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The physical health of parents of children with disabilities: Is this related to parental stress and respite care?

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ABSTRACT

Parents of children with disabilities often have worse physical and mental health than those with typically developing children and the general population. The stress associated with raising these children is a key predictor of health, with these parents reporting high levels of parental stress. Exploration of this stress-health relationship has largely focused on mental health, suggesting its severity is related to individual factors of parental stress and the use of respite care. Therefore, the current report chose to investigate physical health, specifically exploring which factors of parental stress best predict physical health and if the amount of respite care used can moderate this relationship. This was achieved using a quantitative, cross-sectional design. Eighty parents of children with disabilities completed an online questionnaire consisting of the SF-12 Health Survey, the Parenting Stress Index-Short Form and measures of short- and long-term respite care. Unexpectedly, no correlation was found between parental stress and physical health; despite parents having clinical levels of stress, they were measured to have average physical health. Whilst this lack of a relationship means the potential benefits of respite could not be investigated, this finding was positive, suggesting that not all parents of children with disabilities have poor physical health. However, the reasoning behind this is unknown, possibly the result of extraneous variables or limitations of the health measure used. Further research should validate these findings.

KEY WORDS:	PHYSICAL HEALTH	PARENTAL STRESS	RESPITE CARE	SOCIAL SUPPORT
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Introduction

A disability is a long-term physical or mental condition that limits someone in terms of their movement, senses or ability (United Nations, 2006). It is estimated that 8% of the UK's 6.5 million unpaid carers care for a child with disabilities, and 5% care for adult children (Carers UK, 2015). Caring for a child with disabilities imposes high physical, financial and emotional demands on parents, and the provision of this constant care over time can lead to 'breaking point' when a parent perceives they no longer have the capability to care for their child (Mencap, 2013). As a result, these children are nine times more likely to become a looked-after child than typically developing (TD) children (Cousins, 2006). In light of this, investigating the impact of parenting and caring for a child with disabilities is important to determine how these problems can be minimised, to improve both the parent's and the child's quality of life and hopefully reduce the number who are relinquished by their parents (Nankervis, Rosewarne, & Vassos, 2011). The current study focuses on the impact caring for a child can have on parents' health and the factors that influence this outcome, specifically parental stress and respite care.

Parental Health

Caring for a child with disabilities is associated with poorer health, with parents of these children scoring below average on ratings of their mental and physical health in comparison to standardised population data (Remedios et al., 2015). Meta-analyses have found that parents of children with developmental disabilities have elevated levels of depression (Singer, 2006) and report more physical health problems (Miodrag, Burke, Tanner-Smith, & Hodapp, 2015) than parents of TD children, with small to medium effect sizes. For example, Olsson and Hwang (2008) found that mothers of children with intellectual disabilities had significantly worse mental health than mothers with TD children. In terms of physical health, parents of children with developmental disabilities reported significantly more parental stress and worse physical health than age-matched parents of TD children with a similar socio-economic status (SES; Cantwell, Muldoon, & Gallagher, 2014). A similar effect has been found in African American parents; parents of a child with disabilities reported significantly more somatic symptoms, (physical symptoms such as headaches, backaches and trouble sleeping) than those without (Ha, Greenberg, & Seltzer, 2011). This suggests a parent's health can be negatively influenced by having a child with disabilities, regardless of SES, age or cultural background, which have also been shown to correlate with health outcomes (Baum, Garofalo, & Yali, 1999; Franco, Pottick, & Huang, 2010). A key influence on health, as proclaimed by numerous reviews and studies, is stress (e.g. McEwen, 2012; Schneiderman, Ironson, & Siegel, 2005). The present study will explore how parental stress specifically pertains to health, as those with children with disabilities experience significantly more stress and report a lower quality of life than those with TD children (Cuzzocrea, Larcan, Baiocco, & Costa, 2011; Cuzzocrea, Murdaca, Costa, Filippello, & Larcan, 2016; Hayes & Watson, 2013).

Parental Stress

Parental stress is the experience of discomfort that results from demands associated with being a parent. It is commonly measured using the Parenting Stress Index-Short

Form (PSI-SF; Abidin, 1995) which suggests parental stress consists of three main factors, namely the parent's distress (the parent's perception of their stress related to their role), the child's challenging behaviour (e.g. aggressive or destructive behaviour), and the parent's perception of their interactions with their child (e.g. whether they think their child likes to be close to them or appreciates what they do for them). Established on the theory that chronic stress leads to deterioration in physical and mental health (McEwen, 2012), the literature suggests that parental stress and health are negatively correlated and stress can predict physical health. For example, Gallagher and Whiteley (2013) found that higher parental stress was associated with poorer physical health, with the most common health issues being headaches, sleep, gastrointestinal and respiratory problems, also found by Cantwell et al. (2014). Moreover, Hung, Wu, Chiang, Wu, and Yeh (2010) measured the mental health of parents of physically disabled children, reporting that higher levels of parental stress correlated negatively with mental health. This suggests that parental stress is an influential variable in determining the health of parents of children with disabilities. The study by Hung et al. also investigated how different factors of parental stress contributed to the parent's mental health, through individually analysing the subdomains of the PSI-SF. High parental distress was found to be the most significant predictor of poor mental health and the only significant independent determinate. This suggests that factors of parental stress may differ in their relation to parental health; however, further research needs to verify this in parents with children with other disabilities and investigate if the same is true for physical health. The current research aims to address these matters directly.

Parental stress is also related to the child's disability, severity and age. Studies have suggested that parents of children with Autism Spectrum Disorder (ASD) report greater stress than those with children with other disabilities (including Down's syndrome, cerebral palsy and undifferentiated developmental delays) and TD children (Cuzzocrea et al., 2016; Hayes & Watson, 2013). Moreover, the severity of the disorder influences stress, with parents of low-functioning ASD children reporting higher levels of stress than parents of children with high-functioning ASD (Cuzzocrea et al., 2016; Kissel & Nelson, 2016). Extensive research has been carried out into the impact of having a child with ASD on parents (see Bonis, 2016, for a review of the current literature). However, other research (e.g. Estes et al., 2009; Woodman, 2014) suggests the extent of the child's problem behaviours significantly increases parental stress regardless of their diagnosis. Therefore, it is important to investigate parental stress related to children with a range of disabilities, of which the current literature is sparse. Furthermore, studies tend to recruit parents of young children with disabilities. In the few where parents with children of a range of ages were recruited, the child's age is shown to correlate with parental stress, with trajectories indicating that parental stress generally increases between early to middle childhood (aged 3 to 10) then decreases through adolescence (up to age 18) (Woodman, 2014; Woodman, Mawdsley, & Hauser-Cram, 2016). It is therefore important for future studies to recruit parents of children of a range of ages and disabilities to determine whether these factors influence the stress-health relationship, another intention of this investigation. Other factors suggested to impact parental stress and health include SES (Barbosa Sindaux Lima, Cardoso dos Santos, & Da Costa Silva, 2016) and the number of siblings in the family (Harper, Dyches, Harper, Roper, & South, 2013).

Social Support and Respite Care

Overall, the literature intimates that having a child with disabilities can negatively impact a parent's quality of life, by inducing stress which can deteriorate their physical and mental health. However, a number of factors can reduce parental stress, such as social support. Social support is the assistance people receive from others, which can be informal support provided by friends and family or formal support provided by a service (Darwin, Tholen, Idun, & Zuo, 1996). A number of studies have focused on the benefits of informal social support. Woodman (2014) found that social support moderated the relationship between a child's behaviour problems and parenting stress, buffering the otherwise negative effect. Social support has also been shown to benefit parents' health. Smith, Greenberg and Seltzer (2012) found that over an 18-month period, a larger social support network was associated with reduced depression symptoms and higher levels of positive affect in mothers of adolescents and adults with ASD. Similar results have been found in parents of younger children with ASD (Bishop, Richler, Cain, & Lord, 2007).

In addition, high levels of social support are shown to moderate the stress-physical health relationship in carers. Goode, Haley, Rothe and Ford (1998) longitudinally measured the health of carers of relatives with Alzheimer's disease and possible influencers of this outcome. This included the caregiver's perceived stressfulness of their relative's impairments and listing members of their social support network, describing how helpful these people are and their satisfaction with this. The study found that as stressfulness increased, physical health worsened. However, initial social support had a protective effect on changes in physical health symptoms, with those who reported higher levels of social support even experiencing improvements in their health over the year. Yet, as this study concerns people caring for their older relatives with Alzheimer's, the results may vary when caring for a child with disabilities. A similar result has been shown in parents of children with developmental disabilities, Cantwell et al. (2014) found stress was associated with poor physical health and this was moderated by perceived social support, but only when stress was low. The link was not attenuated when stress was high. Nevertheless, this may have occurred as this study measured perceived social support, whereas the Goode et al. study measured actual support. When parents are highly stressed, perceiving good social support may not moderate their physical health, because this is when actual support needs to be accessed and the type of support they require may not be the support they perceive accessible (Cantwell et al., 2014). This suggests social support has the potential to reduce the negative relationship between parental stress and health, and this may be more substantial when support is provided in a formal manner, such as through respite care or interventions. Accordingly, further research should investigate the moderating effects of actual support on the stress-physical health relationship in parents of children with disabilities.

Respite care is a temporary service provided for individuals with disabilities to offer their parent(s) a break from caring for their child (Mullins, Aniol, Boyd, Page & Chaney, 2002), thus it is a formal provision of social support. In comparison to social support, limited research has investigated the benefits of respite care on the health of parents. Cross-sectional studies that have investigated respite care suggest respite is associated with reduced stress and depressive symptoms and better marital quality (Dyches, Christensen, Harper, Mandelco, & Roper, 2016; Harper et al., 2013; Robertson et al., 2011), but these are largely focused on parents of children with ASD.

Moreover, an empirical study (Remedios et al., 2015) found that parents of children with life-threatening conditions experienced a reduction in fatigue and improved psychological adjustment and mental health after up to four days of out-of-home respite care. However, studies so far have only investigated the use of respite care in the short term (within the past year) and few have examined the influence on physical health. Whilst the study by Remedios et al. (2015) did investigate the effect on physical health, no effect was found. However, this may have been because the benefits of respite were measured as a one-off occurrence, and the timespan was only two weeks before and one week after respite. In comparison to mental health, the link between stress and physical health is thought to occur over a longer period (Johnston, 2002), thus the benefits of respite care on parent's physical health may be influential over a longer period, either a greater number of hours or a greater number of years of consistent respite care. This is an area of the literature that has not been investigated, thus the benefits are currently unknown (Robertson et al., 2011).

Consequently, the current study aims to add to the research-base by investigating whether the amount of respite care parents access relates to their physical health. Assuming that parents generally use respite services throughout their child's life, this investigation would elicit data more applicable to them. Moreover, as a recent report (Mencap, 2013) indicates local authorities have reduced their spending on respite care provisions, it is vital to examine additional benefits of respite care to justify increasing this funding. If respite care can improve parent's health outcomes, this could reduce government costs in the long-term.

The Present Study

As outlined above, research proposes parents of children with disabilities have worse physical and mental health than parents with TD children, and this is influenced by parental stress. Parental stress is considered to involve three main subtypes (parental distress, child behaviour and parent-child interactions) and one paper has suggested that these factors separately contribute to parents' mental health (Hung et al., 2010). The current study has chosen to focus on physical health because of the scarce and inconsistent literature on this in comparison to mental health. Therefore, the study aims to investigate whether parental stress subtypes can separately predict the physical health of parents of children with a range of disabilities. Furthermore, since several studies suggest social support may moderate the association between stress and physical health (Cantwell et al., 2014; Goode et al., 1998), the current research aims to investigate whether respite care (a more formal type of social support) also moderates this relationship. Moreover, due to the more long-term effect of stress on physical health, the benefits of respite care may be influenced by the amount parents utilise it. As a result, the current study will also investigate whether respite care moderates the link between stress and physical health in parents who have used respite care in varying amounts. This will be measured through the amount of respite accessed in the last year (termed: short-term [ST] respite) and by the number of years parents have used it during their child's life (termed: long-term [LT] respite). For diagrams of the proposed moderation, see Figures 1 and 2. The age of the child with disabilities, the number of children with disabilities and level of parent education (as a proxy for SES; Winters-Miner et al., 2015) will be controlled for as these are demonstrated to correlate with parental stress (Barbosa Sindeaux Lima et al., 2016; Harper et al., 2013; Woodman, 2014).

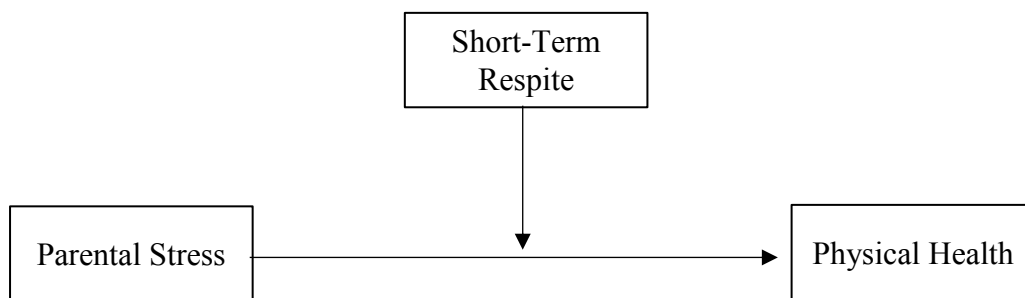


Figure 1: The proposed relationship between parental stress, physical health and short-term respite, with the latter moderating the relationship.

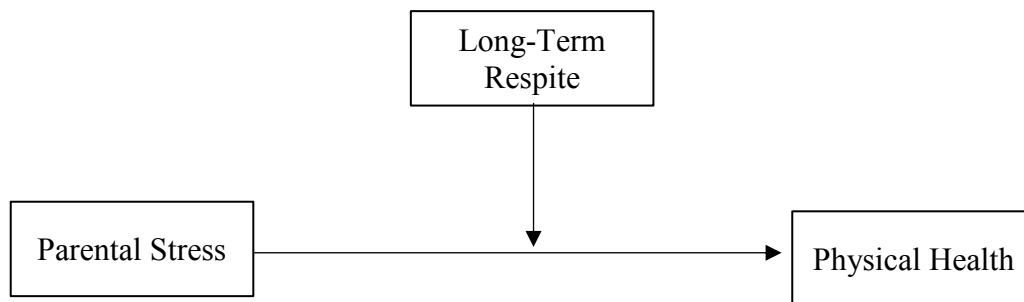


Figure 2: The proposed relationship between parental stress, physical health and long-term respite, with the latter moderating the relationship.

Therefore, this paper has two main research questions. First (Q1), which factors of parental stress, as measured by the PSI-SF (the parent's distress, the child's challenging behaviour, and the parent-child dysfunctional interactions), best predict the physical health of parents of children with a range of disabilities? Based on previous research (Cantwell et al., 2014; Gallagher & Whiteley, 2013) it is hypothesised that there will be a significant negative relationship between parental stress and physical health (H1a), such that all three factors will predict physical health, but they will differ in their contribution (H1b; Hung et al., 2010). Second (Q2), does the amount of respite care parents access moderate the relationship between parental stress and physical health? Based on the benefits of social support (Cantwell et al., 2014; Goode et al., 1998), it is hypothesised that the amount of respite care parents access will significantly moderate the relationship between parental stress and physical health. Firstly, it is hypothesised that there will be a weaker negative relationship between parental stress and physical health for those who have accessed more hours of respite in the past year. Likewise, there will be a stronger negative relationship for those who have used fewer hours of respite in the past year (ST respite; H2a). Secondly, it is hypothesised that there will be a weaker negative relationship between parental stress and physical health for those who have accessed respite care for a greater number of years of their child's life. Likewise, those who have accessed respite for a fewer number of years of their child's life, there will be a stronger

negative relationship (LT respite; H2b). See Figure 3 for proposed simple slopes graph.

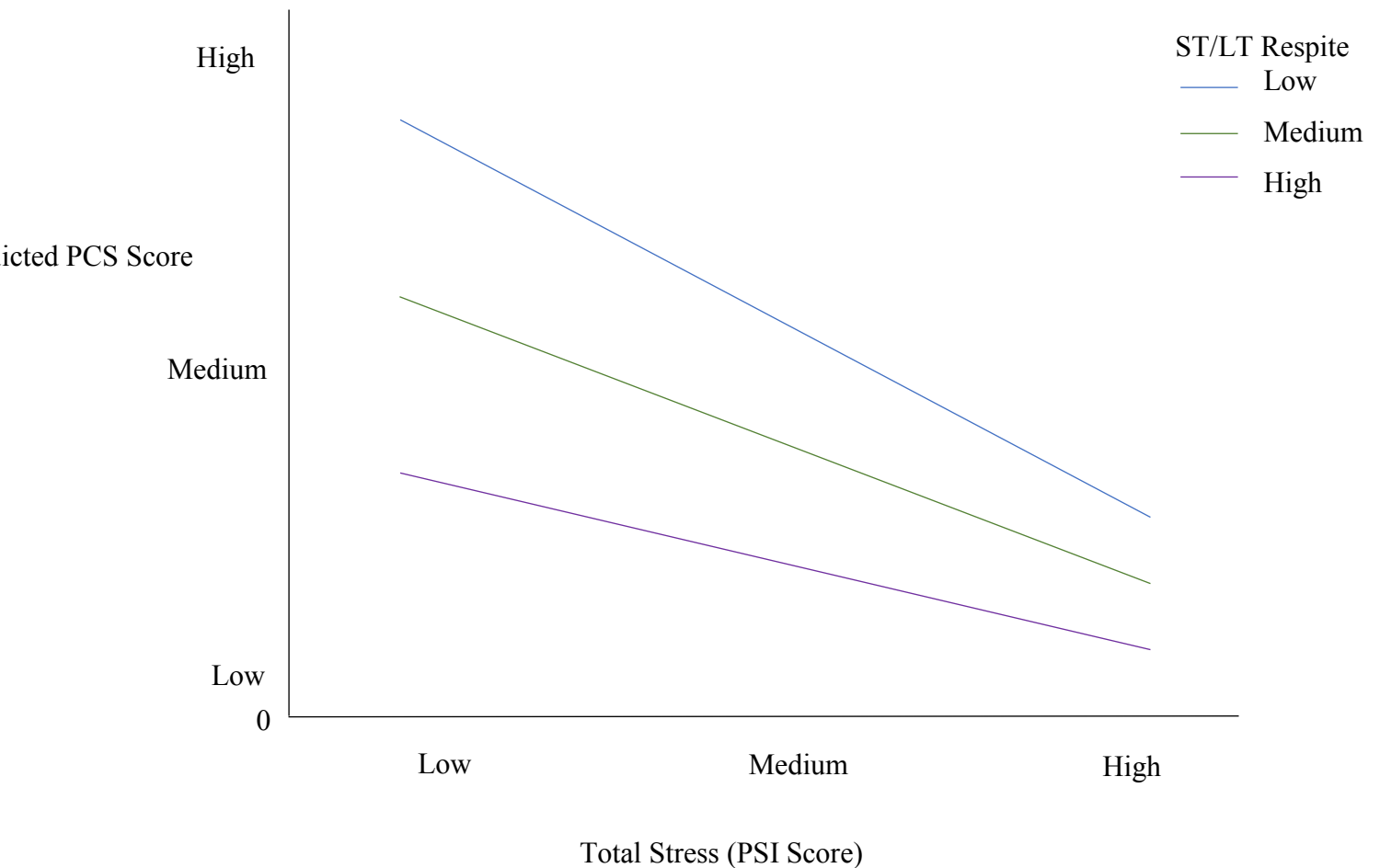


Figure 3: Proposed simple slopes line graph of the moderating relationship of short-term or long-term respite on the relationship between physical health and parenting stress, as measured by PCS Score and PSI Score.

Note. ST = Short-Term, LT = Long-Term, PCS =Physical Component Summary, PSI = Parenting Stress Index

Method

Participants

Participants were 80 parents of children with disabilities, of which, 73 (91%) were female. Data concerned 92 children with disabilities, 65 (70.6%) were male, with a mean age of 11 years 2 months ($SD = 5$ years, 8 months, $Range = 1$ to 27 years). They had on average two comorbid diagnoses and all but one resided at home. See Table 1 and Table 2 for the full demographic details of the parents and their children,

respectively. Parents were recruited by snowball and volunteer sampling, through advertisements on social media and emails to some parents; by the researchers, by the charitable respite providers, Disability Challengers and Cherry Trees, and by the advice service Parent Voice. The researchers also visited Disability Challengers day-schemes, advertising the questionnaire by handing out flyers to parents.

Table 1
Demographic information of the participants

Demographic Data	Frequency (% of Parents)
Age	
20-30	5 (6.3)
31-40	17 (21.3)
41-50	41 (51.2)
51-60	16 (20)
61-70	1 (1.3)
Marital Status	
Married/Domestic Partnership Relationship	65 (81.3)
Single	7 (8.8)
Divorced/Separated	5 (6.3)
Level of Education/SES Proxy	
No formal qualification	3 (3.8)
GCSE's/O Levels/NVQ/Equivalent	19 (23.8)
A Levels/Equivalent	19 (23.8)
Undergraduate Degree	23 (28.7)
Postgraduate Degree	16 (20)
Ethnicity	
White British	76 (95)
White and Asian	1 (1.3)
Other	3 (3.8)
Number of Children	
One	18 (22.5)
Two	37 (46.3)
Three	19 (23.8)
Four	6 (7.5)
Number of Children with Disabilities	
One	69 (86.3)
Two	10 (12.5)
Three	1 (1.3)

Table 2
Frequency and percentage of diagnoses of the children of participants

Diagnosis	Frequency (% of Children)
ASD	58 (63.0)
Learning Disability	24 (22.1)
Global Development Delay	23 (21.2)
Other	23 (21.2)
Learning Difficulty	19 (17.5)
ADHD	17 (15.6)
Epilepsy	13 (12.0)
Cerebral Palsy	9 (8.3)
Impaired Vision	6 (5.5)
Down Syndrome	4 (3.7)
DCD	4 (3.7)
Angelman Syndrome	1 (0.9)
Traumatic Brain Injury	1 (0.9)

Design

The data were collected as part of a larger study investigating the benefits of respite care on mental and physical health, however, the current study focused on physical health, thus only the methods for this will be discussed. A quantitative, cross-sectional design was used. In both Q1 and Q2, the outcome variable was parental physical health. To address Q1, the predictors were the three subdomains of the PSI-SF. To address Q2, total parental stress was the predictor variable and the amount of respite care was the moderator. The control variables were level of parent education, the number of children with disabilities and the age of the child (or average age of children if the parent had more than one with disabilities).

Measures

Demographics

The parent's age, gender, level of education, marital status and ethnicity were collated. Parental education was used as a proxy for SES, as this has been successfully used in a number of studies (Winters-Miner et al., 2015). The number of children in the

family and the number of those with disabilities was also reported. In regard to the child (or children) with disabilities, information concerning date of birth, gender and diagnosed disability was gathered. If the parent had more than one child with disabilities, an average of their children was calculated.

Physical health. The 12-item Short Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1998) was used to measure the physical health of the parents. The SF-12 was developed as a shorter version of the SF-36 and is shown to be as valid and reliable as the full version in the general population (Ware, Kosinski, & Keller, 1996). It measures four concepts relating to physical health: physical functioning, limitations to their role due to health problems, bodily pain and general health, with higher scores indicating better health. It has been successfully used to assess the physical and mental health of parents of children with disabilities (Remedios et al., 2015). The original manual algorithms (Ware et al., 1998) were used to generate a physical component summary (PCS). Ware et al. (1998) reported the mean for the general U.S. population as 50.12 ($SD = 9.45$, Range = 13-69).

Parental stress

Parents' perceived stress was measured using the PSI-SF (3rd Edition; Abidin, 1995). This is a self-report measure, consisting of 36-items, derived from the original 120-item PSI. Parents have to rate their agreement with statements using a 5-point Likert scale (strongly disagree to strongly agree). This provides four outcomes: Parental Distress (PD; the parent's perception of their stress related to their role), Parent-Child Dysfunctional Interactions (PCDI; perceptions of stress related to interacting with their child) Difficult Child (DC; perceptions of the ease of caring for their child), and Total Stress (overall level of stress). The PSI-SF has been demonstrated to have strong reliability and validity among parents of children with disabilities (Abidin, 1995; Hanson & Hanline, 1990). Whilst the PSI-SF is designed to capture the stress of parents of children aged one month to twelve years, it has been frequently used with parents of children with disabilities of any age (e.g. Hastings, Daley, Burns, & Beck, 2006; Woodman, 2014) due to the developmental age of children with disabilities being typically lower (Woodman, 2014). Abidin (1995) reported 69 to be an average Total Stress score (Range = 36-180, IQR = 55-86), with higher scores indicating greater levels of stress, and scores above the 90th percentile (91) are considered clinically significant (Abidin, 1995; Barbosa Sindeaux Lima et al., 2016).

Respite care

The amount of respite care accessed was measured by asking parents in a normal week and during school holidays "how many hours do your children spend away from you, at these forms of respite care?", where they had to indicate their use of various forms of respite. These data were used to calculate an estimate for ST respite care (number of hours used in the last year). The total number of hours accessed during an average school-term week was multiplied by a year of term-time (39 weeks), and the total number of hours accessed during the school holiday was multiplied by a year of holiday-time (13 weeks). These totals were then aggregated. Parents were also asked to estimate how many years they had been using respite care; these data were used to calculate an estimate of LT respite care, by dividing the number of years of usage by the child's age. If a parent had multiple children with disabilities, the amount

used was calculated for each child, then the values were summed and divided by the number of children.

Procedure

Prior to conducting the study, favourable ethical approval was obtained. The measures were collated into an online survey using the software Qualtrics and made available for parents to complete. Participants completed the survey in their own time and on their own electronic device (either phone, computer or tablet). The survey took approximately 11 minutes to complete. Upon clicking on the link, participants were presented with an information screen outlining the study's aims and a consent form. Once they had agreed to the conditions, they began the survey, answering the questions in the order presented above. Once they had completed the survey, they were presented with a debriefing screen and thanked for their time. Responses were recorded automatically by the online system.

Statistical Analysis

The Statistical Package for the Social Science (SPSS 24) was used to analyse the data. To address the hypotheses, correlations between the variables and the covariates were analysed. Significant correlations were followed up with the following analyses: first, to address H1a, a hierarchical linear regression was conducted, with the control variables (average age of children, parent education and the number of children with disabilities) being entered into the model first and PSI Total Stress second. Second, to address H1b, a hierarchical multiple linear regression was conducted and the known predictors entered first again and the three factors of the PSI entered in the second step. Finally, to address H2a and H2b, PROCESS, an SPSS add-on macro for statistical moderation analysis (Hayes, 2013) was used, where PSI Total Stress was entered as the independent variable and PCS as the outcome variable. This was carried out twice with two different moderators, ST (H2a) and LT respite care (H2b). Refer back to Figures 1, 2 and 3 for the proposed moderation.

Results

Data Pre-Processing

Data cleaning

Upon downloading the data from Qualtrics, the data were cleaned. Of the 168 questionnaires completed, 49 respondents were removed as they did not have a child with a disability. A further 31 were removed as they had not sufficiently completed the questionnaire. A total of 88 respondents remained.

Outliers

Eight respondents were excluded from all analyses, hence 80 remained. Three cases were removed as they did not report the child's date of birth. Two were significant outliers for ST respite care and two for PCS, indicated by z-scores being outside the range of ± 3.29 and ± 2.56 (z-score = 7.27, z-score = 2.75, z-score = -3.56, z-score =

-2.75) (Field, 2013). One had undue influence on the H1a regression, indicated by a Mahalanobis distance larger than 15 (24.56) (Field, 2013).

Assumption testing

It was found that the variables ST respite care, PCS and DC were non-parametric in their dispersion of data, thus non-parametric analyses were used.

Descriptive Statistics

Means, standard deviations, medians and interquartile ranges are reported for all measurements (Table 3). In terms of respite care, on average, parents used respite for 4 hours a week during school term ($SD = 5$ hours) and 11 hours a week during the holidays ($SD = 19$ hours) and they had been using respite for an average of 3 years and 9 months ($SD = 3$ years, 7 months). Thirty parents did not use any form of respite care (for a further breakdown of types of respite used, see Table 4). Non-parametric correlations (Spearman's Rho) were conducted between all variables (Table 5). The correlations showed that the PSI subscales significantly correlated, with medium-to-high effect sizes. However, no variables significantly correlated with PCS. Given this lack of significant correlations with parental physical health, the planned regression and moderation analyses were not conducted.

Table 3
Means, standard deviations, medians and interquartile ranges of measures collected

Measure	<i>Mean</i>	<i>SD</i>	<i>Median</i>	<i>IQR</i>
PCS	50.44	8.15	52.81	10.39
PSI				
Total	115.15	23.65	116.50	31.8
PD	38.88	8.52	39.00	14.0
PCDI	34.70	8.32	34.50	11.0
DC	41.58	10.38	43.00	15.0
Respite Care				
ST	316	363	195	435
LT	0.32	0.25	0.33	0.42

Note. PCS = Physical Component Summary, PSI = Parenting Stress Index, PD = Parental Distress, PCDI = Parent-Child Dysfunctional Interaction, DC = Difficult Child, ST = Short-Term Respite, LT = Long-Term Respite. ST Respite reported in hours, LT Respite reported in the number of years using respite divided by their age.

Table 4

Total and mean number of hours and number of children with disabilities attending different types of respite care per week.

Type of Respite Care	School Term			School Holidays		
	<i>Total (hrs per week)</i>	<i>Frequency (children)</i>	<i>Mean (hrs per week)</i>	<i>Total (hrs per week)</i>	<i>Frequency (children)</i>	<i>Mean (hrs per week)</i>
Day Scheme	98.5	23	1.07	764	47	6.50
Evening Scheme	97.7	30	1.06	13	4	0.14
In-home Carers	43	8	0.47	27	5	0.29
Overnight Stays	47	3	0.51	72	3	0.78
Private Carers	32	7	0.35	170	7	1.85
Friends/Family	28	8	0.30	11	8	1.21
Other	36.5	5	0.40	77	12	0.84
<i>Total</i>	382.7	61	4.16	1068	81	11.61

Table 5
Summary of Spearman's Rho correlations for scores on measures collected

Variables	1	2	3	4	5	6	7	8	9	10
1. PCS	-									
2. PSI PD	.10	-								
3. PSI PCDI	-.03	.61**	-							
4. PSI DC	.12	.57**	.72**	-						
5. PSI Total	.11	.80**	.88**	.91**	-					
6. Short-Term Respite	-.15	.05	.08	.07	.07	-				
7. Long-Term Respite	-.16	-.02	.02	.06	.02	.65**	-			
8. Average Age	-.14	-.18	.18	-.04	-.04	.20	.13	-		
9. Number of disabled children	-.12	.03	-.02	.06	.02	-.07	-.07	-.14	-	
10. Parent Education	-.03	-.01	.11	.11	.10	.18	.18	-.06	-.34**	-

Note. PCS = Physical Component Summary, PSI = Parenting Stress Index, PD = Parental Distress, PCDI = Parent-Child Dysfunctional Interaction, DC = Difficult Child
**p < .001

Discussion

Building on studies that have investigated the stress-physical health relationship in parents of children with disabilities (e.g. Cantwell et al., 2014; Gallagher & Whiteley, 2013) and the benefits of respite care (e.g. Harper et al., 2013; Remedios et al., 2015), this study was designed to combine these two areas of research. It aimed to explore the relationship between factors of parental stress on physical health, as previous literature has investigated this for mental health (Hung et al., 2010). It also aimed to determine if the amount of respite care used could moderate the stress-physical health relationship, as research has shown social support to moderate this and respite is a more formal type of social support (Cantwell et al., 2014; Darwin et al. 1996; Goode et al., 1998). Unexpectedly, this study did not find a significant relationship between parental stress and physical health. Whilst the mean score for the PSI Total Stress and its subdomains (PD, PCDI and DC) were of clinical significance (Cuzzocrea et al., 2011), the score for the PCS of the SF-12 was close to the population norm (50.12; Ware, Kosinski, & Keller, 1998), meaning that despite being clinically stressed, the parents were of average physical health. Moreover, physical health did not correlate with any other measures including the amount of respite care (ST or LT), the average age of the child, number of children with disabilities or level of parent education. In consequence, the hypotheses were rejected. Firstly, there was no significant negative relationship between parental stress and physical health (H1a), and as the PSI factors were significantly correlated, none of them individually predicted physical health (H1b). Secondly, as there was no relationship, the use of respite care in the ST (H2a) or LT (H2b) could not moderate this. These results meant that the moderating effect of respite could not be investigated and imply that significant parental stress does not relate to the physical health of these parents.

The lack of a correlation between stress and physical health is in contrast to previous research and theory. High levels of chronic stress are considered to lead to poorer physical health (McEwen, 2012), a theory based on numerous studies of this relationship. Likewise, research on the stress and physical health of parents of children with disabilities have found that higher parental stress can predict lower physical health (Cantwell et al., 2014; Gallagher & Whiteley, 2013), and the physical health of these parents is poor (Allik, Larsson, & Smedje, 2006; Miodrag et al., 2015; Remedios et al., 2015). However, a few studies on physical health alone have found the health of parent carers to be comparable to parents of TD children (Seltzer, Greenberg, Floyd, Pettee, & Hong, 2001) and national norms (Chen, Ryan-Henry, Heller, & Chen, 2001), lending some support to the current study's results. This suggests that not all parents of children with disabilities have poor physical health, however as these studies did not measure stress, the nature of this relationship in these circumstances is not known.

The absence of the expected correlation could be explained by confounding variables which may have buffered the relationship between stress and physical health, thus a correlation could not be found. These variables may have made the parents more resistant to the chronic stress they are under, resulting in them being measured to have average health. Coping style, perceived control and social support are shown to influence this association and were not measured in the current study. Coping style is the way someone manages a stressful situation in an attempt to regain some normal functioning (Lazarus & Launier, 1978), these are either approach or avoidant

strategies (Roth & Cohen, 1986). Researchers propose that approach coping, when an individual gathers information and takes direct action, is generally more adaptive, particularly for chronic stress (Holahan & Moos, 1987). This has been shown to influence the relationship between stress and health in caregivers. For example, Goode et al. (1998) found that higher levels of approach versus avoidance coping strategies predicted better health over time, moderating the relationship between stress and physical health. Perceived control is also considered to mediate the stress-physical health relationship, with higher levels of perceived personal control being more adaptive (Seeman & Lewis, 1995). For example, Cantwell et al. (2014) found that mastery (the belief that one has control over the challenges in life) mediated the relationship between stress and physical health in parents of children with disabilities, with a greater sense of self-mastery being associated with better health. Furthermore, despite measuring the use of respite care, the parent's perceived social support network was not measured, which may also have influenced their physical health, as the perception of a larger network is associated with better physical health in caregivers (Goode et al., 1998).

Taken together, it is possible that high levels of any of these variables; approach coping style, mastery and social support, could have influenced the relationship between stress and physical health, protecting them from the negative effects of their high parental stress and mitigating a correlation. These factors depend on a person's personal and contextual circumstances, including the level of education and SES. The sample population had a noticeably high standard of education (20% had completed a post-graduate degree). This was also used as a proxy for SES, suggesting participants were of a high SES. These features may have increased the levels of these factors in the sampled population, as a high level of education is associated with a greater likelihood of using an approach coping style (Holahan & Moos, 1987). Likewise, high SES is related to a higher sense of mastery (Falci, 2011) and perceiving a larger social support network (Taylor & Seeman, 1999).

However, an alternative explanation is that the non-significant results could have been caused by an invalid operationalisation of the concept of physical health through the use of the SF-12 (Ware et al., 1998), meaning that the parents may have been of poor physical health, but the measure did not detect this. The SF-12 was selected for this research as it measures both physical and mental health in a concise, self-reported form and this study was part of a wider investigation which also needed data on the mental health of the parents. Moreover, previous studies using the SF-12 (Allik et al., 2006; Remedios et al., 2015) have found the physical health of parents of children with disabilities to be significantly below the norm population mean, suggesting that this is an effective measure of physical health. However, these studies did not measure parental stress in relation to health. Alternatively, studies that did investigate this relationship (e.g. Cantwell et al., 2014; Gallagher & Whiteley, 2013) used other measures, such as the Physical Health Questionnaire (PHQ; Schat, Kelloway, & Desmarais, 2005), continuing to find these parents to have poor physical health, as well as a significant negative correlation between this and stress. There are two main ways in which the SF-12 contrasts from the PHQ, which may have resulted in an inaccurate measure of overall physical health and no relationship between stress and physical health.

Firstly, the PCS of the SF-12 is quite narrow in its measure of physical health. It enquires about four concepts: physical functioning, limitations to their role due to health problems, bodily pain and general health. In contrast, the PHQ also asks participants about headaches, gastronomical problems (upset stomach), respiratory infections and sleep disturbances, thus it requires details of physical health on a broader spectrum, hence it is more likely to capture poor health of some kind. Moreover, research into the effects of stress on physical health suggests that chronic stress may more directly affect the areas of physical health measured by the PHQ. Chronic stress causes changes in the Hypothalamic Pituitary Adrenal (HPA) axis (McEwen, 2012), which increases the production of hormones that interrupt sleep (Han, Kim, & Shim, 2012) and decrease immune function, increasing the chances of a viral or bacterial infection (Lagraauw, Kuiper, & Bot, 2015). They also cause problems with digestion (Mayer, Naliboff, Chang, & Coutinho, 2001) and promote headaches (Maleki, Becerra, & Borsook, 2012). Thus, these areas of physical health may be more susceptible to stress. In further support of this, a number of studies have demonstrated poor immune functioning in parents of children with disabilities (e.g. Gallagher, Phillips, Drayson, & Carroll, 2009; Lovell, Moss, & Wetherell, 2012), suggesting this is possible in the kind of population measured.

Secondly, the time-frames used may have impacted the results. The SF-12 asks parents about the severity of their health currently and within the past four weeks. In contrast, the PHQ asks about the frequency of physical symptoms within the past year. The shorter time-frame of the SF-12 may not accurately reflect a parent's general physical health, which is what this study sought to capture. Participants might have had better health within the last month, but not for a significant period beforehand, which would not have been reflected by the SF-12. Overall, aspects of the parents' physical health may have been poor, but the SF-12 did not capture them due to the confines of its questions. If a different measure had been used, parents may have been measured to have below average health and these may have negatively correlated with stress.

Due to the lack of a relationship between parental stress and physical health, this study was unable to investigate its main aim of exploring the potential benefits respite care can have on the physical health of parent carers. Therefore, future research should aim to investigate this by adjusting the current study's design and recruiting parents from a wider demographic pool with the intention to identify a stress-physical health relationship and determine whether respite care can moderate this. This should be done using a broader measure of physical health, such as the PHQ. Research should use a prospective design and measure these factors over a consistent period, this could be done longitudinally. Parents with children with disabilities could be enrolled in the study before they access respite care, to measure their stress and physical health prior to using this service. Then these variables could be measured, along with their frequency of use of respite care, on a yearly basis to gain a trajectory of physical health in relation to stress and respite. This form of study would more accurately identify whether utilising respite care can protect a parent's physical health from declining due to the stress associated with their role. A beneficial moderation could provide a further reason why respite care is a vital provision of the local authorities and a worthwhile investment, for it improves children's and their parents' quality of lives and potentially reduce government costs in the long-term (Mencap, 2013).

Conclusion

Overall, this study sought to investigate the relationship between factors of parental stress and physical health of parents with children with disabilities and determine if the amount of respite care used can moderate this link. This was based on two strands of previous research that suggested factors of parental stress could separately predict mental health (Hung et al., 2010) and that social support has a moderating effect of the stress-health relationship (Goode et al., 1998). Despite no significant result, the findings of this study are important and positive as they imply that despite significant parental stress, parents of children with disabilities can be of average physical health. However, the reasoning behind this is unknown. This may be attributable to extraneous variables that were not measured. Alternatively, limitations of the methodology may have meant other aspects of physical health were poor, but these were not detected. Further research should investigate this relationship using more accurate measures and over a sustained period to either confirm or mitigate these findings.

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