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Improved Social Skills in Children with Developmental Delays After Parent Participation in MBSR: The Role of Parent–Child Relational Factors

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Abstract Parents of children with developmental delays (DD) often report significantly heightened levels of stress when compared to families of typically developing (TD) children. While elevated levels of early parenting stress are shown to negatively impact social development in TD children, this effect may be compounded for children with DD, who are already at greater risk of experiencing social difficulties. We sought to examine whether changes in child social skills occur after parent participation in mindfulness based stress reduction (MBSR) intervention, and whether these changes were associated with parent–child relational factors. Parental stress was reduced through an 8-week MBSR training group. Changes in child social skills were measured using the social skills improvement system (SSIS), which was completed by 3 categories of respondents: parents participating in the study, a secondary informant, and the child’s teacher. Parent–child relational factors were measured using the parenting relationship questionnaire (PRQ). Data from 24 families of children with DD (ages 2.5–5) was examined in this study. Paired samples *t*-tests examining pre-post differences revealed that mothers, secondary informants, and teachers acknowledged improvements in child self-control. Mothers and teachers also reported improvements in empathy and engagement, while secondary informants and teachers reported improvements in child assertion. Teachers also reported improvements in children’s communication, responsibility, and cooperation. Variance in child self-control was

significantly accounted for by changes in two parent–child relational factors: attachment and discipline practices. These results suggest that addressing parental mental health may enhance the efficacy of child-focused interventions by promoting parental consistency in discipline and perceived attachment (i.e. parent–child closeness).

Keywords Developmental delay · Parental stress · Social skills · Mindfulness · Parenting

Introduction

Parents of children with developmental delays (DD) consistently report higher levels of parenting stress when compared to parents of typically developing (TD) children (Baker et al. 2003; Baxter et al. 2000; Emerson 2003; Hauser-Cram et al. 2001; Neece et al. 2012; Webster et al. 2008). In fact, nearly a third of parents in this population report stress levels scoring within the clinical range (Davis and Carter, 2008). In general, highly stressed parents are significantly more vulnerable to parental depression (Anastopoulos et al. 1992; Deater-Deckard et al. 1998; Hastings et al. 2006), marital conflict (Kersh et al. 2006; Suarez and Baker 1997), poorer physical health (Eisenhower et al. 2009; Oelofsen and Richardson 2006), and less effective parenting (Crnic et al. 2005; Coldwell et al. 2006). However, raising a child with DD can place parents at greater risk for experiencing a wide range of additional stressors such as low levels of parenting confidence (Liu et al. 2012; Fonseca et al. 2013; Sepa et al. 2004), which can impact parents’ emotional well-being, hinder their adjustment to the parenting role, and decrease overall parental effectiveness (Jones and Prinz 2005). Additionally, high levels of parenting stress are shown to lead to

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poor child outcomes, such as poor psychosocial health (Webster et al. 2008), increased child behavior problems (Baker et al. 2003; Briggs-Gowan et al. 2001; Donenberg and Baker, 1993; Johnston and Mash 2001; Neece et al. 2012) and lower social competence (Neece and Baker 2008; Anthony et al. 2005; Guralnick et al. 2003). Evidence suggests that the relationship between childhood problems and parenting stress is bidirectional, such that higher parenting stress leads to greater childhood problems, which in turn continue to exacerbate parental stress over time (Baker et al. 2003; Neece et al. 2012; Orsmond et al. 2003).

The impact of parental stress on childhood problems is especially concerning in families of children with DD, as these children are inherently more vulnerable to poorer behavioral and social difficulties (Merrell and Holland, 1997). Consequently, it is the higher levels of behavior problems (rather than intellectual delays) that are the primary source of child-related stress in the family (Baker et al. 2002; Beck et al. 2004; Hassall et al. 2005; Hastings 2003). However, as the influence of child behavior problems on parenting stress decreases with child age, difficulties in child social skills begin to exhibit greater contributions to parenting stress over time (Neece and Baker 2008). This is likely because children with DD are inherently at greater risk for poor social competence, a crucial skillset promoting prosocial problem solving and protecting against further maladjustment (Fenning et al. 2011; Downey and Coyne 1990). Addressing parental stress early on is likely to promote healthier social development among children with DD, which may subsequently reduce parental stress as the child continues to develop. However, interventions aimed at improving childhood problems seldom address parental stress. While most interventions attempt to break the negative cycle between stress and childhood problems by intervening directly with the child, interventions that primarily target parental stress may prove to be an additionally effective means of improving childhood outcomes (Neece 2013).

Given the bidirectional relationship between parent and child maladjustment, it is reasonable to suspect that the parent–child relationship plays a critical mediating role through which parental stress influences child behavioral and social development. For example, high levels of parenting stress may impact the development of parent–child closeness and attachment. While risk factors such as DD may not directly interfere with parent–child closeness (Hoffman et al. 2009), parenting stress can promote insecure attachment between the parent and child, as predicted by psychological distance rather than physical separation (Jarvis and Creasy 1991). Stress induced decreases in maternal sensitivity may also disrupt the parent–child relationship. Reciprocal give-and-take between mother and

child is a critical attribute of sensitivity, promoting child comfort, child–mother attachment, and overall child development (Shin et al. 2008). Kim and Kim (2009) found that poor psychological status in mothers had a negative effect on maternal sensitivity and attachment in turn. Ruptures in parent–child attachment may further impact the relationship by increasing stress related to the maternal role (Teti et al. 1991).

High levels of stress that promote poor parent–child relationships are likely to result in less effective parenting styles and behaviors as well. As a result, authoritarian parenting styles that are more negative and controlling are common among the highly stressed parents of children with DD (Woolfson and Grant 2006). These styles are more likely to negatively affect social-cognitive processes that are critical for peer-related social competence (Guralnick, 1999). While limit setting is necessary for social development (Lengua et al. 2011), parent–child relational factors that are shown to promote greater social competence are often tied to more positive interactions that include positive parent affect, less harsh discipline (Green and Baker 2011), sensitive-parenting (Barnett et al. 2012) and calm discussion (Pettit et al. 1997). Hart et al. (1992) illustrated this concept by demonstrating that children of less power assertive parents exhibited fewer disruptive playground behaviors, more prosocial behaviors, and were more preferred by their peers. Fostering foundational emotionally positive parent–child relationships early on can set the stage for parent–child interactions that promote prosocial problem solving skills as children develop. In fact, as children grow into middle childhood, their ability to independently engage in emotional discourse with their parents is associated with greater prosocial problem solving strategies, and in turn, more adaptive social outcomes regardless of the presence of a DD (Fenning et al. 2011).

Negative parent–child relationships characterized by poor and harsh parenting practices may detrimentally impact children with DD to a greater extent than TD children. Because psychopathology develops as a product of bidirectional interactions between individual and environmental factors (Sameroff 2009), families coping with the additional stressors associated with individual risk, such as DD and intellectual disability (ID), play a particularly important role in providing an environment that can either intensify risk or serve a protective function (Sameroff 1998). For example, Green and Baker (2011) found that parents' negative affect predicted significantly lower social skills for children with ID than for children with TD. The impact of poor parent–child relationships on social development is especially concerning. Social competence is among one of the most important aspects of individual development, with social skills providing a critical protective factor against further maladjustment (Downey and

Coyne 1990; Fenning et al. 2011). By directly targeting parent stress in families of children with DD, the parent–child relationship may be improved and vulnerabilities in social development may be reduced.

Fortunately, there is evidence supporting the efficacy of interventions aimed at reducing parental stress. In their review of stress reduction interventions for parents of children with DD, Hastings and Beck (2004) found support for the use of standard service models such as respite care and case management, as well as growing evidence for parent-led support networks. The strongest identified evidence-base was for cognitive behavioral group interventions. However, Hastings and Beck (2004) acknowledged the lack of data available for other theoretical approaches to stress reduction, and encouraged growth in this area of research in order to strengthen the evidence-base for possible alternative models.

One alternative model of stress reduction that has gained growing support in the literature is mindfulness-based intervention. Given the prominent surge of interest in treatments incorporating the practice of mindfulness (Allen et al. 2006; Baer et al. 2008), it is not surprising that various mindful-parenting interventions have been evaluated with the often highly stressed parents of children with DD (Bazzano et al. 2010; Benn et al. 2012). Mindfulness may help parents achieve a more relaxed and peaceful state of mind, which can promote greater awareness during parent–child interactions. As a result, parents might become better listeners to their children, as well as more aware of impulses, allowing them to achieve a greater sense of control during interactions. Interventions promoting mindful parenting have been used with both TD children with externalizing behavior problems as well as children with Autism Spectrum Disorders (Singh et al. 2006) and found to be effective in reducing children’s externalizing behavior and attention problems as well as improving children’s self-control, compliance, and attunement to others (Bögels et al. 2008; Singh et al. 2010a, 2010b). Mindful parenting interventions focus directly on the parent–child relationship by teaching parents to identify interactions that result in relational disconnectedness (Placone-Willey 2002). While recent studies demonstrate promising results of parent mindfulness training, these studies are limited by small sample sizes and lack of randomization to treatment conditions, indicating a need for further research in this area.

In contrast to mindful parenting interventions, mindfulness based stress reduction (MBSR) focuses directly on personal stress without providing additional training on applying mindful skills to parent–child interactions. Training is completed through an 8-week manualized stress reduction intervention delivered in a group format. Participants learn to manage stress by enhancing personal

awareness on a moment-to-moment basis using several techniques including exercising awareness of physical sensations and cognitions, breathing exercises, meditation, and yoga. MBSR is supported by over two decades of extensive research showing its effectiveness in reducing stress, anxiety, and depression, as well as promoting overall well-being (Chiesa & Serretti, 2009). Previous studies indicate that the majority of people who complete the 8-week MBSR program report experiencing a greater ability to cope more effectively with both short and long-term stressful situations, a critical skill for parents of children with DD.

To date, one study has shown that using MBSR to target parent stress may also lead to improved child behavior problems (Neece 2013). While previous studies have provided parents with a skillset specific to mindful parenting techniques, Neece (2013) demonstrated that targeting parent stress without any focus on parenting skills or parent–child interactions may have an indirect “spillover effect” on the child (Neece 2013). After providing an 8-week MBSR treatment course for parents of children with DD, Neece (2013) found that MBSR was not only efficacious in reducing overall parenting stress and depression, but that parents reported reductions in child behavior problems as well. Specifically, parents in the MBSR treatment group reported that their children had fewer behavior problems in the areas of attention and ADHD symptomatology when compared to those in a wait-list control group. While improvements in behavior problems were apparent, spillover effects in other areas of child development were not examined. Furthermore, although the author suggested that changes in parenting behavior and parent–child relationships are likely responsible for positive outcomes in children, these potential mediating factors have not been examined empirically.

The purpose of the current study is to continue examining the impact of MBSR on the same sample used in the Neece (2013) study and explore whether spillover effects occur in areas additional to those summarized above. Our first aim is to examine whether parent participation in MBSR results in spillover effects that positively impact child social skills. Our second aim is to examine whether any improvements in child social skills are mediated by changes to the parent–child relationship. We hypothesized that parents would report improvements in child social skills in the areas measured by the social skills improvement system (SSIS). We also anticipated that the moment-to-moment awareness and nonjudgmental responding that characterizes the skills taught in MBSR would allow parents to experience improved relationships with their children. Specifically, we hypothesized that parents would report feeling a greater sense of sensitivity/attachment and reduced relational frustration as captured by scales within

the parenting relationship questionnaire (PRQ). Lastly, we hypothesized that changes in parent–child relational factors would predict changes in child social skills.

Method

Participants

The current study involved 24 parents who participated in the mindful awareness for parenting stress (MAPS) project, which included parents of children ages 2.5–5 years old with DD. Although some participants were recruited through the local newspaper, local elementary schools, and community disability groups, primary recruitment was conducted through the Inland Empire Regional Center located in the San Bernardino and Riverside counties of southern California. In California, practically all families of individuals with DD receive services from one of nine Regional Centers. Families who met the inclusion criteria were selected by the Regional Center’s computer databases and received a letter and brochure informing them of the study. Information about the study was also posted on a website which allowed interested parents to submit their information.

Criteria for inclusion in the study were: (1) Having a child ages 2.5–5 years, (2) the child was determined by Regional Center (or by an independent assessment) to have a DD, (3) the parent reported more than 10 child behavior problems (the recommended cutoff score for determining risk of conduct problems) on the Eyberg Child Behavior Inventory (ECBI; Robinson et al. 1980), (4) the parent was not receiving any form of psychological or behavioral treatment at the time of referral (e.g. counseling, parent training, parent support group, etc.), (5) the parent agreed to participate in the intervention, and (6) the parent spoke and understood English. Exclusion criteria included parents of children with debilitating physical disabilities or severe intellectual impairments that prevented the child from participating in a parent–child interaction task that was a part of the larger laboratory assessment protocol (e.g. child is not ambulatory). In order to be included, parents must also have completed all initial measures and attended the initial assessment before the beginning of the first intervention session.

Of the 95 families that were screened for the study, 63 were determined to be eligible, and 51 parents elected to participate in the intervention. Within participating families, primary and secondary informants were identified. The primary informants were all mothers who each participated in the laboratory assessments. The secondary informants were primarily fathers with the exception of one grandfather. During the initial assessment, primary

informants (from hereon referred to as “mothers”) were invited to bring the secondary informant from their family to participate in the intervention as well. Eleven secondary informants chose to participate in the intervention, and were excluded from any analyses that utilized data reported from mothers, so as to not include children twice in any analysis. Of the remaining participating mothers, five completed the initial assessments but dropped out of the study before the intervention, two participated in the study but did not return pre-treatment measures in time, 10 did not return post-treatment data in time, and one did not provide complete data for the measures relevant to this study. This left 24 mothers who provided complete data for the measures included in this study. There were no demographic differences between participants who completed the intervention and those who dropped out of the study, nor were there differences between participants who turned in completed data versus those who did not complete the measures relevant to this study.

Table 1 depicts the demographics of the current sample. The majority of children were boys (66.7 %), with 37.8 % of children identified as Hispanic. Parents reported 33.3 % of the children as Caucasian, 8.3 % as Asian, and 20.8 % as “Other.” The Mean age of the children was 3.4 years with a standard deviation of 0.82. Most of the participating parents were married (79.2 %). Families reported a range of annual incomes with 50 % reporting an annual income of more than \$50,000 but incomes ranged from \$0 to over \$95,000. The average number of years parents completed in school was 15.0 years with a standard deviation of 2.6.

According to the Gilliam Autism Rating Scale—Second Edition (Gilliam 2006) 83.3 % of the children in our sample had a “very likely” diagnosis of autism. At the time of the initial assessment, 92 % of the children were reported to receive special education services in school and 83 % of the children were enrolled in a special education classroom. Although not formally assessed, the majority of children were estimated to have intellectual disability no

Table 1 Demographic characteristics

Demographic characteristics	
Child Characteristics	
Gender (% Boys)	66.7 %
Age, M(SD)	3.4 (.82)
Ethnicity (% Caucasian)	33.3 %
Mother Characteristics	
Age, M(SD)	36 (8.0)
Marital Status (% Married)	79.2 %
Years of Education, M(SD)	15 (2.6)
Family Income (% >\$50,000)	50 %

N = 24 children

higher than the mild to moderate range given the demands of the laboratory assessment. For example, children had to understand and follow directions in a structured play task in order to be eligible for the study.

Procedure

Institutional review board approval was obtained for the protection of human subjects prior to commencing this intervention study. Interested parents contacted the MAPS Project by phone, postcard, or submitting their information on the project website. Study personnel then conducted a phone screen to determine the eligibility of the parent. If the parent met inclusion criteria, an intake laboratory assessment was scheduled. Prior to the initial assessment, parents were mailed a packet of questionnaires to be completed by mothers before arriving at the lab assessment. During the lab assessment, the mothers completed the informed consent and were interviewed to collect demographic information, including information on the child's school of attendance and current teacher. This information was used to mail an additional packet with two questionnaires to be completed and returned by the child's teacher. Finally, mothers drew a piece of paper out of a box which informed them of whether they were assigned to the immediate treatment or waitlist-control intervention group. In addition, a secondary informant of each child completed a packet of measures. For the purposes of achieving sufficient power the experimental design was not utilized in the current study. Given that both groups eventually received treatment, data from the immediate treatment and waitlist-control were combined to achieve a sample size of 24. Power analysis indicated that 25 people were needed in order to have an 80 % power to detect a large effect size ($F^2 = .35$) from pre to post treatment, which is consistent with the effect sizes observed in this study.

Parents assigned to the immediate treatment group began the intervention in March 2012 and parents assigned to the control group began the intervention in June 2012. The 8-week mindfulness based stress reduction (MBSR) intervention followed the manual outlined by Dr. Jon Kabat-Zinn at the University of Massachusetts Medical Center (Blacker et al. 2009; Kabat-Zinn et al. 1992). This intervention consisted of three main components: (1) didactic material covering the concept of mindfulness, the psychology and physiology of stress and anxiety, and ways in which mindfulness can be implemented in everyday life to facilitate more adaptive responses to challenges and distress, (2) mindfulness exercises during the group meetings and as homework between sessions, and (3) discussion and sharing in pairs and in the larger group. The MBSR program included eight weekly 2-hour sessions, a daylong 6-hour meditation retreat after session 6, and daily home

practice based on audio CDs with instruction. Formal mindfulness exercises included the body scan, sitting meditation with awareness of breath, and mindful movement. The instructor for the group had over 20 years experience practicing mindfulness and teaching MBSR, completed the Advanced MBSR Teacher training at the University of Massachusetts Medical Center, and had received supervision with senior MBSR teachers through the Center for Mindfulness at the University of Massachusetts Medical Center. While parents participated in the MBSR intervention, trained doctoral students specializing in child clinical psychology from the university provided childcare, but no intervention was delivered.

Although we limited our sample to those who completed the measures relevant to the aims of the current study, data is available regarding the degree to which the overall sample acquired and used the skills associated with MBSR training. Neece and Roberts (under review) conducted feasibility analyses demonstrating an 84.3 % completion rate and an attrition rate of 15.7 %. Regarding the use of mindfulness learned in treatment, parents were asked to rate their use of mindfulness on a 10-point scale (0 indicating no use at all; 10 indicating very frequent, almost constant use). Parents averaged a 3.69 at the start of the course with an average increase of a half a point each session.

Participants were paid a total of \$25–35 (depending on whether they were assigned to the treatment group or control group, which required an additional laboratory visit) for completion of questionnaires and lab assessments, to compensate them for their time and in an effort to minimize attrition. Other benefits to participants included paid parking during lab assessments, childcare provided during weekly intervention group meetings, access to specialists in child development, the opportunity to learn more about their children's abilities across various situations, a feedback report on their child's behavioral development after the end of the intervention, and emailed links to community mindfulness opportunities and resources to reinforce ongoing practice after program completion.

Measures

Demographic Data

Demographic data were collected during an interview with the participating parent.

Parenting Relationship Questionnaire (PRQ)

The Parenting Relationship Questionnaire (PRQ; Kamphaus and Reynolds 2006) is a 45-item scale designed to

Table 2 Sample child social skill means at intake compared with SSIS norms

Social skill	Sample		Norm sample		Norm subsample with DD	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-control	5.9	3.4	11	3.3	7.4	5.2
Communication	9.4	3.6	15.3	3.3	7.2	5.1
Cooperation	8.4	2.7	12.1	3.1	7.6	4.3
Assertion	7.2	3.3	14.7	3.9	6.4	4.6
Responsibility	5.9	2.8	11.4	3.5	6.9	4.9
Empathy	6.1	4.0	13.3	3.1	8.0	5.6
Engagement	6.6	3.8	15.4	3.9	6.8	5.7

assess the relationship between the primary caregiver and his or her child. The scale measures this construct through seven subscales including attachment, discipline practices, involvement, parenting confidence, and relational frustration. Parents respond to the questions on the PRQ in a Likert type scale with Never (1) to Almost Always (4). Sample items for this measure include, “I can sense my child’s moods; I know what to say to calm down my child; It is important for a child to follow the house rules.” A test review of this measure conducted by Kamphaus and Reynolds (2006) demonstrated fairly high internal consistency, with median scores of .82–.87 and good test–retest reliability of .75–.89. This instrument was also demonstrated to be valid based on moderate to high correlations with similar measures such as the parent–child relationship inventory (PCRI). Chronbach’s alpha was calculated for each scale for the current sample and ranged from .62–.85 ($M = .75$).

Social Skills Improvement System (SSIS)

Child social skills were assessed by mothers, secondary informants and teachers report using the parent and teacher forms of the Social Skills Improvement System (SSIS; Gresham and Elliott 2008) rating scales respectively. Sample items for this measure include, “Joins activities when they have already started; Says when there is a problem; Stays calm when teased.” The SSIS is a 79-item widely used questionnaire that provides a broad assessment of child social skills, problem behaviors, and academic competence for children. This measure was shown to have adequate reliability (at least .70 for social skills subscales) and good validity, as evidenced by moderate to high correlations in expected directions among subscales, as well as validity analyses conducted with the Behavior Assessment System for Children (2nd ed.; BASC-2; Reynolds and Kamphaus 2004), and the Vineland Adaptive Behavior Scales (2nd ed.; Sparrow et al. 2005, 2006). All social skills subscales on the SSIS were examined for changes, as parents and teachers perceive the areas identified on this

measure as either important or critical for development in pre-school children (Frey et al. 2014). These seven scales were examined separately and included communication, cooperation, self-control, responsibility, empathy, engagement, and assertion. Internal consistency for this sample was .87.

Data Analyses

The distributions of the primary variables were examined at both pre and post-treatment. As suggested by Cohen, (Cohen et al. 2002), all outliers were set equal to plus or minus three standard deviations from the mean in order to reduce the influence of extreme data points on the results. Data points that were more than three standard deviations above or below the mean of a variable were considered to be outliers. None were identified. Additionally, demographic variables listed in Table 1 that had a significant relationship ($p < .05$) with one or more of the independent variables and one or more of the dependent variables were tested as covariates in the analyses. No positive covariates were identified for the subsequent analyses.

Results

At intake, the mean score on the self-control, empathy, and engagement subscales was below average when compared to the normative sample of the SSIS. Children in the current sample scored below one standard deviation from the norm sample on self-control as well as two standard deviations below the norm sample on empathy and engagement. Participant scores were fairly consistent with the norm subsample of children with DD (within one standard deviation of norm means on all seven social skills measured), which included children ages 3–5 with global developmental delays (Gresham and Elliott 2008). See Table 2.

Regarding the parent–child relationship at intake, parents tended to score within the average range in discipline

Table 3 Changes in child social skills and parent–child relational factors after parent participation in MBSR

Social skills	Participating parent				Secondary informant				Teacher			
	Pre-tx (SD)	Post-tx (SD)	<i>t</i>	<i>d</i>	Pre-tx (SD)	Post-tx (SD)	<i>t</i>	<i>d</i>	Pre-tx (SD)	Post-tx (SD)	<i>t</i>	<i>d</i>
Self-control	5.9 (3.4)	7.5 (3.6)	2.61*	.54	4.2 (4.1)	6.4 (3.6)	2.61*	.36	6.6 (4.5)	8.0 (4.7)	2.60*	.59
Communication	9.4 (3.6)	9.2 (4.6)	.382	.03	8.0 (4.3)	8.6 (4.1)	0.51	.10	7.1 (3.8)	9.6 (3.8)	3.57**	.83
Cooperation	9.4 (3.6)	9.2 (4.6)	.382	.03	8.2 (3.0)	8.7 (2.6)	0.98	.12	9.4 (3.2)	11.3 (2.0)	3.23**	.75
Assertion	7.2 (3.3)	8.4 (3.7)	1.71	.24	5.5 (3.9)	7.7 (3.3)	3.09**	.74	4.3 (3.2)	5.6 (3.6)	2.06*	.48
Responsibility	5.9 (2.8)	6.8 (4.0)	1.58	.18	5.4 (3.7)	6.3 (2.9)	1.11	.19	7.2 (4.1)	8.8 (4.4)	2.56*	.58
Empathy	6.1 (4.0)	7.6 (4.5)	3.12**	.61	5.5 (3.4)	6.9 (3.8)	1.74	.27	5.1 (4.0)	7.0 (3.8)	2.45*	.58
Engagement	6.6 (3.8)	8.5 (4.8)	−2.63*	.61	5.5 (4.5)	6.7 (4.5)	1.29	.19	6.8 (3.0)	8.7 (3.6)	3.57**	.82
PRQ variables												
Involvement	12.9 (4.0)	14.2 (4.1)	−1.48	.23								
Relationship frustration	10.5 (3.1)	8.4 (3.3)	3.47**	.48								
Parenting confidence	11.2 (2.4)	12.6 (3.1)	−2.16*	.37								
Attachment	20.9 (4.6)	21.4 (4.5)	−0.53	.08								
Discipline practices	14.8 (5.7)	15.3 (6.1)	−.77	.06								

* $p < .05$, ** $p < .01$

practices (Mean T -score = 44, 30th percentile), attachment (Mean T = 42, 20th percentile) and involvement (Mean T = 44, 29th percentile). Scores were lower in parenting confidence (Mean T = 36, 9th percentile) and higher in relationship frustration (Mean T = 63, 92nd percentile), based on PRQ norms (Kamphaus and Reynolds 2006).

Paired samples t -tests were conducted to detect changes in child social skills after parents received the MBSR intervention. Mothers, secondary informants, and teachers each reported significant improvements across several social skills subscales. All three reporters acknowledged improvements in child self-control. In addition to child self-control, mothers reported improvements in empathy and engagement, while secondary informants reported improvements in assertion. Interestingly, among the three reporters, teachers reported the highest number of changes in child social skills. Teacher reports were consistent with mothers, demonstrating improvements in empathy and engagement, as well as consistent with secondary informants demonstrating improvements in assertion. Furthermore, teacher reports showed significant improvements in communication, responsibility, and cooperation. Lastly teacher data showed significant improvements in the overall social skill standard score provided by the SSIS and composed of all subscales (pre-treatment M = 70.83(12.646), post-treatment M = 78.72(12.953), $t(17) = -4.717$, $p < .001$). The effect size for this difference was large ($d = .97$). Both mothers and teachers reported medium sized changes in child self-control,

according to Cohen’s conventions (Cohen 1988) (mothers, $d = .54$; teachers, $d = .59$), and secondary informants reported smaller changes ($d = .36$). Effect sizes for the remaining changes in child social skills ranged from small to large. See Table 3 for summary.

Additional paired sample t -tests revealed significant changes across two parent-relational factors: relationship frustration (pre-treatment M = 10.5(3.1), post-treatment M = 8.4(3.3), $t(23) = 3.47$, $p = .002$, $d = .48$), and parenting confidence (pre-treatment M = 11.2(2.4), post-treatment M = 12.6(3.1), $t(23) = -2.16$, $p = .042$, $d = .37$). In addition, a small to medium effect size was observed for changes in involvement ($d = .31$) along with small effect sizes for changes in attachment ($d = .10$) and discipline practices ($d = .12$). However, the changes in these parent–child relational factors were not statistically significant.

Based on the results of the t -tests reported above, five linear hierarchical regressions were run to examine how changes in child self-control related to changes that occurred across each of the parent–child relational factors. The child social skill variable self-control was selected for analysis due to the consistency of reports from mothers, secondary informants, and teachers who all independently reported significant improvements in this skill from pre to post treatment. Each regression included the post-treatment self-control score as the dependent variable. The pre-treatment self-control score was then entered in the first step. In the second step, the pre-treatment score for one of

Table 4 Final models of child self-control regressed onto parent–child relational factors (N = 24)

Final models of child self-control regressed onto parent–child relational factors (N = 24)			
	B	SE B	β
IV: Discipline practices			
Step 1: Pre-tx self-control	.742	.165	.709***
Step 2: Pre-tx discipline practices	−.384	.165	−.613*
Step 3: Post-tx discipline practices	.401	.152	.675**
IV: Attachment			
Step 1: Pre-tx self-control	.917	.165	.877***
Step 2: Pre-tx attachment	−.480	.139	−.620**
Step 3: Post-tx attachment	.271	.128	.338*
IV: Relationship frustration			
Step 1: Pre-tx self-control	.687	.200	.657**
Step 2: Pre-tx relationship frustration	.110	.274	.096
Step 3: Post-tx relationship frustration	−.041	.249	−.037
IV: Involvement			
Step 1: Pre-tx self-control	.575	.190	.550**
Step 2: Pre-tx involvement	.062	.179	.069
Step 3: Post-tx involvement	−.247	.172	−.284
IV: Parenting confidence			
Step 1: Pre-tx self-control	.965	.215	.923***
Step 2: Pre-tx parenting confidence	−.747	.329	−.493*
Step 3: Post-tx parenting confidence	.204	.191	.178

* $p < .05$, ** $p < .01$,
 *** $p < .001$

the five parent–child relational factors was entered. The third and final step of each regression included the post-treatment score for the parent–child relational factor of interest, allowing each parent–child relational factor to be examined as an independent variable. By controlling for pre-treatment levels of each variable we were able to examine how changes in child self-control were related to parent–child relational factors. Of these regressions, two were significant. As child self-control increased, these changes were significantly accounted for by increases in attachment ($\beta = .338$, $t(3, 20) = 2.12$, $p = .047$) as well as increases in consistent discipline practices ($\beta = .675$, $t(3, 20) = 2.64$, $p = .016$). See Table 4.

Discussion

The current study investigated the impact of MBSR for parents on the development of social skills in children with DD. Parents who received the intervention reported significant reductions in parental stress and depression, improvements in their general life satisfaction, and subsequent reductions in child behavior problems (Neece 2013). The current study expanded on the results of Neece (2013), finding that parents who received MBSR also observed collateral gain in their child's social skills, including self-control, assertion, empathy, and engagement. Specifically,

improvements in self-control were noted across three independent reporters, highlighting the salience of these changes across multiple observers and environments. Furthermore, it appears that improvements in child self-control are associated with changes in parental reports of consistent discipline practices and feelings of attachment. Although significant changes were observed for relationship frustration and parenting confidence, these changes were not associated with changes in child self-control. Furthermore, several parent–child relational factors (attachment, discipline practices, and involvement) were within average ranges at baseline, suggesting that parents were already reporting relatively appropriate parent–child relational functioning in these areas. As a result, changes may have been subtle, or more qualitatively related to the application of mindfulness skills in these areas, rather than experiencing statistically significant increases or reductions of specific factors. This possibility is further discussed when exploring mechanisms for improvements in child self-control below. Although statistically significant changes in parent–child relational factors were not observed in discipline practices and attachment, it is important to note that some improvements did occur and that these changes were significantly associated with improvements in child self-control. It is possible that the lack of significance observed for these changes was due to underpowered analyses. As a result, clearer differences might be observed if this study were replicated with a larger sample.

The results of the current study indicate that in addition to improved parental mental health and child behavior problems shown in Neece (2013), MBSR also had a positive impact on the parent–child relationship, which may then contribute to improved child social development. These results continue to support past research regarding the impact of interventions promoting mindful parenting on various childhood gains such as improved compliance in children with ADHD (Singh et al. 2010), reduced aggression, non-compliance, and self-injury in children with autism (Singh et al. 2006, 2007), and increased positive social interactions in children with DD (Singh et al. 2007). The current study builds upon these previous findings, identifying self-control in particular, as a key variable that is not only improved with parent mindfulness training, but may also be a primary contributor to improvements in several of the areas identified above. Poor self-control is highly pertinent to the behavioral and emotional difficulties commonly experienced by children with delays, as this skill is directly related to a child's ability to regulate their own emotional and behavioral responses in social situations. Children with DD are far more likely to exhibit poor emotional self-regulation (Wilson et al. 2007), placing them at heightened risk for behavior dysregulation, as seen in higher levels of aggressive behavior (Bohnert et al. 2003). Parent–child interactions that teach self-control not only promote skills that are necessary for positive social outcomes, such as behavior regulation, but can have more general and lasting positive effects as well. For example, greater self-control in childhood is related to cognitive and attentional competencies that can enhance academic achievement, and is also predictive of a greater ability to cope with frustration and stress in adolescence (Shoda et al. 1990).

Increased self-control was associated with increases in parent-reported attachment. As defined in the PRQ, attachment refers to “the affective, cognitive, and behavioral relationship between a parent and child that results in feelings of closeness, empathy, and understanding on the part of the parent for the child” (PRQ; Kamphaus and Reynolds 2006, p. 3). Improvements in a parent's feelings of closeness and empathy toward their child may lead to significant gains in child self-control, with increased positivity in parent–child interactions acting as a possible mediator. Specifically, parents who feel especially close with their child may express these feelings through more positive parenting behaviors with their child. Parents might demonstrate greater attunement to their child by anticipating needs and addressing them early on before the child becomes excessively frustrated, and provide greater positive reinforcements for good behavior. In turn, these parenting behaviors are likely to increase the child's engagement with the parent and ultimately their motivation to self-regulate, thereby improving self-control.

Mindful techniques may play an additional role in increasing positive parenting behaviors during parent–child interactions. Mindfulness training is shown to enhance a participant's ability to engage in positive reappraisal, which Garland et al. (2009) argue is a critical mechanism of action underlying the therapeutic efficacy of mindful interventions. Positive reappraisal as an active, meaning-based coping mechanism can enhance parent's adaptability to stressful situations, and imbue difficult parent–child interactions with positive meaning. This form of coping is shown to increase positive affect (Garland et al. 2009), which may further promote more positive parenting behaviors during interactions with their children, thereby enhancing parent–child closeness. In addition, using positive-reappraisal through mindfulness is likely to heighten parental awareness of positive child qualities during interactions, resulting in more frequent and consistent positive reinforcement for adaptive behaviors. This in turn may lead to more positive behavioral contingencies on the part of the parent, resulting in additional child gains in positive self-regulation strategies and ultimately self-control.

In addition to being associated with greater attachment, increased self-control was associated with an increased consistency in parental discipline practices. This result is in line with previous research demonstrating that consistent discipline promotes healthier socio-emotional and behavioral development in children (Nieman et al. 2004; Pffiffer et al. 2005; Yamagata et al. 2013). By remaining consistent in their limit setting, parents teach children that specific problem behaviors will always lead to undesirable consequences, whereas refraining from problem behaviors will prevent negative consequences. As the child learns that their ability to self-regulate results in predictable positive or negative changes in the parent–child interaction (i.e. the parents behavior through consequences implementation/child's experience of consequence), the child's sense of self-control is likely to increase. Furthermore, parents who adopt mindful techniques in their parenting style may be more prone to increasing positive interactions through positive reappraisal as mentioned above. Singh et al. (2010) suggested that parents of children at risk for greater non-compliance are more likely to employ external control strategies in order to improve child compliance. In doing so, the child is less likely to practice internal strategies of control, and less likely to have positive interactions with parents. This effect may be compounded for children with DD who are at greater risk for noncompliance (Baker et al. 2003; Donenberg and Baker 1993; Johnston and Mash 2001; Neece et al. 2012), and whose parents often experience heightened levels of stress that place them at a greater risk for applying external control strategies such as those common in harsh authoritarian parenting styles (Woolfson and Grant, 2006).

Our results show that parents can optimize their child's ability to practice self-control by engaging in more positive parenting (increasing a sense of attachment to their child) as well as maintaining consistent discipline through limit setting and predictable consequences.

The current findings must be considered within the context of several study limitations. First the sample size was small, limiting our ability to detect smaller effects that may be present. The current study also does not include follow-up data, which prevents us from knowing the long-term benefits of parent participation in MBSR on child social development over time. In addition, our findings relied solely on parent-report data to measure parent–child relational variables and reporting biases may have influenced results. Although the use of teacher-report data enhances the validity of the findings related to changes in child social skills, subsequent studies should use observational measures in order to examine changes in parent–child relationship factors and parenting behavior during interactions. It should also be noted that six of the secondary informants providing collateral data on the child's social skills were also receiving the mindfulness intervention. Their participation in the treatment may have impacted their perceptions of the child's behavior either through expectancy or through their own reductions in stress. Moreover, gains may have been greater for mothers whose participating secondary informant was also their spouse, due to a possibility of additional improved distress in other areas such as the marital relationship. Although it may have been informative to examine differences in social skills acquisitions between children who had one parent participating in the study versus those who had two participating parents, the low number of secondary informers participating in the intervention limited our ability to conduct such analyses. To ultimately examine these differences, future studies should address the limited response rate of key caregivers using differing outreach and engagement processes. Lastly, the current study showed improvements in child social skills from pre-treatment to post-treatment, as limited power prevented us from detecting changes through the experimental design. As a result, we were unable to control for developmental changes due to time, which may have contributed to child improvements.

The present study explored the impact of parent participation in MBSR on child social skills using the same sample as the Neece (2013) study that examined the “spillover” effect of MBSR on child behavior problems. This study also builds upon the Neece and Baker (2008) study that examined the relationship between parental stress and child social skills. While the results of this study are novel in that social skills variables were examined longitudinally, these findings do not provide a complete model for the development of child social skills following parental stress reduction through MBSR. The mechanisms

by which parental stress reduction and mindfulness training affect the parent–child relationship and how the parent–child relationship subsequently impacts child social skills development remain unclear, and there are likely multiple mediators to this relationship. Further studies should examine possible changes in child emotion and behavior regulation as a byproduct of parent participation in MBSR, as well as a precursor to improved child self-control. There may also be additional moderators across these findings that should be examined, such as child level of intellectual functioning. Furthermore, studies should continue to examine the implications of these findings longer term, as social competence is foundational to the hierarchical development of healthy psychosocial functioning. Therefore early intervention with highly stressed parents may continue to positively impact development over the course of several years, especially during school entry.

Despite its limitations, the implications of this study are significant. This study provides additional support for the use of MBSR as an innovative approach to treating social emotional development in youth with DD by intervening with families early on in order to ameliorate the development of psychopathology later on. While previous analyses of the present sample have suggested that parental stress should be emphasized in treatments aimed at reducing child behavior problems (Neece 2013), the current findings expand on this implication by suggesting the usefulness of targeting parental stress in social skills interventions as well. Parental mental health may limit the ability to support child social skills groups, thereby reducing the impact of these interventions. Delivering MBSR to parents of children with DD can enhance the efficacy of child-directed interventions by promoting parental consistency and parent–child closeness. These qualities are critical to social development, as they lead to a positive self-concept and self-esteem, which promote further development of healthy social skills for children (Ooi et al. 2006). Ultimately, the development of social competence is among one of the most important aspects of individual development, with social skills providing a critical protective factor against further maladjustment (Downey and Coyne 1990; Fenning et al. 2011). Interventions should also address parental mental health as it provides a critical layer in a firm foundation on which social competence can be achieved, thereby optimizing child development overall.

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