The association between stress and physical health problems in parents caring for children with intellectual disabilities is moderated by children’s challenging behaviours.

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Abstract

The present study examined the moderating role of social support and challenging behaviour on the stress–physical health relationship in parents caring for children with intellectual disabilities. Parents of children with intellectual disabilities (n=70) reported more physical health problems compared to control parents (n = 45) and were more likely to visit their general practitioner for treatment. Further, challenging behaviours, but not social support, was found to moderate this association; parents of children with intellectual disabilities reported poorer physical health when both challenging behaviours and stress were perceived to be high. These findings are discussed in light of the literature.

Key words: Challenging Behaviours; Intellectual Disabilities; Physical Health; Social Support; Stress
Introduction

Parents caring for a child with an intellectual disability (e.g. Autism, Down syndrome and Fragile X) report more psychological distress compared to parents of typically developing children (Dunn, Burbine, Bowers, & Tantleff-Dunn, 2001; Eisenhower, Baker, & Blacher, 2005; Gallagher, Phillips, Oliver & Carroll, 2008). Moreover, in recent decades interest in the relationship between psychological stress and physical health has been growing rapidly (for reviews, see S. Cohen & Herbert, 1996; Schneiderman, Ironson, & Siegel, 2005). Psychological functioning, in particular exposure to chronic psychological stress and the emotional reactions to same, has been implicated in the development and progression to a wide range of physical diseases including diabetes as well as increases in psychosomatic symptoms such as gastrointestinal problems, upper respiratory tract infections (see Cohen & Herbert, 1996; Pinquart & Sorensen, 2003; Ramachandruni, Handberg, & Sheps, 2004). In older caregivers of patients with schizophrenia (Dyck, Short, & Vitaliano, 1999) and dementia (Lee, Colditz, Berkman, & Kawachi, 2003; Schulz & Beach, 1999) caregiver stress found to predict poorer physical health with higher rates of infection and greater risk of cardiovascular morbidity and mortality being observed. However, much of this research linking caregiver stress to physical health has tended to concentrate on older caregivers, with few studies examining these associations in relatively younger caregivers, in particular parents caring for children with intellectual disabilities. More importantly, a call for research on the determinants of physical health in these parents has just recently been made (Miodrag & Hodapp, 2010).

Like older caregivers, parents providing extraordinary care to children with intellectual disabilities may also be at increased risk of poor physical health. In comparison to controls, parents of children with intellectual disabilities rate their general health as poorer (Allik, Larsson, & Smedje, 2006; Hedov, Anneren, & Wikblad, 2000)
and older parents were found to report greater limitations from arthritis (Magaña, & Smith, 2006). In a mixed disability sample (children with cerebral palsy, epilepsy, mental handicap and learning disability), caregiving parents, relative to control parents, were more likely to report greater numbers of specific debilitating health problems such as back problems and arthritis (Lach, et al., 2009). However, studies examining the predictors of psychosomatic symptoms such as headaches, gastrointestinal problems and rates of infectious episodes in these parents are extremely rare. In fact, such symptoms have been associated poorer quality of life (García-Campayo, Ayuso-Mateos, Caballero, 2008), lower job satisfaction (Meeusen, Van Dam, Brown-Mahoney, Van Zundert & Knape, 2010) and are predictive of future health service use even after controlling for objective indices of health (Sha, Callahan, Counsell, et al., 2005). Although, the disability types were not disclosed one study found that compared to parents of children without disabilities, parents of children with disabilities were found to report poorer physical health and more psychosomatic symptoms (e.g. headaches and gastrointestinal problems) (Ha, Greenberg, Seltzer, 2011). Together, these studies suggest that the physical health in parental caregivers is cause for concern and that such research in parents caring for children with intellectual disabilities is clearly warranted.

In terms of exploring the underlying pathways, challenging behaviors are one of the main sources of stress in these parents (Blacher & McIntyre, 2006; Floyd & Gallagher, 1997; Hastings, Daley, Burns, & Beck, 2006) and have been associated with poor mental and physical health in spousal caregivers of dementia patients (Pinquart & Sorensen, 2003; Vitaliano, Zhang, & Scanlan, 2003). They have also been linked to perturbations of the stress hormone cortisol (Seltzer, et al., 2010) and immune response to medical vaccinations in parents of children with intellectual disabilities (Gallagher, Phillips, Drayson, & Carroll, 2009a, 2009b) both of which are related to a number of physical
health conditions (e.g. rates of infection, diabetes). Thus, it could be that challenging are a likely candidate to explore in this context. Moreover, physical health status was found to be poorer and more pronounced in parents of children with neurodevelopmental disabilities who displayed higher behavioral challenges (Lach, et al., 2009) implying that this may be a key determinant of health outcomes in this group. Further, in parents caring for children with intellectual disabilities increased stress is associated with impaired quality of life and poorer psychosocial functioning (Allik et al., 2006) while in other contexts, stress has been found to be positively associated with poor physical health (S. Cohen, Tyrrell, & Smith, 1991) in particular rates of infectious episodes; those who reported more stress were more likely to succumb to upper respiratory tract infections. Not only do these studies highlight the existence of associations between challenging behaviors, parental stress and poor physical health, they also provide an opportunity to see whether the association between stress and physical health problems in parents caring for children with intellectual disabilities is influenced by children’s challenging behaviours. Thus it could be that challenging behaviour and stress either alone or in combination are increasing parents caring for children with intellectual disability’s vulnerability to physical health problems. For example, in combination, it could be that any association between stress and physical health problems in parents of children with intellectual disabilities could be moderated by the challenging behaviors displayed by the child.

A growing body of evidence has also accumulated demonstrating clear links between social support and a number of physical health outcomes (see Berkman, Glass, Brissette, & Seeman, 2000; Berkman & Syme, 1979; Uchino, 2006). For example, population-based studies indicate that individuals with low levels of social support have higher mortality rates from coronary heart disease (Berkman, Leo-Summers, & Horwitz, 1992;
Brummett, et al., 2001). There is also evidence linking greater support to lower rates of infectious disease (Lee & Rotheram-Borus, 2001; Patterson, et al., 1996), better immune response (Gallagher, Phillips, Ferraro, Drayson, & Carroll, 2008) and recovery from surgery (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998). While in older caregivers of patients with dementia, physical health status was not only associated with patient challenging behaviors and psychological distress, it was also related to their perceived availability of social support (Schultz, O'Brien, Bookwala, & Fleissner, 1995).

In the context of parental caregiving, social support was found to be particularly important and protective for the physical health of parents of children with cerebral palsy (Raina, et al., 2005). Research also demonstrates that stress in parents caring for a child with an intellectual disability is ameliorated through greater social support (Dunn, et al., 2001; Weiss, 2002). In fact, one of the key mechanisms linking social support to physical health is through its buffering effects on psychological stress, i.e., the stress buffering hypothesis (Cohen, Gottlieb, & Underwood 2001; Cohen & Wills, 1985). The evidence above highlight the links between social support, stress and physical health and it could be that parents of children with intellectual disabilities with greater social support may report less stress and better physical health compared to those with poorer social relationships.

Therefore, the aim of this study was to examine whether parents of children with intellectual disabilities would report more physical health problems compared to parents caring for typically developing children (controls). Based on the above evidence, it is hypothesized first, that, parents of children with intellectual disabilities would report more physical health problems than parents of typically developing children; second, that any association between stress and physical health problems in parents caring for children...
with intellectual disabilities will be moderated by 1) child challenging behaviours and 2) levels of social support.

**Methods**

*Participants and procedure*

Seventy parents of children with intellectual disabilities and 45 parents of typically developing children (controls) participated in the study. Parents of children with intellectual disabilities were recruited via special need schools and syndrome specific newsletters and through word of mouth. In total, 122 parents expressed interest and requested more information and questionnaire packs. Out of these, 80 parents returned the questionnaires (66% response rate), 10 were discarded due to incomplete data. Inclusion criteria for these parents were: providing home care for a child with autism, Down syndrome or other types of intellectual disability (e.g. Cornelia de Lange, Smith-Magenis syndromes). The syndrome types were chosen as they represent a wide variety of intellectual disability phenotypes. Twenty-eight of these parents self-reported caring for a child with autism, 20 caring for a child with Down syndrome and 22 caring for a child with other syndromes types (e.g., Wolfram syndrome, Smith-Magenis etc). Controls were parents caring for typically developing children recruited via local schools, word of mouth and University advertisements. In all, 64 control parents responded to our call for volunteers and each was sent a pack of questionnaires and a prepaid envelope in which to return them. Out of these, 45 parents returned completed questionnaires; a response rate of 69%. Further, there were no differences between the groups on the number of parental dyads involved; there were nine dyads in our parents caring for children with intellectual disability sample and seven in the control group, \( \chi^2 (1) = 0.16, p = .69 \). Parents who did not return the packs invariably cited time pressures and other
family commitments as reasons for non-participation. The study was approved by the relevant University Research Ethics Committee and all participants gave informed consent.

**Measures**

Participants’ socio-demographics were assessed by standard questions. The Registrar General’s social class classification which is based on occupational status was used as a measure of socio-economic status (Office of Population Censuses and Surveys, 1978). Participants were asked to specify the occupation of the head of household, which was scored, 1, professional (e.g. physician), 2, managerial (e.g. director), 3, non-manual/clerical (e.g. secretary), 4, skilled manual (e.g. carpenter), 5, semi-skilled manual, (e.g. bus driver), 6, unskilled manual (e.g. laborer). This measure has been used previously in caregiver research (Gallagher et al., 2008; Gallagher et al., 2009a).

**Psychological Stress**

The Perceived Stress Scale (Cohen, Kamarck, & Meremstein, 1983) was used to measure psychological stress. This abbreviated 4-item scale, used extensively in caregiver research (Gallagher, et al., 2009b; Vedhara, et al., 2002) measures how stressful individuals perceive situations they have experienced to be over the last month. Scale responses range from 0, never, to 4, very often, and include two reverse scored items, with higher scores indicating greater perceived stress. Items in the scale include ‘In the past month, how often have you felt able to control the important things in your life?’ and ‘In the past month, how often have you felt that things were going your way?’ This scale
shows good test–retest reliability \(r = .80\) and internal reliability (Cronbach’s \(\alpha = .75\)).

In the present study an internal consistency of \(\alpha = .88\) was observed.

**Social support**

Social support was assessed using the 12-item Support Functions Scale (Dunst, Trivette, & Deal, 1988). Parents rated each source of support available to them including practical (e.g. ‘someone to help take care of my child’) and emotional (e.g. ‘someone to talk to about things that worry me’) support on a 5-point Likert scale ranging from 1, never, to 5, quite often. The total score was used for analysis, with higher scores indicating more social support. It has been shown to be reliable (Cronbach’s \(\alpha = .86\)) and has been used previously in intellectual disability research (Gallagher et al., 2008; White & Hastings, 2004). A high internal consistency (\(\alpha = .89\)) was also evident for the present sample.

**Child’s Challenging behaviors**

The 25-item Strengths and Difficulties Questionnaire (Goodman, 1997) was used to screen for child challenging behaviors. The measure has five subscales, with one assessing prosocial behavior (e.g. ‘kind to younger children’) and four assessing challenging behavior problems; emotional symptoms (e.g. ‘often unhappy, downhearted or tearful’), conduct disorder (e.g. ‘often argumentative with adults’), hyperactivity (e.g. easily distracted, concentration wanders’), and peer relationships (e.g. rather solitary, tends to play alone’). Parents are asked to rate whether a behavior is 0, somewhat true, 1, true, or 2, certainly true, of their child with higher scores indicating more problem behavior. Some items are reversed scored (e.g. generally obedient, usually does what adults request). The scale has been shown to be reliable (Cronbach’s \(\alpha = .76\)) and
effective at identifying behavioral problems in children (Goodman & Scott, 1999). Further, it has been used extensively in research with children with intellectual disabilities (Gallagher et al., 2009; Hastings, et al., 2006). Internal consistency for the whole scale in this study was .88.

Physical Health

Self-reported physical health was measured using the Physical Health Questionnaire (Schat, Kelloway, & Desmarais, 2005). This is a brief 14-item self-report scale of somatic symptoms which include: sleep disturbances, headaches, gastrointestinal problems, and respiratory infectious episodes. Parents are asked to rate how they have been feeling physically during the last year from 1 (not at all) to 7 (all of the time). The scale asks questions on sleep e.g. ‘How often do you wake up during the night?’, headaches e.g. ‘How often have you experienced headaches?’, digestive problems e.g. ‘How often have you suffered from an upset stomach?’ and colds and flu e.g. ‘How often have you had minor colds?’. A high score indicates poor self reported physical health. A high internal consistency was observed here (α = .84). There is also a single item question whereby parents were asked ‘Compared to others of your age and sex, how would rate your general health?’ and asked to choose from one of the following, excellent, above average, average, below average or very poor. A simple yes/no question asking participants if they had been to see their family physician to treat any of these symptoms was also inserted.

Statistical analyses

Initial analyses of group differences were by Chi-square and univariate ANOVA, with partial eta-squared (η²p) as the measure of effect size. These analyses were
employed to test the first hypothesis. Occasional differences in degrees of freedom reflect missing data from uncompleted questionnaires. To test the second set of hypotheses, which focused solely on parents caring for children with intellectual disabilities, linear regressions, mainly testing hierarchical models, were conducted. In these models, socio-demographics and other potential confounds were entered at step 1. To see if any of the psychosocial variables were predictive of physical health in these parents, each variable was entered separately at Step 2. In subsequent models we aimed to test for moderation by children’s challenging behaviours and social support on stress and physical health. For this analysis the approach described by Aiken and West (1991) and Holmbeck (Holmbeck, 2002) was used. Here, prior to all analyses, all linear predictor variables were centered at their means to avoid multicollinearity before entering the cross product into the model in Step 3, with both predictors entered simultaneously at Step 2 and control variables at Step 1.

**Results**

*Group differences in socio-demographic characteristics, psychosocial factors and physical health*

In terms of socio-demographics, 10% of caregivers reported being professional, 17% managerial, 40% non-manual/clerical, 11% skilled manual, 12% semi-skilled manual, and finally 11% as unskilled manual. Nineteen percent of controls reported being professional, 18% managerial, 26% non-manual/clerical, 8% skilled manual, 3% semi-skilled manual, and finally 26% as unskilled manual; there was no statistical difference between the groups $\chi^2 (6) = 11.88$, $p = .07$. The majority of our sample reported being white (86% vs 95%) and married/living together (76% vs 93%), for parents of children with intellectual disabilities and controls respectively; these were not statistically
different. The other characteristics of the parental groups are presented in Table 1. As can be seen, the groups are well matched on most variables, although parents of children with intellectual disabilities were slightly older and spent more time caregiving over the course of the day.

[Insert Table 1 about here]

As expected there were differences between groups on perceived stress, social support, challenging behaviours and physical health and the effect sizes observed for these were, partial eta-squares of (η²_p) .05, .13, .19, and .34, respectively. Moreover, these η²_p values signify small, medium and large effect sizes (J. Cohen, 1988; Pierce, Block, & Agunis, 2004). Parents of children with intellectual disabilities reported higher perceived stress, more challenging behaviours in their children, less social support and more physical health problems than control parents (see Table 1). Further, PHQ subscale analysis revealed significant differences in the domains of sleep disturbances, F (1, 113), = 69.57, p < .001, headaches, F (1,113), = 41.76, p < .001, gastrointestinal problems, F (1, 113), = 38.07, p < .001 and rates of infection, F (1, 113), = 10.56, p = .002, all of which were higher in parents of children with intellectual disabilities; these are illustrated in Figure 1. A higher percentage of control parents were also more likely to rate their health as above average compared to parents of children with intellectual disabilities, 67% vs 33%, p = .003; and 33% of control parents compared to 54% of parents of children with intellectual disabilities were more likely to seek medical treatment from their general practitioner for these physical health complaints, χ² (1) = 4.84, p = .03.

[Insert Figure 1 about here]
Associations between perceived stress, challenging behaviour, social support and physical health in parents of children with intellectual disabilities

In hierarchical linear regression analysis, perceived stress and challenging behaviours were significant predictors of physical health problems in parents of children with intellectual disabilities; see Table 2 for summary statistics. In analyses in which each of the challenging behaviour subscales were entered simultaneously, only conduct behaviours emerged as a predictor of physical health problem scores, $\beta = .46$, $t = 3.53$, $p < 0.001$. Further, after mean centering the predictor variables, a significant interaction between perceived stress and challenging behaviours was found at Step 3 and in combination these variables accounted for an additional 11% of the variance in physical health problem scores. This interaction is illustrated in Figure 2, where high and low refer to $+1SD$ and $-1SD$ respectively. As can be seen, lower reporting of challenging behaviours during times of low stress appears to be associated with better physical health scores. In contrast, when parents of children with intellectual disabilities reported high challenging behaviours in their children and perceived their stress to be higher, they also reported poorer physical health. Social support was not significant in the equations nor did it interact with perceived stress.

[Insert Table 2 about here]

[Insert Figure 2 about here]
Discussion

The present study tested whether parents of children with intellectual disabilities would report poorer physical health problems compared to parents of typically developing children. As expected, these parents were found to report more physical health problems, and these were specific to the domains of sleep, headaches, gastrointestinal problems and respiratory infectious episodes. In relating our results to the existing literature, they are somewhat consistent with other studies in parents caring for children with mixed disabilities (Brehaut et al., 2004; Lach, et al., 2009; Raina, et al., 2005); the health problems in these studies were more debilitating and chronic (e.g., asthma, arthritis). However, a greater number of headaches, sleep complaints and backaches were found in a sample parents caring for children with disabilities compared to a control sample who children were not disabled (Ha, Greenberg & Seltzer, 2011); albeit, the type of disability was not disclosed in this study. There is also congruency with previous studies reporting higher sleep problems in parents with children with intellectual disabilities (Gallagher, Phillips, & Carroll, 2010; Hedov, Anneren, & Wikblad, 2002) as well as poorer self-rated health (Allik, et al., 2006); thus our findings tend to resonate with the wider literature on family caregiving. Nonetheless, it must be acknowledged that the mean score of 57 on the physical health questionnaire reported by parents of children with intellectual disabilities is less than that seen in other stressful roles; Schat and colleagues evidenced a mean score of 69 across a range of healthcare personal when developing the physical health questionnaire (Schat, et al., 2005).

More importantly this study also found that parent of children with intellectual disabilities were less likely to rate their health as above average, and a higher percentage of these compared to control parents reported visiting their family physician for treatment of these physical health problems, 54% vs 33%, respectively. To our knowledge, this is
the first study that has tested this particular relationship between reporting of physical health problems or symptoms and increased consultations with their general practitioner. The economic implications of this are quite obvious, but it must be acknowledged that roughly 75% of patients report resolution or improvement of these type of problems within a few weeks of seeing a health care provider (Kroenke, 2003); those symptoms most likely to persist are headaches, pain and musculoskeletal complaints.

This study also investigated whether perceived stress, social support and challenging behaviours would be associated with poorer physical health in parents caring for children with intellectual disabilities. Although the association between social support and physical health was in the expected direction, it was non-significant. Further, there was no support for the stress buffering hypothesis. One explanation for the lack of significance could be attributed to the scale used; in the present study the scale focused on ‘perceived availability support’ and perhaps a scale such as the Family Support Scale (Dunst, Jenkins, & Trivette, 1984) which focused on ‘helpfulness of sources of support’ (e.g. formal and informal) may have been more appropriate in this context. It could also be that supportive respite services and not perceived support is what is most important for these particular parents. Despite this, we found that perceived stress and child challenging behaviors were most predictive and as hypothesized the interaction between these two factors was significant. The negative consequences of increased stress on physical health found here are similar to that found elsewhere for other health indices in these parenting families (e.g. quality of life and chronic conditions) (Allik, et al., 2006; Brehaut, et al., 2004). Moreover, as in other parenting families (Lach et al., 2009; Raina et al., 2005) child challenging behaviours were associated with poorer physical health. Further, in our subscale analyses on the challenging behaviour questionnaire it was conduct problems that appeared to drive this negative association and this is congruent
with our previous studies (Gallagher et al., 2009a) which found that greater reporting of conduct problems by these parents was associated with poorer immunity.

Interestingly, the interaction between perceived stress and child challenging behaviours explained an additional 11% of the variance of physical health problems in parents caring for children with intellectual disabilities. Although associations between child challenging behaviours and parenting stress and well-being have been reported previously (Hastings & Beck, 2004; Hastings & Brown, 2002) our findings add to the growing body of evidence linking these factors to the poor physical health seen in parents caring for children with intellectual disabilities. However, what is unique to the present study is that the association between perceived stress and poor physical health was moderated by children’s challenging behaviour. Here we found that these negative effects were more pronounced when parents reported high challenging behaviours in conjunction with high stress, whereas low challenging behaviours and low stress appeared to be associated with better physical health in these parental caregivers. It is perhaps worth mentioning that the negative effects of challenging behaviour are not limited to self-report of health, they have also been linked to lower immune responses to medical vaccinations (Gallagher, et al., 2009a, 2009b) and poor neuroendocrine functioning (Seltzer, et al., 2010) in these parents; two likely physiological mechanisms that may underlie these reported associations.

There are a number of study limitations which must be taken into account. Firstly, the findings in this research are based on cross sectional data; therefore it is not possible to infer causation. For example, parents of children with intellectual disabilities who report more health problems may have done so even before the birth of their child or it could be that those who report poorer health are more likely to report higher stress and more child problem behaviours. Similarly, the association between stress and behaviour problems
could be bi-directional and has been observed elsewhere (Baker, et al., 2003). Thus, longitudinal designs may help with this issue. Secondly, most of the findings in this research rely on self report from parents for the psychosocial, socio-demographic and physical health variables. Thus, this gives a subjective view of parents’ circumstances and relies on parents to be willing to reveal an accurate picture of the extent of their child’s problem behaviour or their health status for example (Lach et al, 2009). Clearly this may not give an entirely representative account, however, these types of self report measures are commonly used within caregiver research and have been shown to be reliable and valid (Gallagher et al, 2009a; Lach et al, 2009). Further, we did try to elicit a more objective measure by asking parents if they visited their physician for treatment for these issues and this was almost significant and was more pronounced in those parents caring for children with intellectual disabilities. Thirdly, there is the possibility of confounding due to socio-demographics, however, in regression analyses our main findings withstood adjustment for these potential confounds. Fourthly, it is difficult to know what type of stressor was being perceived as most challenging as the perceived stress scale does not capture such data. Future studies could try and assess this in more detail. Finally, our disability sample was a mixed syndrome group, thus it could be that different social and psychological factors are at play across disability subtypes. However, when we split this sample into parents of children with autism and mixed syndrome there was no difference between the two groups on physical health scores; data not shown.

In summary, despite its limitations, this study has contributed to the literature and extended previous research. Importantly it has demonstrated the potential risk of impaired physical health that these parents caring for children with intellectual disabilities have. Moreover, parents of children with intellectual disabilities were more
likely to seek treatment for these physical health problems relative to control parents. Further, our results showed stress and child challenging behaviors to be key determinants of physical health status in parents caring for children with intellectual disabilities. In particular, we found that child problem behavior moderated the association between stress and self-reported physical health problems, but protective benefits were only observed when perceptions of the stress and behaviors were both low. Together these findings help to elucidate the dynamic influence of child characteristics and stress appraisal on physical health they also underscore the importance for researchers to examine the precise components of these interactions (Miodrag & Hodapp, 2010). Moreover, this should inspire further research and influence the design of interventions, in particular those that combine stress and behaviour management techniques which have been found to be most effective for improving well-being in these parents (Hastings & Beck, 2004).

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References


does it compare with that of other Canadian caregivers? *Pediatrics, 114*, e182-191.


García-Campayo, J., Ayuso-Mateos, J, Caballero,L., Romera, I., Aragonés, E.,


<table>
<thead>
<tr>
<th></th>
<th>Caregivers (N = 70)</th>
<th>Controls (N = 45)</th>
<th>Test of difference</th>
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<tr>
<td>Gender (Female)</td>
<td>55 (79%)</td>
<td>32 (71%)</td>
<td>$\chi^2 (1) = 1.14$, $p = .29$</td>
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<td>Mean age (SD) years</td>
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<td>38.6 (8.20)</td>
<td>$F (1,110) = 6.84$, $p = .01$</td>
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<td>Mean age of main care recipient (SD) years</td>
<td>10.4 (4.38)</td>
<td>9.0 (4.58)</td>
<td>$F (1,111) = 2.52$, $p = .15$</td>
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<td>Time caregiving (SD) per day</td>
<td>9.8 (5.95)</td>
<td>6.5 (4.94)</td>
<td>$F (1,104) = 7.0$, $p = .004$</td>
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<td>Mean PSS score (SD)</td>
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<td>Mean SDQ score (SD)</td>
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<td>40.8 (14.09)</td>
<td>$F (1,113) = 57.32$, $p &lt; .001$</td>
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Table 2. Summary of hierarchical regressions predicting physical health problems in parents caring for children with intellectual disabilities

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<td>.24</td>
<td>.00</td>
</tr>
<tr>
<td>Problem behaviour x Stress</td>
<td>-.34</td>
<td>2.85</td>
<td>.006</td>
<td>.36</td>
<td>.11</td>
</tr>
</tbody>
</table>
Figure Legends

Figure 1:

Differences between parents caring for children with intellectual disabilities (caregivers) and control parents on physical health problems in domains of sleep disturbances, headaches, gastrointestinal problems and respiratory infectious episodes; high scores indicate poorer health

Figure 2:

Interaction between children’s challenging behaviours and perceived stress on physical health problem scores in parents caring for children with intellectual disabilities
Figure 1

Figure 2