J Autism Dev Disord (2016) 46:2042–2053
DOI 10.1007/s10803-016-2728-2

ORIGINAL PAPER

Stress in Parents of Children with Autism Spectrum Disorder: An Exploration of Demands and Resources

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Abstract We applied the ABCX model of stress and coping to assess the association between child and family demands, school-based resources (i.e., parent–teacher alliance and COMPASS, a consultation intervention), and two measures of parent stress: perceptions of the demands of raising a child (Child domain) and reactions to those demands (Parent domain). Data were analyzed from seventy-nine parents of children ages 3–9 with ASD participating in two randomized controlled trials of COMPASS. Stronger parent–teacher alliance correlated with decreased Parent domain stress and participation in COMPASS correlated with decreased Child domain stress after controlling for baseline stress. The study indicates that school-based resources can help reduce parent stress.

Keywords Autism · Parent · Stress · Intervention · Resources · Demands

Introduction

Compared to parent caregivers of neurotypical children and of children with other disabilities, parent caregivers of children with autism spectrum disorder (ASD) report increased stress (e.g., Baker-Ericzén et al. 2005; Paynter et al. 2013; Sanders and Morgan 1997; Hayes and Watson 2013) and financial costs related to caring for their child. The incremental costs of caring for a child with autism is upwards of 3 million dollars over of his/her lifetime (Ganz 2007). The stress placed on family members to afford and coordinate care across providers combined with barriers to access services (e.g., denial of insurance coverage) reduces the ability of many families to earn a living and adds further to their overall emotional burden (Young et al. 2009). Parent stress, in turn, places caregivers at increased risk for psychosocial problems including reduced psychological wellbeing, poorer marital adjustment, and increased depressive symptoms (Paynter et al. 2013; Ingersoll and Hambrick 2011; Rivard et al. 2014). Physical health also may be impacted (Pakenham et al. 2005). Moreover, recent research indicates that stress may impact cellular processes related to longevity. Family members of children with autism who have an infant were found to have shorter than normal telomeres (Nelson et al. 2015). Given that telomere length is related to cellular reproductive capability and physical and mental health consequences (Nelson et al. 2015; Mather et al. 2011), these findings suggest that the lifespan of parents who care for children with serious problems may be compromised.

Researchers have identified a variety of factors that impact parent stress. These factors can be conceptualized using the ABCX Model of Family Stress (McCubbin and Patterson 1983). The ABCX model explains the interplay between stressful life events, i.e., demands (e.g., an ASD diagnosis), available resources (e.g., social support and services received), and the appraisal of a situation (e.g., negative or positive) on family adaptational outcomes (e.g., stress, health). Together, those categories contribute to a family's overall perceived stress or adaptation. The model is flexible; researchers may choose which components to include in their model, and how to measure them (Stuart and McGrew 2009).

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Several investigators have applied the ABCX model to study stress and adaptation in families with children with ASD (e.g., Paynter et al. 2013; McStay et al. 2014; Pakenham et al. 2005; Pozo et al. 2014; Manning et al. 2011; McGrew and Keyes 2014). For example, in one of the earliest applications, Bristol (1987) used the model to predict healthy adaptation (e.g., improved marital adjustment, decreased symptoms of depression) in mothers of children with ASD or communication disorders. More recently, the ABCX model was found to account for 32–47 % of the variance in family functioning, parent distress, and parent–child dysfunctional interactions in families of school-age children with autism (Manning 2008).

Below, we briefly review the literature on child and lifestyle-related factors related to parent stress in ASD. *Child-related factors* impact the perceived demands of the stressor within the ABCX model and include number and severity of problem behaviors (Harper et al. 2013; Reyns 2006; Benson and Karlof 2009), poorer social relatedness (Davis and Carter 2008), lower levels of adaptive behavior (Tomanik et al. 2004; Szatmari et al. 1994; Smith et al. 2012), older age of the child (Rivard et al. 2014), lower IQ (Baker-Ericzén et al. 2005; Ingersoll and Hambrick 2011), and restricted and repetitive behaviors, and communication impairments (Benson 2010; Estes et al. 2009; Lecavalier et al. 2006; Hayes and Watson 2013). Family factors and characteristics also impact caregiver demands. Examples include caregiver marital distress, number of children living in a family's home (Harper et al. 2013), and economic distress, such as increased financial hardships, expenses, and reduced capacity to work (Stuart and McGrew 2009; Bristol 1987).

Just as demands tend to increase stress, resources serve a compensatory role to decrease stress levels and increase positive outcomes (Lazarus and Folkman 1984). Resources can include both external (e.g., social support, access to services) and internal (e.g., education level, income) factors. Examples of *external resources* are respite and formal ASD services. Respite care, a support service in which a hired individual provides care for a child or adult with ASD for a specified period of time on a consistent basis (Meadan et al. 2010), is an effective coping strategy for parents of children with ASD (Harper et al. 2013; Strunk 2010). Moreover, respite care has been found to reduce parent stress (Cowen and Reed 2002; Meadan et al. 2010) and improve family outcomes (Ruble and McGrew 2007). Informal services and supports associated with reduced maternal stress (Ekas et al. 2010) and decreased levels of depressed mood and anxiety among parents of children with ASD (Benson and Karlof 2009; Turnbull et al. 2006; Boyd 2002) include perceived social supports and support from family, friends, and neighbors. In contrast, higher psychological distress and poorer mental health in parents of children with ASD are linked to low levels of social support (Paynter et al. 2013; Stuart and McGrew 2009; Smith et al. 2012; Zablotsky et al. 2013). Interestingly, satisfaction with the social supports received may be more important than the number of supports (Meadan et al. 2010). Moreover, both general support and autism-specific support (e.g., support from teachers or health-care providers) have been found to buffer the stress-effects of caring for a child with autism (Stuart and McGrew 2009). Finally, having two parents involved in caregiving may provide an informal source of respite by dividing the responsibilities of household management and sharing the role of disciplinarian (Meadan et al. 2010).

However, a family's access these resources (services) may depend on a number of *external* (e.g., rural vs. urban location) and *internal factors* specific to the parents and family (e.g., education level, income, and race). For example, minority families, families whose members have little education, those who do not use mainstream treatment approaches, and those who live in rural areas, tend to have less access to formal support services (Meadan et al. 2010; Thomas et al. 2007). In contrast, parents living in areas with greater wealth may have lower levels of stress than those living in rural or urban areas where assistance is not as easily available (Bromley et al. 2004). Parents' race may also influence the quality and type of services received. Non-White parents of children with ASD report receiving less family-centered care (Reinke 2013; Montes and Halterman 2011). Similarly, parents of Black and Hispanic children with special healthcare needs in general (i.e., chronic physical, developmental, behavioral, or emotional conditions) were more likely to report dissatisfaction with care, and difficulty finding services than parents of White children with special needs (Ngui and Flores 2007).

Gaps in the Literature

Despite what is known about the underlying factors impacting stress, only a few studies have examined interventions to reduce parent stress. For example, parent-focused interventions, in which parents are directly involved in the delivery of their child's treatment or have learned skills to cope with having a child with ASD have been shown to buffer or reduce burden and stress (e.g., Koegel et al. 1996). There is also evidence that peer-led parent interventions (e.g., Dykens et al. 2014) and parent education and counseling interventions can reduce stress and improve mental health outcomes (Tonge et al. 2006). However, a recent review of seven parent-involved child-focused intervention studies for young children with ASD using randomized controlled designs failed to find any significant post-test improvements in parent mental health or other outcomes (Dababnah and Parish 2015). Common to all these studies was an explicit focus on the parent, either as the target of the intervention or as the focal active change agent in the child's intervention. However, few studies have directly examined the potential indirect effects of *evidence-based, child-focused* autism interventions that do not explicitly involve parents in treatment delivery, on the stress and burden of parents of children with ASD. Thus, it is still an open question whether child focused interventions can improve child outcomes, while also reducing parent stress.

Another gap concerns the potential impact of contextualized support, which is identified as an external resource within the ABCX model. Although general social support has been shown to reduce stress/burden in parents of children with ASD in several studies, few studies have examined the impact of contextual (autism-specific) supports, such as the perceived support from professional helpers (e.g., physicians, direct care staff, or teachers), despite the fact that such support can be helpful (e.g., Stuart and McGrew 2009). For children with ASD in special education, the support of the special education teacher may be particularly important both to improving child outcomes and to reducing concerns and stress for the parents of those children. Accordingly, we also examined the relationship between parent–teacher alliance and parent stress.

Purpose

In the current study, we operationalized three of the four elements of the ABCX model: Demands, Resources, and Adaptational Outcomes (see Fig. 1). We did not include the fourth component, appraisal and coping with the stressor, because we did not collect measures in this area. Under Demands, we included *Characteristics of the Child with ASD*, i.e., language ability, IQ, problem behaviors, adaptive behavior, and severity of autism symptoms, and *Family Characteristics*, i.e., the number of children living in the home and additional family stressors or pile-up demands. Under Resources, we included *Internal Resources*, i.e., parent level of education, family annual income, and parent race, and *External Resources*, i.e., respite services, receipt of an evidence-based parent–teacher consultation intervention, and alliance with special education teacher. *Adaptation* was assessed using two subscales from the Parent Stress Inventory, the Child domain, i.e., parents' perception of the demands they faced in caring for their child with ASD and the Parent domain, i.e., parents' perceptions of their level of stress reaction or distress in caring for their child.

Across our sample of parents of children with autism, we tested the following four hypotheses: (1) *Greater demands* (e.g., more problem behaviors, less adaptive behavior) will be associated with *increased stress* and (2) *Increased levels of internal and external resources* (e.g., greater education and annual income, more services received) will be associated with *reduced stress*. Two additional hypotheses addressed specific external resources associated with their child's school services: (3) Parents who *received the school-based consultation intervention* (described below) will report *less stress*; and (4) A *stronger parent–teacher alliance* will be associated with *reduced stress.*

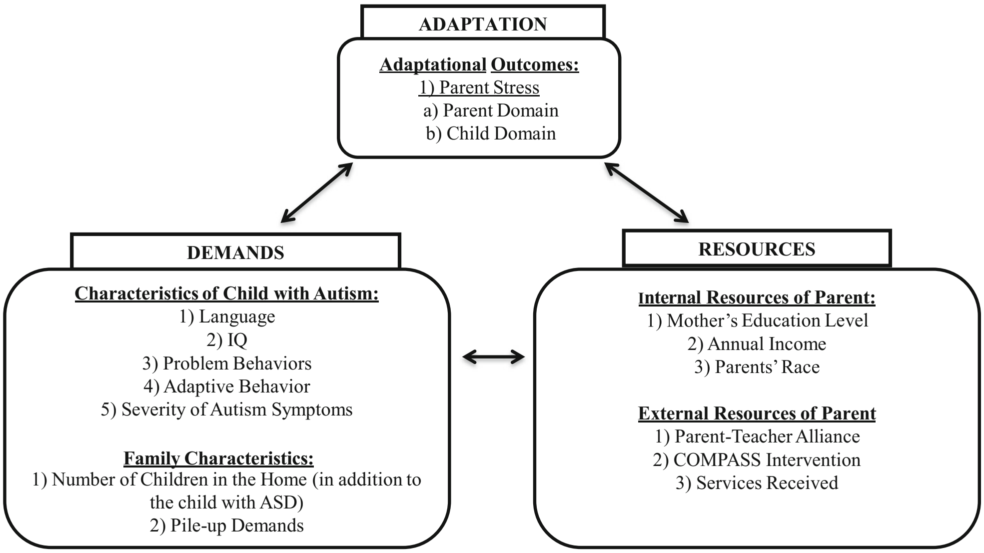

Fig. 1 Modified double ABCX model

Methods

Design and Participants

Data are from a secondary analysis of two randomized controlled trials (RCTs) of a parent–teacher consultation intervention called COMPASS. The studies were conducted between 2006 and 2011. COMPASS is comprised of an initial planning meeting that lasts approximately 3 h, followed by four coaching sessions that last between one and one and a half hours, spaced evenly throughout the remainder of the school year. The total time that the consultant spends with the teacher is less than 10 h. The initial session involves the special education teacher, the parent, and the consultant with a primary goal of creating a shared understanding of the child's personal and environmental challenges and supports. Priority skills are identified based on the comprehensive discussion of the COMPASS profile that asks the teacher and parent to review the child's preferences and strengths, fears and frustrations, self-management skills, problem behaviors, social skills, communication skills, sensory issues and preferences, and learning skills. Following the discussion of the child's COMPASS profile, goals targeting each of the following critical areas: socialization, communication, and learning/behavioral skills are identified based on parent and teacher priorities. After this step, high quality goals are written and transferred to a goal attainment scale for ongoing progress monitoring. With parent and teacher input, intervention plans for each goal are developed using the profile for individualizing evidence-based practices. Parents were required to come to the initial consultation and were invited to participate in the teacher-coaching sessions. However, fewer than 5 % of parents participated in the follow-up teacher coaching sessions. Moreover, although parents received reports from all the sessions and were encouraged to help generalize skills at home, none were involved in the delivery of the intervention in the classroom. Fidelity measures were collected for the initial consultation and each of the coaching sessions.

Data from seventy-nine children and caregivers (72 mothers; two mother/father dyads; two guardians; one grandmother; one father, and one grandmother/father dyad) of children with ASD (35 from Study One, 44 from Study Two) were collected. One caregiver completed all questionnaires for each family. Children ranged in age from 3 to 9 ($M = 5.89$; $SD = 1.60$) at baseline. To be eligible, children had to have a diagnosis of ASD and be receiving special education services under the special education eligibility of autism. One child per classroom of 79 teachers was recruited. If more than one child with ASD was in a teacher's classroom, the initials of all eligible children were collected and a student was randomly selected for recruitment. Detailed procedures and findings with regards to the study's randomization procedure, inclusion and exclusion criteria, recruitment methods, fidelity measures, attrition, and design are reported elsewhere (e.g., Ruble et al. 2010, 2012, 2013).

An ASD diagnosis was confirmed using the Autism Diagnostic Observation Schedule (ADOS; Lord et al. 1989). Following a baseline evaluation at the start of the school year (Time One), the 79 parent/child dyads were randomized into one of two groups by a person independent of the research team: (a) the COMPASS intervention group ($n = 47$) or (b) the comparison (control) group ($n = 32$), which received special education services as usual. The Time Two evaluation was conducted at the end of the school year. The children were evaluated by the research team (Time Two). Examiners who conducted the Time Two outcome assessment were blind to group assignment. All study procedures were approved by the IRB at a large midwestern university.

Measures

Demands

Characteristics of the Child with ASD

Language ability. Language was assessed at Time One using the Oral and Written Language Scales (OWLS; Carrow-Woolfolk 1996). The OWLS is an assessment of receptive and expressive language for children between the ages of 3 and 21. Internal consistency scores range from .84 to .93 and test–retest reliabilities range from .73 to .90 (Carrow-Woolfolk 1996).

Intellectual ability. Intellectual ability was assessed at Time One using the Differential Abilities Scale (DAS; Elliott 1990). The General Conceptual Ability (GCA) subscore was used to measure overall cognitive ability. Internal consistency scores range from .89 to .95 for the preschool level and from .95 to .96 for the school-age level. The test–retest reliability of GCA sub-scores for both age levels range from .89 to .95 (Elliott1990).

Problem behaviors and adaptive behavior. Child behavior was assessed at Time One using the parent version of the Behavior Assessment System for Children Second Edition (BASC-2), a multi-method, multidimensional system for children and young adults ages 2 through 25 (Reynolds and Kamphaus 2004). Nine clinical scores generate four Parent Rating Scale composite scores: Externalizing Problems, Internalizing Problems, Behavioral Symptoms Index, and Adaptive Skills. The latter two composite scales were used in the current study. When raw scores on the Behavioral Symptoms Index (BSI) are converted to T scores, scores between 60 and 69 are considered at risk and scores greater than or equal to 70 are clinically significant. For the Adaptive Skills subscale, lower scores indicate more severe symptoms; T scores between 31 and 40 are at risk and scores less than or equal to 30 are clinically significant. Psychometric properties are reported in the BASC-2 manual (Reynolds and Kampaus 2004). Internal consistency scores on the BASC-2 range from .90 to .95 for the composite scores (Volker et al. 2010).

Severity of ASD symptoms. Autism severity was assessed with the Childhood Autism Rating Scale (CARS), a 15-item, clinician-reported, observational scale designed to evaluate several functioning dimensions (e.g., social relating, resistance to change, and communication) at Time One (Schopler et al. 1980). Items were rated using a 4-point scale, indexing degree of abnormality. The total scale test–retest reliability is .88 and the correlation between the CARS and clinical ratings of autism is .84 (Schopler et al. 1980).

Family Characteristics

Demographics. A caregiver background questionnaire was completed by parents at Time One, and was used to assess parents' education levels, family annual income, and parents' race.

Number of children in the home. The number of children living in the home was assessed using the Caregiver Background Form at Time One.

Pile-up demands. Pile-up demands (additional life stressors) were measured using the Life Stress scale from the Parenting Stress Index: Third Edition (PSI; Abidin and Brunner 1995), a parent-reported measure. The Life Stress scale does not contribute to the Total Stress scale, nor does it contribute to the Parent or Child Domain subscales, and is thus, an independent measure of pile-up demands. In the current study, Cronbach's alpha was .59 for the 19-item subscale.

Resources

External Resources

Parent–teacher alliance. The 20-item Parent–Teacher Alliance Questionnaire (PTAQ), a parent-reported measure, was administered at Time One to evaluate parents' perceptions of the parent–teacher relationship. It was adapted from the Parenting Alliance Inventory, which assesses the degree to which parents agree or align in their behaviors toward their child (Abidin and Brunner 1995). The PTAQ assesses the degree to which the parent and the special education teacher agree or align in their interactions with the child with ASD. Items are rated using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). A lower score indicates a greater alliance. Internal consistency in the current study was .95.

COMPASS intervention. A child either received the COMPASS intervention or was placed into the control group, receiving special education services as usual.

Services. The number of ASD-related services a child received (e.g., speech therapy, occupational therapy, behavior services), and total hours of services received each month were reported at Time Two, using the Caregiver Background Form.

Outcome

Adaptation

Parent stress. The 120-item Parenting Stress Index: Third Edition (PSI; Abidin and Brunner 1995), a parent-reported measure, was used to assess parent stress at Time One and Time Two. The PSI has been used to examine stress in parents of children with ASD (Hudock 2013; Almutairi 2002) and special needs (McLennan et al. 2012). Items are scored on a 5-point Likert-type scale (1 = "Strongly disagree", 5 = "Strongly agree"). The subscales of the PSI are grouped into two domains: the Parent Domain (seven subscales) and the Child Domain (six subscales). The Child Domain measures parents' perception of the demands of caring for the child, and as such is a measure of the stressor or demand. The Parent Domain measures parents' reaction to the demands of caring for the child, and, as such is a measure of stress or distress. Cronbach's alpha for the Child domain subscales (i.e., Distractability/Hyperactivity, Adaptability, Reinforces Parent, Demandingness, Mood, Acceptability) ranges from .70 to .83 (Hudock 2013). Cronbach's alpha for the Parent domain subscales (i.e., Competence, Isolation, Attachment, Health, Role-Restriction, Depression, Spouse) ranges from .70 to .84. Test–retest reliability for the subscales ranges from .69 to .91 over time frames from 3 weeks to 1 year (Abidin and Brunner 1995).

Data Analysis

First, Pearson correlations were calculated to examine the bivariate relationships between the variables in the adapted ABCX model and parents' reported stress on the Child domain and Parent domain subscales of the PSI. A partial correlation was also run to test the relationship between COMPASS intervention and the two domains of parent stress, while controlling for baseline levels of stress. Second, we conducted two separate hierarchical stepwise regression analyses to predict the two parent stress outcomes: Child domain stress and Parent domain stress.

Results

Participants

Table 1 displays the descriptive statistics and socio-demographic variables for the total sample of 79 parent dyads

Table 1 Descriptive statistics

Variable	Total sample size	Total (N = 79) mean (SD)	(COMPASS) (N = 47) mean (SD)	Control (N = 32) mean (SD)	(COMPASS) intervention versus control
Characteristics of the child with ASD					
Language	N = 77	50.55 (16.03)	52.77 (14.50)	47.07 (17.86)	t(75) = −1.54, p = .13
IQ	N = 79	52.09 (23.33)	53.72 (23.05)	49.69 (23.90)	t(77) = −.75, p = .45
Problem behaviors	N = 75	67.97 (9.49)	66.44 (9.86)	70.27 (8.56)	t(73) = 1.73, p = .09
Adaptive behavior	N = 75	25.04 (8.68)	26.07 (8.35)	23.50 (9.09)	t(73) = −1.26, p = .21
Autism symptoms	N = 74	37.02 (8.23)	35.34 (8.21)	39.48 (7.74)	t(72) = 2.18, p = .03*
Lifestyle characteristics					
Number of children in the home	N = 65	.92 (.92)	.71 (.73)	1.22 (1.09)	t(63) = 2.27, p = .03*
Pile-up demands	N = 74	12.30 (11.69)	12.36 (11.02)	12.21 (12.87)	t(72) = −.05, p = .96
Internal resources					
Education level	N = 62	–	–	–	$\chi^2(1) = .10$, p = .76
Did not earn a college degree		44	25	19	
College graduate or greater		18	11	7	
Annual income	N = 61	–	–	–	$\chi^2(1) = 2.24$, p = .13
50 K or less/year		38	19	19	
More than 50 K/year		23	16	7	
Parental race	N = 76	–	–	–	$\chi^2(1) = 2.39$, p = .12
White		60	39	21	
Non-white		16	7	9	
External resources					
Parent–teacher alliance	N = 72	34.13 (10.22)	33.07 (9.31)	35.79 (11.49)	t(48.91) = −1.05, p = .30
Total services received	N = 78	2.10 (2.27)	2.04 (2.16)	2.19 (2.44)	t(76) = .28, p = .78
No. hours of services/month	N = 61	13.04 (21.53)	11.61 (15.11)	14.83 (27.82)	t(59) = .58, p = .57

* $p < .05$

for the COMPASS and control groups separately. Forty-seven parents were assigned to the COMPASS group and 32 were assigned to the Control group. Initially, 259 teacher participants were screened for eligibility. A total of 171 teacher participants failed to meet inclusion criteria [e.g., not a teacher, no student with ASD, student out of age range, or student planning to move (n = 95); not interested in participating (n = 76)]. After enrollment, six parents and three teachers dropped out of the study. Reasons were parents did not return initial measures (4); child was removed from school for home schooling or moved (2); teacher moved (1); and teacher caseload increased (2). The numbers of respondents completing each measure are described in Table 1. As described in more detail in the original studies, there were no differences on baseline measures between those with complete data and those who dropped out or had missing data.

Twenty-nine percent (n = 18) of the sample earned a college degree or higher and 23 of the 61 parents who reported income (38 %) earned more than $50,000 each year. Of the 76 parents who reported ethnicity/race, seventy-nine percent (n = 60) identified as White. Of the 65 families reporting the number of children in their family, 82 % (n = 53) had none or one additional child residing in the home with a mean of .92 (*SD* = .92). Families reported receiving a mean of two ASD-related services in addition to special education (*SD* = 2.27) (e.g., speech and language therapy, occupational therapy) (n = 78). The estimated intelligence levels of the children with ASD (IQ) as measured using the DAS ranged from 24 to 131, with a mean of 52.09 (*SD* = 23.33; Median = 52.00). Symptom scores on the CARS ranged from 19.5 to 53, with a mean of 37.02 (*SD* = 8.23); scores greater than 36 are considered severe (Schopler et al. 1980). Adaptive behavior scores on the BASC-2 ranged from 10 to 51, with a mean of 25.04 (*SD* = 8.68). Scores below 70 are considered mildly deficient and scores below 50 are moderately deficient. All participants and their children resided in one of 14 counties in two midwestern states. The parents who received the COMPASS intervention differed from the parents randomized to the control group on two variables: their children had fewer autism symptoms [$M_{\text{COMPASS}} = 35.34$ (8.21) vs. $M_{\text{Control}} = 39.48$ (7.74); $p < .05$] and fewer additional children living at home [$M_{\text{COMPASS}} = .71$ (.73) vs. $M_{\text{Control}} = 1.22$ (1.09); $p < .05$].

Bivariate Analyses

Table 2 displays the results from the bivariate analyses. Four variables were significantly correlated with *both* increased Child domain stress and increased Parent domain stress: increased levels of problem behavior, non-White parent race, non-participation in the COMPASS intervention, and greater total services received. Four variables were significantly and uniquely associated with increased *Child domain* stress: child's lower level of language attainment, IQ score, and adaptive behavior, as well as increased number of children in the home, (all p values <.05). Three variables were significantly and uniquely related to increased *Parent domain stress*: lower family income, mother's lower level of education, and lower levels of parent–teacher alliance (all p values <.05). In addition, to account for potential group differences in baseline stress, we ran partial correlations to assess the relationships between COMPASS Intervention and Parent and Child stress domains at Time 2 while controlling for baseline levels of stress at Time 1. The partial correlation between Parent domain stress and COMPASS was no longer significant ($r = -.11$), whereas the correlation between Child domain stress and COMPASS decreased but remained significant ($r = -.21$, $p = .04$).

Regression Analyses

The results from the regression analyses are shown in Table 3. Two regressions were conducted independently to assess predictors of Child domain and Parent domain stress separately. For both regressions, predictor variables from the ABCX model that correlated with the outcome with an effect size of $r = .20$ or higher were entered Stepwise into the regression (see Table 2). For the Child domain subscale, eleven predictors were entered. Two variables were significantly and independently related to Child domain stress multivariately: problem behaviors ($\beta = .49$) and total services received ($\beta = .26$), $F(3,44) = 10.54$, $p = .000$, accounting for 32 % of the variance.

For the Parent domain subscale, eight predictors were entered. Of the eight variables examined, three were significantly and independently related to Parent domain stress multivariately: problem behaviors ($\beta = .46$), mother's education ($\beta = -.33$), and parent–teacher alliance (reverse scored; $\beta = .31$), $F(3,52) = 11.26$, $p = .000$, accounting for 39 % of the variance.

Table 2 Pearson (r) correlations

	Parent domain (PSI)	Child domain (PSI)
Characteristics of child with autism		
Language	−.12	−.28**
IQ	−.17	−.32**
Problem behaviors	.42**	.51**
Adaptive behavior	−.23	−.38**
Severity of autism symptoms	.1	.19
Lifestyle characteristics		
Number of children in the home	.15	.38**
Pile-up demands	.18	.06
Internal resources		
Income	−.36**	−.2
Mother's education level	−.39**	−.22
Race[a]	.33**	.31**
External resources of parent		
Parent–teacher alliance[b]	.26*	.03
(COMPASS) intervention	−.20*	−.32**
Total services	.29*	.29*
Total hours of services	.01	.23

* $p < .05$; ** $p < .01$

[a] Dichotomized: lower score = White; higher score = non-white

[b] This scale was reverse coded

Table 3 Regression analyses: predictors of stress using the parenting stress index

Predictors of child domain	β	*p*	R	R^2	Test of overall model
Behavioral Sx[a]	.49	.000	.57	.32	$F(3,44) = 10.54$, $p = .000$
Total services	.26	.042			
Predictors of parent domain	**β**	***p***	**R**	**R^2**	**Test of overall model**
Behavioral Sx[a]	.46	.000	.63	.39	$F(3,52) = 11.26$, $p = .000$
Mother's education	−.33	.003			
PTA[b]	.31	.007			

All *p* values, beta weights and *F* values are for the final model. Variables were entered into the regression equations if they correlated with Child or Parent Domain stress at r = .20 or higher

Predicting stress in the child domain: entered stepwise: language, IQ, problem behaviors, adaptive behaviour, autism symptoms, siblings in home, mother's education level, race, enrolled in (COMPASS) (yes/no), total number of services received, hours of services received

Predicting stress in the parent domain: entered Stepwise: problem behaviors, adaptive behaviour, annual income, mother's education level, race, parent–teacher alliance, enrolled in (COMPASS) (yes/no), total number of services received

[a] Behavioral Sx = Behavioral symptoms

[b] Parent–teacher alliance. This variable was reverse coded; a lower parent–teacher alliance was associated with more stress

Discussion

There is now strong and consistent evidence that parents of children with ASD are stressed (e.g., Rao and Beidel 2009; Rivard et al. 2014; Huang et al. 2014; Hayes and Watson 2013). However, the factors that may help to alleviate parent stress are less understood. We applied the ABCX model (McCubbin and Patterson 1983) to assess the impact of demands and resources on parent stress (see Fig. 1) with a focus on understanding the impact of external resources, i.e., parent–teacher alliance and the receipt of an educational intervention (COMPASS), on two aspects of parent stress: Child domain stress and Parent domain stress. In general the findings were consistent with our hypotheses, and importantly, provided initial evidence that external school-based supports can have a helpful impact on parent stress. We discuss the findings in more detail, below.

Demands

Consistent with the findings of a recent meta-analysis (Hayes and Watson 2013), problem behaviors were the strongest predictor of stress and predicted both Child domain and Parent domain stress separately. Other measures assessing some aspect of child severity (i.e., poorer language, lower IQ, lower ratings of adaptive behavior) also were related to stress, specifically to Child domain stress, but not to Parent domain stress. Together, these findings generally supported that the greater the demands posed by a child (e.g., more problem behaviors, less adaptive behavior) the greater the perceived stress. Demands (e.g., child's problem behavior, adaptive behavior) were most closely related to the Child domain subscale on the PSI, which is consistent with the intent of the PSI's subscale, in that it assesses the parents' perceptions of the caregiving demands associated with the child. However, a limitation and potential contributor to some of the significant correlations should be noted; the Child domain subscale of the PSI and behavior problems subscale on the BASC-2 are both measured by parent report. Since parents provided information about their stress and their child's problem behaviors and adaptive behaviors, there may be shared method variance.

Although pile-up demands, when measured using the Life Stress scale, did not predict stress, number of children in the home, another indicator of pile-up stress, was associated with increased Child domain scores. Conceptually this makes sense, in that parents with more children must divide their caregiving across multiple children, becoming less able or less available to care for their child with ASD. Thus, parents with more caregiving responsibilities are more susceptible to the additional demands of caring for a child with autism (Ekas and Whitman 2010).

Resources

We posited that greater reported family internal resources, i.e., education and income, would be associated with less reported parent distress and child demands (Thomas et al. 2007; Pakenham et al. 2005). Our prediction was partially supported; parents reporting higher levels of education and higher annual incomes also reported reduced Parent domain stress. However, education level and annual income correlated only at a trend level with scores on the Child domain subscale. Moreover, parent education was an independent predictor in the regression, implying that those with lower levels of education or income may be at increased risk from stress in caring for a child with ASD even when they have access to high quality school services such as those provided by COMPASS.

Race is often a proxy measure for access to and availability of resources. Consistent with the literature and with our hypotheses, non-White parents reported significantly greater stress on both the Parent domain and Child domain subscales, suggesting that such parents have more difficulty accessing services and, in addition, report increased stress. For example, prior studies have found that parents of children with ASD who live in poorer communities or in communities with a higher proportion of African American families have less access to services and to parent support groups and to the information and services that support groups provide (Mandell and Salzer 2007). Taken together our findings indicate that family disadvantage in general (i.e., lower levels of education, lower income, non-white race) is related to increased parent stress when caring for a child with autism. These findings further imply that these parents are in need of increased help and support, however, they also are less likely to have access to such support (Thomas et al. 2007). This disparity in health and access to services is a critical area of unsolved public policy requiring further study and action. Future research also should replicate these findings and assess the degree to which differences in race or the availability of services contributes to parents' stress.

We also predicted that having more external resources, e.g., formal and informal supports, would be related to decreased stress. We investigated two sources of external supports that have been rarely examined: (a) receipt of a formal, evidenced-based school intervention (COMPASS) and (b) parent perception of teacher support of the parent, as measured by teacher–parent alliance. Consistent with our hypothesis, parents receiving COMPASS reported decreased Parent domain and Child domain stress, however, only the latter remained significant after adjusting for baseline levels of stress. A stronger impact on Child domain stress, which reflects parents' ratings of child behaviors, was expected, given that the primary focus of the COMPASS intervention was on modifying and improving child behaviors, not on reducing parent distress. Specifically, COMPASS was effective in reducing child behaviors and this was reflected in a reduction in parents' assessments of the caregiving demands. Importantly, this did not require any additional intervention effort directed toward the parent, but was a concomitant outcome. Researchers should continue to examine whether other child-focused interventions produce improvement in similar collateral outcomes for parents.

Our hypothesis that a stronger parent–teacher alliance would be associated with reduced parent stress also was supported. Interestingly, and in contrast to the pattern of findings for COMPASS, parents with a stronger alliance with teachers reported less Parent domain stress, but no significant decrease in Child domain stress. Because alliance was a direct support to the parent and not the child, it is not surprising that the association was limited to Parent domain stress. To our knowledge, this is the first demonstration of the potential impact of teachers' perceived support of parents in reducing distress in parents of individuals with ASD. Importantly, there was no intervention cost associated with good parent–teacher alliance. That is, alliance was the natural outcome of open access and communication between parents and teachers. These findings are consistent with the literature positing the potential preferential importance of autism-related versus general support for caregivers, such as, accessing autism websites, interactions with other parents, and having frequent communication with teachers (Morrison 2014). In addition to teachers, the role of other professionals, i.e., physicians, in decreasing parent stress should also be investigated in future studies. Contextual (autism-specific) social support from individuals outside of the family's immediate support network may be especially important in reducing stress (e.g., Stuart and McGrew 2009).

Finally, it should be noted that receipt of services was related to higher levels of stress on both the Parent domain and Child domain subscales. Although somewhat counterintuitive, this is consistent with other studies reporting a direct correlation between numbers of services received and parent stress (Young et al. 2009). That is, the use of services in the current study is likely the effect of stress, not the cause. Thus, the direction may go from need for services to receipt of services, which would explain the positive correlation with stress. In other words, parents that are more stressed may also seek out and require more services.

Limitations

The parents and children who participated in the current study resided in two Midwestern states, which may limit the generalizability of the findings. Moreover, as noted earlier, the source of measurement for the outcome and some of the predictor measures was the same, the parent, which might have artifactually inflated some correlations due to shared method variance. In addition, our sample of 79 parents who were recruited to participate in the school-based intervention (Ruble et al. 2010, 2013) may have already been more psychologically minded and motivated to receive intervention services for their children with ASD. Furthermore, reports of parent stress were only taken at baseline and immediately following the completion of the school-based intervention. It would be useful to re-assess parents' stress levels at multiple long-term follow-up points, to examine the maintenance of any reductions in reported stress over time.

Conclusion

Different predictors of stress in parents of children with ASD emerged in the current study, depending on whether parent-related stress/distress (Parent domain) or perceptions of child-related demands (Child domain) were examined. Future research may wish to examine these aspects of stress separately, rather than using the total score on the Parent Stress Inventory, which simply adds them together. We also identified potential, understudied constructs (e.g., greater parent–teacher alliance, fewer children in the home) that might be usefully included in studies of parent stress, and both confirmed and extended findings from the existing literature of the importance of more widely studied constructs (e.g., behavioral symptoms) in predicting parent stress.

Importantly, as predicted, we were able to show that a child-focused intervention (COMPASS; Ruble et al. 2013; Ruble and McGrew 2015) was associated with reduced parent stress, as measured by Child domain stress. These findings suggest that in the reduction of parent stress, school-based, child-focused interventions may present additional benefits for parents of children with ASD, beyond their direct impact on child behaviors. Future research is needed to explore these significant predictors of stress in other samples of parents across the lifespan. Specifically, the impact of school and child-focused interventions, the parent–teacher alliance, and internal and external resources should continue to be evaluated as potential contributors to parents' stress.

It is also worth noting that the cost of both school-based external resources for reducing parent stress should be minimal. COMPASS was directed solely toward the child not the parent. That is, there was no additional delivery cost associated with the reduced parent stress. Similarly, a strong parent–teacher alliance was not a point of intervention, but was the natural result of necessary interactions between the parent and teacher concerning the child with ASD. Moreover, school-based interventions are free and available to all regardless of race, income or locale, some of the negative predictors in our study. Thus, school-based interventions may be an especially important tool for reducing parent stress when caring for a child with ASD generally, and have the further potential to reduce disparities in access to these needed supports for families from disadvantaged backgrounds.

Acknowledgments This work is based on an earlier study and was supported by Grant Numbers R34MH073071 and 1RC1MH089760 from the National Institute of Mental Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Mental Health or the National Institutes of Health. We would like to thank the families and special education teachers who participated in the two RCTs of COMPASS.

Author Contributions TK helped to conceive of the study, participated in the analysis and interpretation of data and drafted the manuscript; YY performed the statistical analysis and interpretation of the data and helped to draft the manuscript; LR and JM conceived of the study, participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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