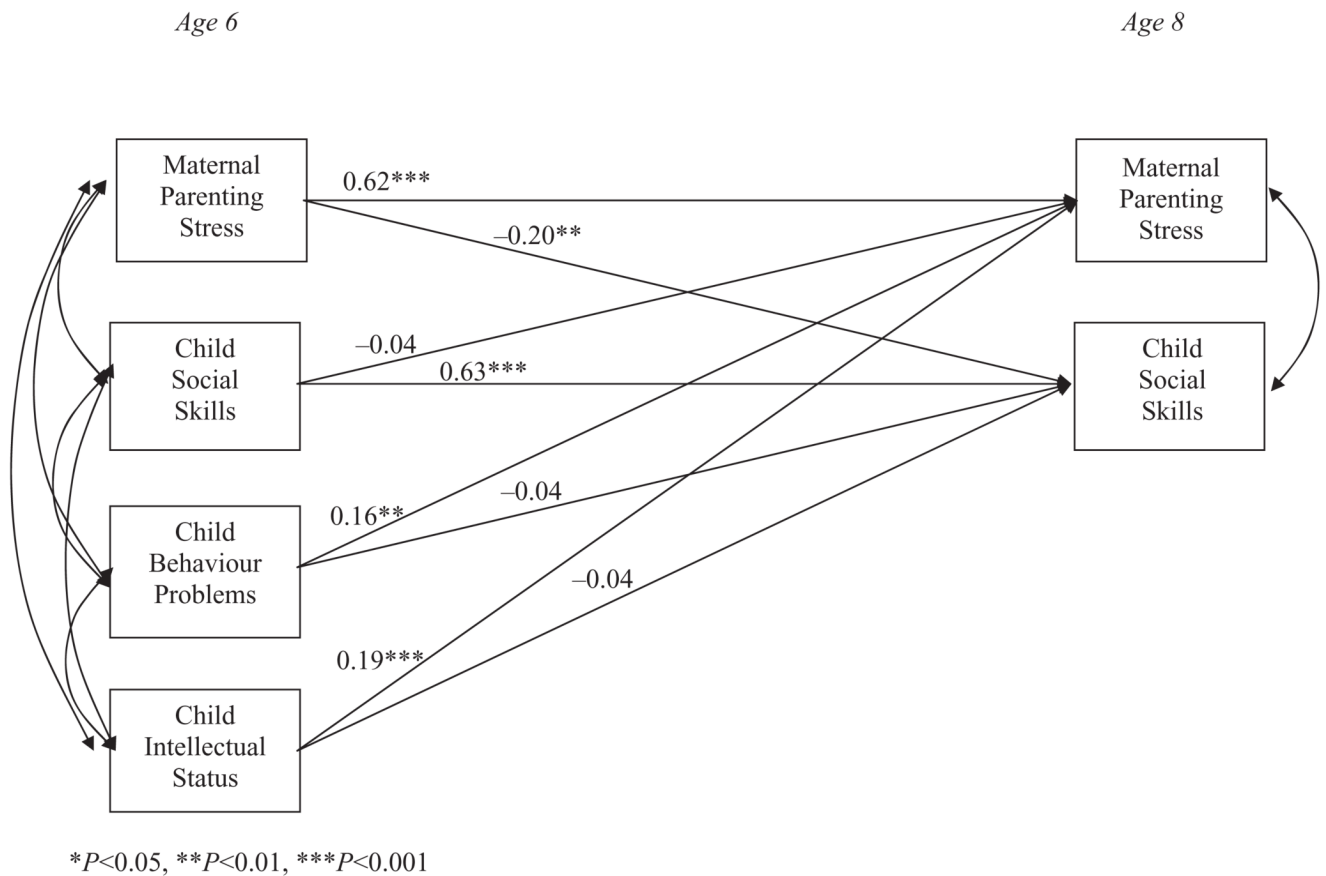


Figure 2.

Cross-lagged panel analysis model predicting child social skills and maternal parenting stress at child age eight.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Table 1Demographics by intellectual status group at age six ($n = 189$)

Variable	Group status		
	Intellectual disability ($n = 74$)	Typically developing ($n = 115$)	t or χ^2 value
Child Variables			
Gender (% boys)	60.8	58.3	$\chi^2 = 0.04$
Race (% Caucasian)	55.4	61.7	$\chi^2 = 0.51$
Child health [†]	3.27	3.79	$t = 5.00^{**}$
Mean Stanford Binet Mental Index (SD)	59.6 (14.4)	103.7 (12.0)	$t = 22.74^{**}$
Family variables			
Maternal education (number of years)	14.5	15.9	$t = 4.40^{**}$
Mean maternal age (SD)	36.1 (6.5)	37.9 (5.9)	$t = 1.42$
Maternal employment (% employed)	65.2	52.7	$\chi^2 = 2.25$
Maternal health [†]	2.99	3.70	$t = 1.86$
Marital status (% married)	78.4	89.6	$\chi^2 = 1.80$
Family income (% earning \$50 000+)	46.8	67.0	$t = 5.54^*$

* $P < 0.05$.** $P < 0.001$.

SD, standard deviation.

[†]Health scale: 1 = poor; 2 = fair; 3 = good; 4 = excellent.

Final model of hierarchical multiple regression predicting maternal parenting stress (combined sample)

Variable	Age six			Age eight		
	B	SE B	β	B	SE B	β
Step 1						
Maternal health	-0.24	0.70	-0.02	0.19	0.75	0.01
Child health	0.34	0.91	0.02	-0.98	1.01	-0.06
Maternal education	0.22	0.22	0.05	0.02	0.23	0.01
Step 2						
Child intellectual status	3.59	1.16	0.17*	3.60	1.30	0.17*
Step 3						
Child behaviour problems	5.62	0.65	0.52**	3.91	0.84	0.36**
Step 4						
Child Social Skills	-2.36	0.61	-0.25**	-2.95	0.72	-0.29**
Step 5						
Behaviour problems \times social skills interaction	-1.0	0.53	-0.10	-1.63	0.59	-0.14*
R^2	0.61			0.59		

* $P < 0.01$,** $P < 0.001$.SE, standard error; B, unstandardized beta; β , standardized beta.

Final model of hierarchical multiple regression predicting maternal parenting stress (sub-samples)

Variable	Intellectual disability						Typically developing						
	Age six			Age eight			Age six			Age eight			
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β	
Step 1													
Maternal health	1.04	1.19	0.08	1.22	1.39	0.09	-1.29	0.86	-0.11	0.17	0.89	0.02	
Child health	0.00	1.38	0.00	-1.76	1.90	-0.09	0.48	1.24	0.03	-1.06	1.17	-0.08	
Maternal education	0.60	0.43	0.11	0.06	0.49	0.01	0.06	0.25	0.02	-0.09	0.26	-0.03	
Step 2													
Child behaviour problems	6.44	1.37	0.61 ^{***}	2.41	2.11	0.20	5.66	0.80	0.56 ^{***}	3.92	0.94	0.43 ^{***}	
Step 3													
Child social skills	-2.56	1.08	-0.22 [*]	-2.54	1.31	-0.21	-2.24	0.74	-0.24 ^{**}	-2.42	0.90	-0.28 ^{**}	
Step 4													
Behaviour problems \times social skills interaction	-0.45	1.06	-0.06	-4.08	1.56	-0.48 [*]	-1.51	0.86	-0.12	-0.16	0.73	-0.02	
R^2	0.58			0.60			0.51			0.43			

* $P < 0.05$,

** $P < 0.01$,

*** $P < 0.001$.

SE, standard error; B, unstandardized beta; β , standardized beta.

Table 4

Final model of longitudinal regression analysis predicting parenting stress at age eight

Variable	B	SE B	β
Step 1			
Maternal health	1.01	0.61	0.07
Child health	0.48	0.77	0.03
Maternal education	0.29	0.19	0.06
Step 2			
Initial parenting stress (6)	0.54	0.07	0.51***
Step 3			
Child status	3.80	1.07	0.17**
Step 4			
Child behaviour problems (6)	0.12	0.03	0.24***
Change in behaviour problems (six to eight)	0.17	0.04	0.20***
Step 5			
Child social skills (six)	-0.07	0.03	-0.13*
Change in social skills (six to eight)	-0.16	0.04	-0.18***
R^2	0.79		

* $P < 0.05$,** $P < 0.01$,*** $P < 0.001$.SE, standard error; B, unstandardized beta; β , standardized beta.Step 2 $\Delta R^2 = 0.59$, Step 3 $\Delta R^2 = 0.03$, Step 4 $\Delta R^2 = 0.07$, Step 5 $\Delta R^2 = 0.02$.

Table 5

Final model of longitudinal regression analysis predicting social skills age eight

Variable	B	SE B	β
Step 1			
Maternal health	2.20	1.19	0.09
Child health	0.94	1.52	0.03
Maternal education	-0.32	0.39	-0.04
Step 2			
Initial social skills (six)	0.61	0.06	0.61*
Step 3			
Child status	1.35	2.20	0.03
Step 4			
Child behaviour problems (six)	-0.02	0.07	-0.02
Change in behaviour problems (six to eight)	-0.14	0.08	-0.09
Step 5			
Parenting stress (six)	-0.54	0.14	-0.29*
Change in parenting stress (six to eight)	-0.62	0.16	-0.21*
R^2	0.74		

* $P < 0.001$.SE, standard error; B, unstandardized beta; β , standardized beta.Step 2 $\Delta R^2 = 0.52$, Step 3 $\Delta R^2 = 0.00$, Step 4 $\Delta R^2 = 0.05$, Step 5 $\Delta R^2 = 0.04$.