Mindfulness-Based Stress Reduction for Parents of Young Children with Developmental Delays: Implications for Parental Mental Health and Child Behavior Problems

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Background Parents of children with developmental delays (DD) typically report elevated levels of parental stress compared with parents of typically developing children. Children with DD are also at high risk for exhibiting significant behaviour problems. Parental stress has been shown to impact the development of these behaviour problems; however, it is rarely addressed in interventions aimed at reducing child behaviour problems. The current study examined the efficacy of mindfulness-based stress reduction (MBSR) for parents of children with DD by investigating whether this intervention is effective in reducing parenting stress and whether decreases in parenting stress lead to reductions in behaviour problems among children with DD.

Materials and methods Forty six parents of children with DD were randomly assigned to an immediate treatment or wait list-control group. Participants completed questionnaires assessing parental stress and child behaviour problems at intake and at a second assessment, which took place after only the immediate treatment group had received the MBSR.

Results Parents who participated in MBSR reported significantly less stress and depression as well as greater life satisfaction compared with wait list-control parents. Regarding child outcomes, children whose parents participated in MBSR were reported to have fewer behaviour problems following the intervention, specifically in the areas of attention problems and ADHD symptomatology.

Discussion Results indicated that MBSR may be an effective intervention for ameliorating parental stress and mental health problems among parents of children with DD. Additionally, these benefits may 'spill over' and improve behaviour challenges among these children.

Keywords: autism spectrum disorders, behaviour problems, developmental disability, intellectual disability, mindfulness, parental stress

Introduction

Parents of children with developmental delays (DD) typically report more parenting stress than parents of typically developing children (Baxter *et al.* 2000; Hauser-Cram *et al.* 2001; Baker *et al.* 2003; Emerson 2003; Oelofsen & Richardson 2006; Webster *et al.* 2008). Interestingly, the relationship between child developmental status and parenting stress appears to be mediated by child behaviour problems such that once behaviour problems are accounted for, there is no longer a significant relationship between child cognitive delay and parenting stress (Hauser-Cram *et al.* 2001;

Baker *et al.* 2002; Herring *et al.* 2006). Additionally, the relationship between behaviour problems and parenting stress appears to be reciprocal such that high behaviour problems lead to increases in parenting stress over time and high parenting stress leads to increases in behaviour problems in children with DD, indicating that the two variables have a mutually escalating effect on each other over time (Baker *et al.* 2003; Orsmond *et al.* 2003; Neece *et al.* 2012). Surprisingly, although parenting stress has been shown to be an important predictor of several child outcomes, it is rarely directly addressed in interventions targeting child behaviour problems. The current study examined the efficacy of an empirically

supported stress-reduction intervention for parents of children with DD, specifically examining whether the intervention was successful in reducing parental stress and whether changes in parenting stress were associated with subsequent changes in child behaviour problems. We use the term 'developmental delay' rather than the more formal diagnosis of intellectual or developmental disability for this sample of young children, as classification would be less stable over time than with school-aged and older children and our classification was based upon parent-report.

Parenting stress among parents of children with DD

Children with DD are more likely to have family environments with high levels of parenting stress. Parents of children with DD typically report more parenting stress than parents of typically developing children (Hauser-Cram *et al.* 2001; Baker *et al.* 2003; Emerson 2003). Among parents of children with disabilities, those who have children with autism spectrum disorders (ASD) typically report the highest levels of stress (Sanders & Morgan 1997; Eisenhower *et al.* 2005; Blacher & McIntyre 2006; Pisula 2007; Estes *et al.* 2009). In fact, in studies examining the clinical profile of these parents, approximately one-third of both mothers and fathers reported clinical levels of parental stress (Davis & Carter 2008). Although there is some evidence to suggest that the stress experienced by parents of children with DD can be chronic, there is marked individual variation in its trajectory over the life course (Glidden & Schoolcraft 2003).

High levels of parental stress are particularly concerning given their association with numerous undesirable outcomes including parent depression (Anastopoulos *et al.* 1992; Deater-Deckard *et al.* 1998; Hastings *et al.* 2006), marital conflict (Suárez & Baker 1997; Kersh *et al.* 2006), poorer physical health (Eisenhower *et al.*, 2009; Oelofsen & Richardson 2006), less effective parenting (Crnic *et al.* 2005; Coldwell *et al.* 2006), and, of most importance to the present study, increased child behaviour problems (Donenberg & Baker 1993; Johnston & Mash 2001; Baker *et al.* 2003; Neece *et al.* 2012). Further, families of children with delays, who experienced high levels of stress on average, reported more family problems, lower parental satisfaction and well-being, and less parental competence and social support (Rodrigue *et al.* 1990; Sanders & Morgan 1997; Pisula 2007). These studies highlight the salience of parental stress as an environmental risk factor for the development of children with DD.

Child behaviour problems and children with DD

Young children with DD are at high risk for behaviour problems and developing comorbid mental disorders. Studies have found heightened externalizing and internalizing behaviour problems relative to typically developing children (Merrell & Holland 1997; Baker *et al.* 2002; Emerson & Einfeld 2010). Baker *et al.* (2002) documented elevations in behaviour problems as young as 3 years of age and found that 26.1% of the children with DD exhibited clinical levels of behaviour problems, compared with 8.3% of children with typical development (Baker *et al.* 2002). Early behaviour problems are a particularly important risk factor because they have been associated with the development of psychopathology among children with and without early developmental risk. In a separate study, Baker *et al.* (2010) found that 54% of typically developing children and 67% of children with DD who had clinical levels of externalizing behaviour problems at age 3 met diagnostic criteria for attention deficit/hyperactivity disorder (ADHD) at age 5 (Baker *et al.* 2010). The increased risk of having an ADHD diagnosis was maintained across middle childhood (Neece *et al.* 2011) and into adolescence (Neece *et al.* 2013).

The development of psychopathology is a significant concern for individuals with DD. Epidemiological studies have found that a third to a half of children and adolescents with delays meet criteria for a comorbid psychiatric disorder (Cormack *et al.*, 2000; Dekker & Koot 2003). Evidence from several studies that have included a comparison group with typical cognitive development suggests that about two and a half to over four times as many children with cognitive delays have serious behaviour/emotional problems as those with typical development (Dekker *et al.* 2002; Emerson & Hatton 2007; deRuiter *et al.* 2008; Baker *et al.* 2010; Neece *et al.* 2011, 2013). Furthermore, many times the diagnosis of DD may obscure other mental health diagnoses, and a person's problematic behaviour is attributed to limitations in cognitive and/or social functioning without further assessment, diagnosis or treatment of other comorbid diagnoses (i.e. diagnostic overshadowing, Reiss & Szyszko 1983). Thus, the prevalence estimates discussed above may actually be an underestimate of the true rates of psychopathology among children with DD.

Investigating interventions for behaviour problems among persons with DD is crucial given the host of associated negative outcomes for the individual with DD, his or her family, and society at large. Indeed, individuals with DD and comorbid behaviour problems are at increased likelihood for academic problems, failure in community living arrangements, frequent moves, social isolation and rejection, and reduced employment prospects (Seltzer & Krauss 2001). Parents of these individuals report elevated levels of stress (Neece et al. 2012), increased need for services as well as increased likelihood of placing their child out of the home (Douma 2006). Adding to our concern, general psychiatric and health care services often lack the staff experience and knowledge for assessing and treating psychopathology in individuals with DD, suggesting that the assessment and treatment – let alone prevention – of psychopathology in these individuals are likely inadequate. Despite the absence of evidence-based treatments to serve this population, studies estimate that 2–14% of youth referred for psychiatric care have DD, indicating that this population comprises a substantial subgroup of patients referred for psychiatric treatment (Sverd 2003). Given the link between parental mental health variables and child behaviour outcomes, interventions that target parental stress offer the opportunity to ameliorate and ideally prevent the development of psychopathology among youth with DD, thereby addressing a significant public health concern and improving the lives of youth with DD and their families.

The transactional relationship between parental stress and child behaviour problems

High levels of behaviour problems and parental stress are significant risk factors for families of children with DD. It is likely that the relationship between these two variables is reciprocal such that child behaviour problems lead to increases in parental stress, which further exacerbate the development of child behaviour problems. Limited longitudinal analyses have supported our hypothesis that the relationship between behaviour problems and parenting stress is bidirectional showing that high behaviour problems lead to increases in parenting stress over time and high parenting stress leads to increases in behaviour problems in children (Baker et al. 2003; Neece et al. 2012) as well as adults (Orsmond et al. 2003). A recent study by Neece et al. (2012) investigated the relationship between parenting stress and child behaviour problems at 7 time points

from children aged 3–9 using a sample of 237 children, 144 of whom were typically developing and 93 who were identified as DD. Results indicated that behaviour problems and parenting stress covaried significantly across time for both groups of children, and cross-lagged panel analyses supported a bidirectional relationship between parenting stress and child behaviour problems for both mothers and fathers. Interestingly, the effect of early parental stress on later child behaviour problems was more consistent over time than the effect of early behaviour problems on later stress (Neece et al. 2012). Earlier work by the same research group also found that early elevations in parenting stress were associated with poorer social skills later in development (Neece & Baker 2008) and a subsequent ADHD diagnosis (Baker et al. 2010), highlighting the importance of parenting stress as a predictor of multiple child outcomes for children with DD.

Mindfulness-based stress reduction

Due to the early onset, lifelong persistence, high level of associated impairment and absence of effective treatment for psychopathology among individuals with DD, dual diagnosis in this population is an important cause of morbidity and high rates of service utilization (Järbrink et al. 2003). Many investigators in this field recognize a clear need for treatments for this population; however, few such treatments have been proposed and even fewer have been empirically tested. Across multiple domains, the relationship between parenting stress and child outcomes has been robust and, thus, appears to be an obvious target for intervention. Surprisingly, parenting stress is rarely directly addressed in interventions targeting child problems. Most of these interventions are child-focused, teaching parents skills to manage their children's behaviour problems and assume that by reducing behaviour problems, parenting stress will decline. However, in the light of findings showing that parenting stress has an impact on the development of children's behaviour problems, it seems logical that parenting stress should be a target for interventions aiming to reduce child behaviour problems. Additionally, parental stress has been shown to decrease the efficacy of behavioural intervention outcomes for youth with DD (Robbins et al. 1991), making an even more compelling case for targeting parental stress in interventions.

Mindfulness-based stress reduction (MBSR) is an evidence-based stress-reduction intervention programme

supported by over two decades of extensive research showing its effectiveness in reducing stress, anxiety and depression and promoting overall well-being (Chiesa & Serretti 2009); however, its efficacy as a treatment for parenting stress is still unknown. Previous studies indicate that the majority of people who complete the 8-week MBSR programme report a greater ability to cope more effectively with both short- and long-term stressful situations, critical skills for parents of children with DD. MBSR may also help to improve one's parenting experience. Mindfulness may help parents to slow down, notice impulses before they act, really listen to their children and come to a more relaxed and peaceful state of mind, which in turn may have a positive effect on their children with DD.

Although MBSR has not been evaluated as an intervention for parenting stress specifically, studies have supported the efficacy of other mindfulness interventions with parents, suggesting that this type of intervention is feasible and effective with this population. More specifically, 'mindful parenting' interventions have been found to be effective in reducing children's externalizing behaviour and attention problems as well as improving children's self-control, compliance and attunement to others (Bogels *et al.* 2008; Singh *et al.* 2010a,b). This intervention has been used with typically developing children with externalizing behaviour problems as well as children with ASD (Singh *et al.* 2006). However, in contrast to MBSR where the focus is on the parents' personal stress, the focus of this 'mindful parenting' approach is on the parent–child relationship, and the intervention teaches parents to identify interactions that result in relational disconnectedness (Placone-Willey, 2001). Two recent studies have also found promising results of parental mindfulness training (Bazzano *et al.* 2010; Benn *et al.* 2012). However, these studies generally have small samples and lack random assignment or control groups, indicating there is still a clear need for research in this area.

The current study

The current study further examined the relationship between parental stress and child behaviour problems, specifically investigating whether MBSR was efficacious in reducing parental stress and subsequent child behaviour problems among families of children with DD. Families were randomly assigned to an immediate treatment or wait list-control group. We expected that parents randomly assigned to the immediate treatment group would report significant reductions in parental

stress and parental depression as well as improvements in life satisfaction, compared with wait list-control parents. Additionally, consistent with the findings of Baker *et al.* (2010), we anticipated that children of parents assigned to the immediate treatment group would show greater reductions in behaviour problems, specifically in the areas of attention problems and ADHD symptoms, compared with children of parents in the wait list-control group.

Materials and Methods

Participants

The current study involved 46 parents who participated in the Mindful Awareness for Parenting Stress (MAPS) Project at Loma Linda University, which included parents of children, aged 2.5–5 years old, with developmental delays. Participants were primarily recruited through the Inland Empire Regional Center, although some were recruited through the local newspaper, local elementary schools and community disability groups. 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 (i) having a child aged 2.5–5 years, (ii) parent(s) reported child to have a developmental delay as determined by Regional Center (or by an independent assessment), (iii) parent(s) reported more than 10 child behaviour problems (the recommended cut-off score for determining risk of conduct problems) on the Eyberg Child Behavior Inventory (ECBI; Robinson *et al.* 1980), (iv) the parent was not receiving any form of psychological or behavioural treatment at the time of referral (e.g. counselling, parent training, parent support group), (v) parent agreed to participate in the intervention and (vi) 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 ninety-five families that were screened for the study, 63 were determined to be eligible and 51 parents enrolled in the study originally. Five parents completed the initial assessments but dropped out of the study before the intervention began leaving a final sample of 46 parents. There were no demographic differences between participants who completed the intervention and those who dropped out of the study.

Table 1 depicts the demographics of the current sample. Of the 46 parents participating in the current study, 21 attended the immediate treatment group and 25 were part of the wait list-control group. In the combined sample, 71.4% of the children were boys. Parents reported 25.7% of the children as Caucasian, 37.1% as Hispanic, 8.6% as Asian, 5.7% as African American and 22.9% as 'Other'. The mean age of the children was 3.84 years with a standard deviation of 0.92. The majority of the participating parents were married (71.7%) and were mothers (78.3%). Families reported a range of annual income with 45.7% reporting an annual income of more than $50 000 and incomes ranged from $0 to over $95 000. The average number of years parents completed in school was 14.54 years with a standard deviation of 2.67. The two intervention groups did not significantly differ on any demographic variable assessed.

Table 1 Demographic characteristics of participants by treatment group

	Treatment, $N = 21$	Control, $N = 25$	χ^2 or t
Children			
Gender (% boys)	66.7	76.5	$\chi^2 = 0.07$
Mean age in years (SD)	3.59 (0.88)	4.12 (0.90)	$t = 1.73$
Ethnicity (% Caucasian)	27.8	23.5	$\chi^2 = 0.00$
Participating parent			
Mean age in years (SD)	34.15 (8.71)	36.40 (8.41)	$t = 0.89$
Marital status (% Married)	81.0	64.0	$\chi^2 = 0.89$
Mean grade in school (SD)	14.86 (2.10)	14.28 (3.90)	$t = 0.73$
Family income (% > $50K)	57.1	36.0	$\chi^2 = 1.29$

Regarding the child's diagnosis, the majority of the children (84.8%) were reported to have a diagnosis on the autism spectrum. Among those families who reported their child to have an ASD, most parents (76.8%) said their child's diagnosis was autistic disorder, and the remaining children were reported to have another diagnoses on the autism spectrum. At the time of the intake assessment, 91.3% of the children were reported to receive special education services in school and 78.3% of the children were enrolled in a special education classroom. Although not formally assessed, the majority of children were estimated to have intellectual functioning in the mild-to-moderate range given the demands of the laboratory assessment. Children had to understand and follow directions in a structured play task in order to be eligible for the study.

Procedures

Procedures were approved by the Institutional Review Board at Loma Linda University. 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 or parents. If the parent met inclusion criteria, an intake laboratory assessment was scheduled. Prior to the initial assessment, parents were mailed a packet of questionnaires that were to be completed before arrival at the assessment.

The initial assessment took place in the MAPS laboratory in the Department of Psychology at Loma Linda University. At this assessment, parents were given an informed consent form that was reviewed by study staff. After completing the informed consent and an interview to collect demographic information, the parents drew a piece of paper out of a box which informed them of whether they were in the immediate treatment or waitlist-control intervention group.

Parents assigned to the immediate treatment group began intervention in March 2012, and parents assigned to the control group began the intervention in June 2012. The mindfulness-based stress reduction (MBSR) intervention followed the manual outlined by Dr. Jon Kabat-Zinn at the University of Massachusetts Medical Center (Kabat-Zinn *et al.* 1992). This intervention consisted of three main components: (i) didactical 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; (ii) mindfulness exercises

during the group meetings and as homework between sessions; and (iii) discussion and sharing in pairs and in the larger group. The MBSR programme included eight weekly 2-h sessions, a daylong 6-h meditation retreat after class 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 practising 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.

After the immediate treatment group completed the intervention, parents participated in a second post-treatment assessment (referred to 'second assessment' for remainder of paper) and completed the measures again. At that time, the parents assigned to the delayed treatment group also returned to the laboratory for the same assessment as part of the wait list-control design. After the completion of the project (all assessments were conducted), parents received a short summary and comparison of their child's behavioural functioning over the course of the intervention in order to reinforce parents' efforts to improve their parenting skills as well as raise awareness of remaining concerns.

Measures

Demographic data

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

Parenting Stress Index–Short Form

The Parenting Stress Index–Short Form (PSI-SF) was used to assess parenting stress (Abidin, 1990). The PSI-SF contains 36 items that are rated on a 5-point Likert scale ranging from 'Strongly Agree' (1) to 'Strongly Disagree' (5) and contains three subscales, Parental Distress, Parent-Child Dysfunctional Interaction and Difficult Child, which are combined into a Total Stress score (Abidin, 1995). The PSI-SF also includes a validity index that measures the extent to which the parent is answering in a way that he/she thinks will make them look best. A score of 10 or less on this index suggests responding in a defensive manner and indicates that caution should be used in interpreting any of the scores.

One participant had a defensive responding score less than 10 at the intake assessment, and this score was removed from the present analyses.

We used the Parental Distress subscale, which measures the extent to which the parent is experiencing stress in his or her role as a parent. This subscale was chosen because it assesses parental stress independent of child behaviour issues, which were also a key outcome variable of the current investigation. Reliability for the Parental Distress subscale with our sample was α = 83. Parents completed the PSI-SF prior to attending the intake assessment and again in the second assessment.

Family Impact Questionnaire

The FIQ is a 50-item questionnaire that asks about the 'child's impact on the family compared with the impact other children his/her age have on their families' (e.g. Item 1: 'My child is more stressful') (FIQ; Donenberg & Baker 1993). Parents endorse items on a 4-point scale ranging from (1) not at all to (4) very much. Although there are six scales, of interest here is a two-scale composite 20-item negative impact score (alpha = 0.92 for current sample). This FIQ negative impact score is considered an indicator of parenting stress. It was designed to avoid the circular reasoning of stress measures, like the Parental Stress Index described above, that ask about child challenges and then infer parenting stress from these. However, although conceptually different, FIQ negative impact scores have been found to relate highly to the Parenting Stress Index Child Domain scores ($r = 0.84$) obtained from mothers of young typically developing children (Donenberg & Baker 1993).

Center for Epidemiologic Studies Depression Scale

To assess for parental depression, parents completed the Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item self-report measure of depressive symptoms including mood, somatic complaints and cognitions (Radloff 1977). Total scores can range from 0 to 60, with a cut-off of 16 for the clinical range. The CES-D has four subscales: Somatic Symptoms (seven items), Depressed Affect (seven items), Positive Affect (reverse scored; four items) and Interpersonal Functioning (two items). The total score of this measure was used to assess the level of parental depression. Internal consistency for the current sample was high ($α = 0.88$), and previous studies indicate that CES-D also

has acceptable test–retest reliability ($r > 0.5$) and construct validity (Radloff 1977).

Satisfaction with Life Scale

The SWLS is a 5-item questionnaire that was designed to assess individuals' general satisfaction with life. Respondents indicate on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree) how much they agree with five statements (e.g. Item 1: 'In most ways my life is close to my ideal') (SWLS, Diener *et al.* 1985). This measure has been shown to have strong psychometric properties (Diener *et al.* 1985; Pavot & Diener 1993; Shevlin *et al.* 1998) and was found to have high internal consistency with the present sample ($\alpha=0.87$)

Child behaviour checklist for ages 1.5–5

The Child behaviour checklist (CBCL) 1.5–5 was used to assess child behaviour problems (Achenbach 2000). The CBCL contains 99 items that are rated as 'not true' (0), 'somewhat or sometimes true' (1) or 'very true or often true' (2). Each item represents a problem behaviour, such as 'acts too young for age' and 'cries a lot'. The CBCL yields a total problem score: 2 broadband externalizing and internalizing scores, 7 narrowband scales and 6 DSM-oriented scales, all of which were used in the present analyses. In the current sample, the mean reliability for the total problem score was $\alpha = 0.93$. The CBCL also shows strong convergent validity with both diagnoses based on DSM-IV-TR diagnostic criteria and similar scales measuring child behaviour problems (Achenbach 2000).

Subjective Units of Distress Scale

The SUDS is a questionnaire that was developed for the current study and used to assess changes in parenting stress and child behaviour problems across the course of the intervention (adapted from Singh *et al.* 2007). At each treatment session, parents reported their experience in the past week in the following domains: (i) how stressed they felt, (ii) how much this stress impacted their daily life, (iii) how well they were able to cope with this stress, (iv) how problematic their child's behaviour had been, (v) how satisfied they were with their relationship with their child and (vi) how often they practised mindfulness. All items were endorsed on a 0–10 scale, where 0 represented the absence of stress, child behaviour problems and mindfulness practice, respectively, and 10 indicated extreme stress, frequent

behaviour problems and frequent almost constant use of mindfulness, respectively. This measure was collected at the beginning of each group resulting in a total of 9 SUDS ratings (8 weekly groups and a daylong retreat) for each participant. It was adapted from the Measure of Subjective Units of Parenting Satisfaction (SUPS) used by Singh *et al.* (2007), which included a subjective measure of parental interaction satisfaction and parents' reports of using mindfulness in between sessions.

Results

The distributions of the primary variables were examined at both time points (i.e. intake and assessment 2). Data points that were more than three standard deviations above or below the mean of a variable were considered to be outliers. As suggested by Cohen *et al.* (2002), all outliers were set equal to plus or minus 3 standard deviations from the mean in order to reduce the influence of extreme data points on the results. Additionally, demographic variables listed in Table 1 that had a significant relationship ($P < 0.05$) with one or more of the independent variables *and* one or more of the dependent variables would have been tested as covariates in the analyses. However, given that there were no treatment group differences in demographic variables, no covariates were identified for the subsequent analyses.

Parental mental health

Independent samples t-tests were conducted to determine whether there were group differences in parental mental health at intake as well as at the second assessment where the immediate treatment group had received the MBSR intervention, but the waitlist-control group had not. These results are presented in Table 2. At intake, there were no group differences in parental stress as measured by the PSI or the FIQ. Additionally, there were no differences in parental depression or general life satisfaction. However, at the second assessment after the immediate treatment group had participated in MBSR, the treatment group had significantly lower stress scores on the PSI and the FIQ, indicating that the intervention was successful in reducing parents' self-reported stress. Furthermore, parents in the immediate treatment group reported significantly less depression and significantly more satisfaction with life compared with parents in the wait list-control group. Effect sizes for treatment group differences at the second assessment were fairly large for all parent mental health measures ranging from $d = 0.70$ to 0.90.

Table 2 Between group differences in parental mental health

	Intake				Assessment two (post-treatment)			
	Treatment, $N = 21$	*Control,* $N = 25$	*t*	*d*	*Treatment,* $N = 21$	*Control,* $N = 25$	*t*	*d*
PSI Parental Distress Subscale	35.17	38.28	0.90	0.29	31.72	37.61	2.11*	0.70
FIQ Negative Impact Score	28.95	32.94	0.94	0.31	21.29	29.50	2.08*	0.79
CES-D Total Depression Score	17.86	17.53	0.08	0.03	11.67	22.00	2.34*	0.87
Satisfaction with Life Total Score	19.80	18.41	0.61	0.20	24.65	19.42	2.70*	0.90

*$P < 0.05$.

Table 3 Between group differences in child behaviour problems

	Intake				Assessment two (post-treatment)			
	Treatment, $N = 19$	*Control,* $N = 16$	*t*	*d*	*Treatment,* $N = 19$	*Control,* $N = 16$	*t*	*d*
CBCL Syndrome Scales								
Emotionally reactive	7.26	5.44	1.40	0.48	6.21	5.13	0.84	−0.31
Anxious/Depressed	5.16	4.63	0.53	0.18	4.43	3.67	0.68	−0.25
Somatic complaints	3.74	4.86	0.23	0.31	3.71	4.47	0.64	0.24
Withdrawn	6.00	6.19	0.22	0.08	5.36	5.27	0.10	−0.04
Sleep problems	4.94	5.13	0.40	0.14	4.36	5.13	0.75	0.28
Attention problems	5.05	5.50	0.45	0.15	3.71	5.53	1.89†	0.71
Aggressive behaviour	18.37	19.63	0.44	0.15	15.21	17.40	0.80	0.30
CBCL Broadband and Total Scores								
Internalizing problems	23.37	20.50	0.98	0.32	19.71	18.53	0.36	−0.13
Externalizing problems	23.42	25.13	0.50	0.17	18.93	22.93	1.20	0.45
Total problems	73.47	74.44	0.10	0.04	58.93	67.20	0.89	0.33
CBCL DSM-Oriented Scales								
Affective problems	5.58	6.38	0.78	0.26	4.07	5.47	1.50	0.57
Anxiety problems	7.26	6.25	0.75	0.26	5.93	5.13	0.53	−0.20
Pervasive developmental problems	11.21	10.44	0.54	0.22	9.71	10.40	0.46	0.17
Attention deficit/Hyperactivity problems	7.42	7.69	0.26	0.09	5.64	8.00	2.27*	0.85
Oppositional defiant problems	6.42	6.13	0.25	0.08	5.36	5.93	0.53	0.20

†$P < 0.10$, *$P < 0.05$.

A reliable change analysis was conducted on measures of parental mental health to assess the percentage of participants who reported a change score at a reliable and meaningful level. Results indicated that 25% of the sample reported a clinically significant reduction in Parental Distress in the PSI, 35.6% on the FIQ, 18.5% on the CES-D and 9.7% reported a meaningful change on the SWLS (Jacobson & Truax 1991).

Child behaviour problems

Independent samples *t*-tests were also used to examine differences in child behaviour problems at intake and at the second assessment. Results are presented in Table 3. There were no group differences in child behaviour problems at intake; however, children in the treatment group were reported to exhibit significantly fewer ADHD symptoms than children in the control group at

the second assessment ($t = 2.27$, $P < 0.05$, $d = 0.85$). Additionally, there was also marginally significant difference in attention symptoms ($t = 1.89$, $P = 0.69$, $d = 0.71$). Reliable change analyses indicated that 28.9% of parents reported a clinically significant reduction in ADHD symptoms and 18.4% reported a meaningful change in attention problems.

Changes across the course of the intervention

Hierarchical linear modelling was used to examine changes in parental stress and child behaviour problems across the course of the intervention. To examine significant change over time, unconditional growth models were conducted including only an intercept (representing the dependent variable at Time 1) and slope (representing the linear rate of change of the dependent variable across ages 5–13). Other growth functions (i.e. quadratic and cubic functions) were also examined to determine whether they improved the fit of the model. An additional growth function was included in the model if it significantly improved the model fit and reduced the deviance statistic as indicated by the chi-square model comparison test. As discussed in Materials and Measures, the SUDS was administered to participants at each group session and the daylong retreat providing a total of 9 data points that were used to model the variable trajectories across the MBSR group. The variable used to represent time ranged from 0 to 8 because there were 9 weekly time points.

Table 4 shows results of the unconditional growth models. Models indicated that there was a significant decrease over time in parent's reports of their overall stress ($B = -0.41$, $P < 0.001$). At the first session, the mean SUDS rating for parents' overall stress was a 7.27

(of 10), and this rating decreased about a half a point on average with each session. The mean SUDS ratings for each session are presented in Figure 1. Additionally, parents also reported a reduction in the degree to which stress impacted their daily lives ($B = -0.26$, $P < 0.001$) as well as an improvement in their reported ability to cope with stress ($B = 0.21$, $P < 0.001$). Similarly, there was also a significant decrease in the degree to which parents reported their children's behaviour to be problematic across the course of the treatment ($B = -0.10$, $P < 0.05$) as well as an increase in parents' satisfaction with their parenting skills ($B = -0.18$, $P < 0.001$) and relationship with their child (B = -0.10, $P < 0.001$). Finally, there was a significant increase in parents' use of mindfulness skills across the MBSR intervention (B = 0.46, $P < 0.001$).

Discussion

The current study investigated the efficacy of MBSR for parents of children with developmental delays, examining the impact of this intervention on both parent and child variables. To the author's knowledge, this is the first study to test the efficacy of MBSR in a randomized design with parents of children with DD, and results suggest that this may be an effective intervention. Parents who received the intervention reported significant reductions in parental stress using two different questionnaires (i.e. the PSI and FIQ) as well as decreases in depression and increases in their general life satisfaction at the second assessment compared with parents who had not participated in MBSR. Additionally, parents who received MBSR reported reductions in their children's ADHD symptoms and attention problems, which is consistent with previous research indicating

Table 4 Results of unconditional growth models

Variable	Intercept parameter (g_{00})	Slope parameter (g_{10})	Intercept variance component (d_0)	Slope variance component (d_1)
Overall stress	7.27 ***	−0.41***	1.63***	0.03**
Impact of stress on daily life	6.79***	−0.26***	3.16***	0.03**
Ability to cope with stress	5.62***	0.21***	2.33***	0.05
Child behaviour problems	5.31***	−0.10*	2.77***	0.03**
Satisfaction in parenting skills	6.10 (0.23)***	0.18 (0.03)***	1.70***	0.03
Satisfaction in relationship with child	7.61 (0.26) ***	0.10 (0.03)***	2.57***	0.01**
Use of mindfulness	3.69 (0.35) ***	0.46 (0.06) ***	4.08***	0.06***

Intercept and slope parameters are presented with standard error in parentheses.
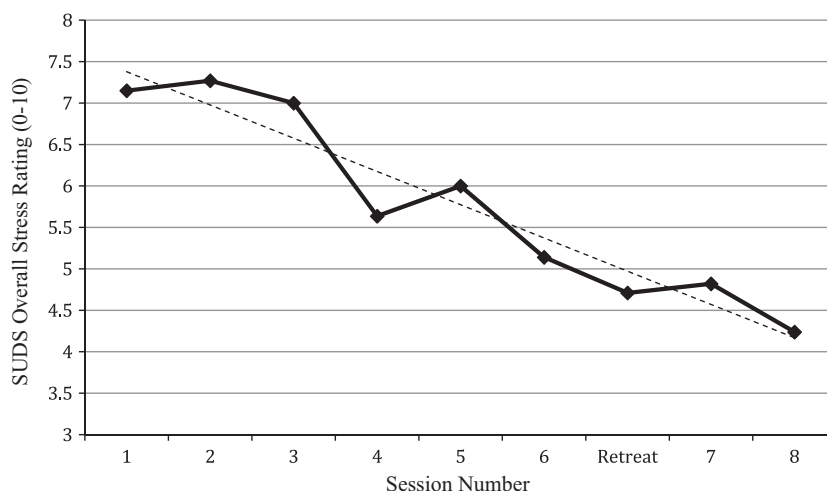*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Figure 1 Mean SUDS Stress Score across MBSR sessions.

that early parental stress is associated with later ADHD symptomatology (Baker *et al.* 2010). Furthermore, parents reported significant decreases in their stress levels and child behaviour problems over the course of the intervention, an improvement in their ability to cope with stress and an increase in their satisfaction with their parenting skills and parent–child relationships. Overall, this initial trial suggests that MBSR is effective in improving a range of parental mental health outcomes and may have a more limited impact on children's behaviour problems.

In addition to the positive clinical outcomes, this study is also important because it provides an experimental test of the association between parental stress and child behaviour problems. A host of correlational studies have suggested that parental mental health problems 'spill over' and negatively impact child behaviour outcomes (Donenberg & Baker 1993; Johnston & Mash 2001; Baker *et al.* 2003; Neece *et al.* 2012), and these results confirm earlier findings using an experimental design. Here, we manipulated parental stress intervening only with parents and observed a reduction in child behaviour problems, particularly in the areas of attention problems and hyperactivity. Our results add to literature in developmental and family psychology by providing a robust test of the transactional relationship between parental stress and child behaviour outcomes.

It is important for future research to further examine the mechanisms through which parental stress may influence child behaviour problems. Parenting behaviour is one possible mediating variable that may

partially account for this relationship. Parental stress has been associated with more negative and intrusive as well as less positive and sensitive parenting behaviour, and this type of parenting has also been associated with elevated child behaviour problems (Abidin 1992; Crnic *et al.* 2005; Deater-Deckard 2006). Thus, it may be that stress reductions resulting from MBSR lead parents to be more sensitive and responsive and less harsh and intrusive, which subsequently improved their child's behaviour issues. With regard to the impact of parent MBSR training on child ADHD symptoms more specifically, it may be that mindfulness training helped parents to be less reactive to their children's behaviour problems, thus preventing probable negative interactions with their children, producing calmness in the parent *and* child and thereby improving attention and self-regulation (Singh *et al.* 2010b). To examine this hypothesis, we conducted *post hoc* analyses and found that parents reported the largest improvement in their ability to be non-reactive from pre- to post-treatment ($t = 6.55$, $P < 0.001$, $d = 1.65$) compared with the other facets of mindfulness (i.e. observing, describing, acting with awareness, non-judgmental; Baer *et al.* 2008). Future studies should continue to investigate intermediate variables that account for the process through which parental stress impacts children's behavioural development.

Although our initial findings were promising, these 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. This may be particularly relevant for the results

examining child behaviour problems where some post-treatment group differences had medium effect sizes but were not statistically significant (e.g. externalizing and affective problems). Additionally, this study did not use an active treatment control group, and thus, the findings only suggest that MBSR is superior to no treatment. For a more rigorous test of the efficacy of this intervention, future studies should compare MBSR to other stress-reduction interventions (See Hastings & Beck 2008 for review). Moreover, our findings relied solely on parent-report data to measure both parental stress and child behaviour problems, and reporting biases may have influenced results. Subsequent studies should use additional reports of child behaviour problems (e.g. from teachers) as well as observational measures and examine biomarkers of stress to validate the current findings. Finally, effectiveness studies are needed to determine whether MBSR is an intervention that is feasible in a routine clinical care setting.

Despite its limitations, the implications of this study are significant. This study highlights a new intervention that may ameliorate significant mental health problems that are so common among families of children with DD. Furthermore, this treatment offers an innovative approach to treating comorbid behaviour problems in youth with DD and provides an opportunity to intervene with families early on, thereby, impeding the development of behaviour problems over time. We know from scientific studies, as well as our own anecdotal experiences, that 'families matter', especially for children with DD. Parents' mental health and well-being has a significant impact on children's development, and therefore, in any attempt to intervene and help children, we must also consider and intervene with their families.

Acknowledgments

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