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Coping and care-related stress in parents of a child with autism spectrum disorder

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ABSTRACT

Background and Objectives: Parenting a child with Autism Spectrum Disorder (ASD) is challenging and can result in elevated levels of parenting stress. This study investigated the relationship between parent-ratings of their child's ASD symptoms and two conceptually different measures of parenting stress: One specific to the ASD context and the other a general stress measure applicable to the broader caregiving context. Additionally, the influence of coping style on the relationship between child's ASD symptoms and parenting stress was investigated.

Design and Methods: Using an internet survey, parents ($N = 178$) caring for a child with ASD reported on coping strategies, completed two measures of parenting stress, and assessed their child's ASD symptoms.

Results: Parenting stress increased with severity of the child's ASD symptoms, but the strength of this relationship depended on whether a general or disorder-specific measure of parenting stress was used. Regression analyses indicated that some coping strategies moderated the impact of ASD symptom severity on the parent's care-related stress, but moderation depended on how stress was conceptualized.

Conclusion: This study reinforces the importance of identifying the coping strategies of parents of children with developmental disorders, and highlights the consequences of using different conceptual approaches to measure parenting stress.

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KEYWORDS

Parenting stress; coping;
autism spectrum disorders;
symptom severity

Parenting stress describes the strains and pressures experienced when performing care-related tasks for one's child (Rao & Beidel, 2009). Parents of children diagnosed with an Autism Spectrum Disorder (ASD) typically experience higher levels of stress, depression, anxiety and anger than other parents (e.g., Hayes & Watson, 2013; Sawyer et al., 2010), including parents of children with other developmental disabilities (Estes et al., 2009; Schieve et al., 2011). Estimates of the prevalence of clinically relevant stress levels in parents caring for a child with ASD range between 26% (Kayfritz, Gragg, & Orr, 2010) and 85% (Ingersoll & Hambrick, 2011). Volkmar and Pauls (2003) report that 85% of individuals diagnosed with ASD have needs requiring care or assistance from their parents and family across their entire lifespans. Due to the life-long nature of ASD and persistent behavioral and emotional challenges associated with caregiving (Lai, Goh, Oei, & Sung, 2015), some studies have found parenting stress levels to be stable over time (Lecavlier, Leone, & Wiltz, 2006), though this finding is not unanimous (Benson, 2014).

Montes and Cianca (2014) identify a number of ASD-related "burdens" that contribute to parenting stress. These include problem behaviors, costs of care (both financial and on career choices), restricted access to child-care and community activities, greater obstacles when accessing education,

time investment into ASD treatment options, and the worry that indecision or uncertainty can compromise time-critical therapy. These stressors can negatively affect the parent–child relationship, lead to maladaptive parenting styles, and diminish the efficacy of interventions (van Steijn, Oerlemans, van Aken, Buitelaar, & Rommelse, 2014). Of concern is that elevated parenting stress can exacerbate ASD-related behavioral problems (Lecavlier et al., 2006), producing a “mutually escalating effect” whereby parental stress elicits further problem behaviors, which in turn induces further stress (Baker et al., 2003; Benson & Karlof, 2009).

The autism spectrum is typically characterized by four core symptoms: restricted and or ritualized behaviors, language difficulties, odd behaviors, and social deficits. Along with these four core symptoms a number of problem behaviors have been identified, including noncompliance, hyperactivity, self-injury, aggression, ritualism, and irritability. Both the severity of ASD core symptoms and prevalence of difficult behaviors are key predictors of impact on parents, with more severe symptoms associated with higher stress levels (Lecavlier et al., 2006; Phetrasuwan & Miles, 2009; Stuart & McGrew, 2009). Benson (2014) on the other hand reports that severity of problem behaviors and presence of prosocial behaviors are better predictors of parenting-stress than ASD symptom severity. However, while some have reported no statistical relationships between core ASD symptoms and parenting stress beyond social deficits (e.g., Davis & Carter, 2008), others describe significant positive relationships between parenting stress and both severity of ASD symptoms and problem behaviors (e.g., Huang et al., 2014; Rivard, Terroux, Parent-Boursier, & Mercier, 2014). Clearly, further clarification of the relationship between ASD core symptoms and parenting stress is required.

ASD is characterized across a spectrum, varying in both symptom presentation and severity. These variations may partly determine individual differences in parenting stress (Plant & Sanders, 2007), with each child with ASD presenting unique challenges and behaviors to his or her parents. As such, Karst and Van Hecke (2012) argue the importance of exploring the impact of ASD-specific care-related tasks in order to gain a better understanding of how ASD characteristics contribute to parenting stress. The origins of these assertions can be traced back to debates over the usefulness of “general” (or “common”) vs. “specific” (or “care-related”) stress scales (Given et al., 1992). The “general” approach posits that stress is due to factors common across all diseases or disorders, such as additional financial strains, degraded health or diminished free time (Theule, Wiener, Tannock, & Jenkins, 2010). In contrast, the “specific” approach argues that each disease or disorder category is associated with a unique constellation of care-related problems that are not necessarily captured by general scales (Nordahl-Hansen, Fletcher-Watson, McConachie, & Kalle, 2016; Vitaliano, Young, & Russo, 1991). In the ASD literature, studies investigating parenting stress have tended to use general measures such as the Parenting Stress Index (Hayes & Watson, 2013). However, a more specific measure for the ASD context has been detailed by Plant and Sanders (2007). Their care-related task stress scale specifically targets challenging tasks performed by parents who care for a child with a developmental disability. While Davis and Carter (2008) indicate that both general and specific approaches are equally sensitive to ASD-related parenting stress, to our knowledge there are no studies that have included both approaches and compared them directly.

In relation to parenting stress, the consideration of coping strategies is important in the context of raising a child with ASD. Coping strategies can influence both the level of parenting stress experienced, and also the level of parental resilience. In the ASD literature, problem-focused coping is posited to improve parental adjustment, while emotion-focused coping is linked to poorer mental health outcomes (Abbeduto et al., 2004). However, Hastings et al. (2005) found that positive reframing, a type of emotion-focused coping, was beneficial in helping parents of children with ASD lower their depression levels, while problem-focused coping had no significant relationship with stress. As Gray (1994) noted, no single coping strategy universally provides a better outcome for parents, and the key issue is appropriately matching the strategy to the problem (Lazarus, 1966). Comparing a sample of mothers of a child with ASD to matched controls, Obeid and Daou (2015) reported significant differences in some (but not all) coping strategies between the two groups, and significantly higher levels of psychological distress in those raising a child with ASD.

Contextual factors will likely dictate the coping strategies adopted by parents. With this in mind, along with the observation that the problem-solving / emotion-focused coping dichotomy constitutes an oversimplification of the stress response, Benson (2010, 2014) sought to advance measures of coping as applied to parents of children with ASD. Using a popular measure of coping style (Brief-COPE: Carver, 1997) administered to mothers of ASD children, Benson performed factor analyses and extracted a four-factor solution. He labeled these four coping dimensions *engagement* (strategies aimed directly at the stressor), *disengagement* (avoidance or denial of the stressor), *distraction* (strategies to direct thoughts away from the stressor), and *cognitive reframing* (appraising the stressor less negatively). Adopting Benson's (2010) structure, Obeid and Daou (2015) reported that parents of a child with ASD were more likely to report using disengagement and engagement coping strategies than controls, and that disengagement coping was highly correlated with psychological distress. Benson (2014) had previously reported that disengagement and distraction coping strategies were associated with greater stress, while cognitive reframing strategies were linked with lower levels of parenting stress. Additionally, they reported that engagement coping strategies were linked with increased parenting stress.

A primary objective of the present study was to examine the relationships between parent-rated ASD core symptoms and both general and specific measures of parenting stress. A secondary objective was to seek evidence for a moderating effect of coping strategy on the relationships between ASD severity and both ASD care-related (i.e., specific) and general parenting stress measures. Whilst there is descriptive evidence supporting the possible moderating effect of coping between core ASD symptoms and parenting stress, few studies have directly tested this proposition. Additionally, we explore associations between coping strategies and parenting stress measures to confirm previous findings in the literature (e.g., Benson, 2014).

Method

Participants

Parents were 18 fathers and 154 mothers with a mean age of 45.27 years ($SD = 9.30$), who had been caring for sons ($n = 145$) or daughters ($n = 28$) with ASD for an average of 11.83 years ($SD = 8.56$). The majority of parents (85%) identified themselves as New Zealand European, and approximately a third indicated that they were solo parents. The sample was relatively well educated, with 81 (44.3%) having a university degree, 32 (17.5%) a qualification from a technical college, and 43 (23.5%) having finished secondary school. The mean age of the child being cared for was 13.30 years ($SD = 10.91$, $Min = 1.92$, $Max = 37$ years), with 85% of the children being 19 years or younger. The mean onset of the child's ASD symptoms was 2.15 years ($SD = 2.05$). Parents were asked to indicate if their child had received a formal medical diagnosis and if so, from whom. Only those indicating a diagnosis from a qualified medical or health professional were included in the study. Sample demographics are detailed more fully in Table 1.

Measures

ASD symptom severity

The severity of the child's ASD core symptoms was measured using the "impact" dimension of the Autism Impact Measure (AIM), developed by Kanne et al. (2014). Parents rated 25 items probing the four core ASD symptoms, with reference to the previous fortnight. The AIM uses a five point Likert-scale ranging from 1 (*Not at All*) to 5 (*Severe*) and contains four subdomains. Kanne et al. (2014), using a sample of 440 children with a pre-existing diagnosis of ASD, presented the following Cronbach's alphas (α_c) and clinician-rated means for the four AIM subdomains: restricted/ritualized behaviors ($M = 19.32$, $\alpha_c = 0.82$), odd/typical behaviors ($M = 12.30$, $\alpha_c = 0.72$), communication/

Table 1. Sample characteristics of parents and recipients ($N = 178$).

	Frequency	Percent
Parents' gender		
Female	159	89%
Male	19	11%
Parents' age band		
Up-29 years	7	4%
30-39	36	21%
40-49	77	44%
50-59	45	26%
60 or over	10	6%
Parents' ethnicity		
European	152	85%
Maori	12	7%
Pacifika	5	3%
Other	9	5%
Parents' education		
Secondary	43	24%
Technical College	32	18%
University	81	45%
Sole carer		
No	122	69%
Yes	56	32%
Lives with child with ASD		
Yes	156	88%
No	12	7%
Sometimes	10	6%
Child's gender		
Male	149	84%
Female	28	16%
Child's age band		
Up to 9 years	56	35%
10-19	78	49%
20-29	17	11%
30 or over	7	4%

language impairment ($M = 13.18$, $\alpha_c = 0.80$), and social/emotional reciprocity deficits ($M = 15.09$, $\alpha_c = 0.90$).

ASD care-related stress scale

Parenting stress relating specifically to tasks commonly encountered by parents of an ASD child was measured using 13 ASD-related caregiving tasks described by Plant and Sanders (2007). Stress levels when conducting these tasks were rated using a 7 point Likert-scale ranging from 1 (*Not at all Stressful*) to 7 (*Very Stressful*). A "not applicable" option was also available for tasks that were not performed by the parent. Scores for each care-giving task were summed to provide a total score with higher scores indicating greater stress. Example questions include "Helping and supervising at mealtimes", "Settling him/her at Bedtime", and "Advocating on behalf of him/her". A more detailed description of this scale has appeared elsewhere (Shepherd, Landon, & Goedeke, 2017).

General care-related stress

General care-related parenting stress was measured using the Caregiver Reaction Scale (CRA: Given et al., 1992), which consists of 24 items measuring general aspects of a caregiving situation, as well as the carer's negative and positive reactions to caring for an individual with a disability or disorder. The CRA consists of five care-related stress subscales: (1) caregiver self-esteem (e.g., "I resent caring for him/her"); (2) lack of family support (e.g., "Others have dumped caring onto me"); (3) financial problems (e.g., "Caring for him/her has put a financial strain on the family."); (4) disrupted schedule

(e.g., “The constant interruptions make it difficult to find time for relaxation”, and (5) health problems (e.g., “Since caring for him/her, it seems like I’m tired all of the time.”). Parents were required to rate the items using a five point Likert-scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The scores of each subscale are calculated, with higher scores reflecting higher stress. The CRA was developed professionally and has been tested thoroughly, and due to its excellent internal consistency it is a recommended tool to assess caregiver stress (Deeken, Taylor, Mangan, Yabroff, & Ingham, 2003).

Coping strategies

Coping was measured using the 28-item BriefCOPE (Carver, 1997), representing 14 different coping styles (2 items each) which, following a principal components analysis, were satisfactorily collapsed into the four subdomains described by Benson (2010): engagement, distraction, disengagement and reframing strategies. Parents were required to rate how frequently they utilize the various coping strategies when faced with care-related stress using a four point Likert-scale ranging from 1 (*I Haven’t Been Doing This At All*) to 4 (*I’ve Been Doing This A Lot*). Total scores for Benson’s (2010) four subdomains were computed, with higher scores indicating more frequent use of that coping strategy. The BriefCOPE has been recommended for studies involving ASD-related parenting stress (Hastings et al., 2005), and in this context its flexibility maximizes construct validity (Lai et al., 2015). The BriefCOPE has consistently demonstrated high internal consistency, and possesses a factor structure that is consistent with the original COPE inventory (Carver, 1997).

Procedures

Parents completed an online questionnaire probing demographic information, measures of core ASD symptoms, perceived ASD care-related stress, general care-related stress, and coping strategies. Nation-wide ASD support agencies located in New Zealand distributed e-mail invitations to parents caring for an individual with ASD. The collection period was 50 days. As the investigators were blinded to the dispatching of email invitations it is not possible to calculate a response rate for this survey. The invitations provided the parents with a link to the online questionnaire. A Participant Information Sheet was attached to the email invitation and downloadable from the online version of the questionnaire. The online survey remained open for 40 days. This research was approved by the Authors’ institutional ethics committee.

Statistical analysis

Statistical analyses were conducted using R version 3.2.3. Preliminary correlational analyses were conducted to estimate the degree of linkages between key outcome variables and to determine if sufficient relationships existed to undertake further regression analyses. To this end partial correlation coefficients were computed controlling for parent age and education, and age of child, as these are commonly identified in the literature as potential confounding variables.

Associations with the two dependent variables (i.e., ASD Care-Related Stress score and the Total CRA score) were modeled separately using two linear multiple regression models each. This approach is based on ANOVA’s partitioning of variance principle, aiming to derive a single explanatory model of the variation of a dependent variable that simultaneously accounts for all variables and confounding effects. An initial model was created probing main effects only for the following explanatory variables: Parent age and education, child age, the four AIM subscale scores and the four BriefCOPE dimensions described by Benson (2010), the latter which were dichotomized using a median split in order to simplify the interpretation of results. A second model, to assess all moderation effects collectively, was then generated from the first model by adding the 16 interaction terms corresponding to each combination of AIM score and dichotomized BriefCOPE moderator. AIM and BriefCOPE variables were forced into the second model, while other variables were included for the purpose of

confounder adjustment only. Here, stepwise model selection based on Akaike's information criterion was used to eliminate variables that were not required by the model for confounder adjustment.

Results

Preliminary data analyses

Table 2 displays means (M), standard deviations (SD), and Cronbach's alphas (α_c) for the AIM, BriefCOPE, and CRA subscales, as well for the CRA total score and the ASD Care-Related Stress scale. Scale consistency for all scales was acceptable, with all alpha coefficients greater than 0.7. Accounting for the different number of items across the subscales, parents judged the restricted/ritualized behavior symptoms to be on average the most severe, while reframing was on average the most utilized coping strategy. By applying independent samples t -tests it was found that, for all but the Communication/Language subscale, our parent-rated means were significantly greater ($p < .05$) than the clinician-rated means reported by Kanne et al. (2014). Partial correlation coefficients, controlling for parent age and level of education, and age of child, amongst the four AIM subscales and between the AIM subscales and coping (BriefCOPE) and parenting stress (CRA, ASD Care-Related Stress scale) are shown. There are strong (i.e., $r > .50$) positive correlations between the four AIM symptom measures and the ASD Care-Related Stress scale, while only weak (i.e., $r < .03$) positive correlations are seen between the AIM and CRA measures. Of note, Fisher r -to- z transformations (all $p < .001$) showed that the coefficients between the four AIM subscales and the Total CRA score were significantly lower than those between the AIM and the ASD Care-Related Stress scales.

Table 2 also reveals a number of small but significant positive correlations between the four domain of the BriefCOPE and the four AIM subdomains. The BriefCOPE can also be expressed as 14 different coping styles (see Table 3), with higher mean values indicate higher levels of use of that coping style. As can be seen in Table 3, the more adaptive coping strategies were more likely to be used, for example, from the cognitive reframing (acceptance, positive reframing, religion) and engagement (active coping, planning) dimensions. In contrast, the least adopted coping styles are those generally considered maladaptive, notably disengagement strategies (behavioral disengagement, denial, substance abuse). Further partial correlational analyses between coping style and parenting stress yielded a number of small-to-large statistically significant coefficients. As regards the correlation coefficients

Table 2. Scale means (M), standard deviations (SD) and the Cronbach's alpha (α_c) for the AIM, the BriefCOPE, the CRA, and the ASD Care-Related Stress scales.

	Items	M	SD	α_c	Partial Correlation Coefficients			
					AIM 1	AIM 2	AIM 3	AIM 4
AIM Subdomains								
1. Restricted/Ritualized Behavior	8	23.82	6.85	.820	1			
2. Communication/Language	5	10.96	4.93	.858	.414**	1		
3. Odd/Atypical Behaviour	5	14.03	4.51	.761	.476**	.475**	1	
4. Social-Emotional Reciprocity	7	18.37	7.03	.872	.588**	.653**	.605**	1
BriefCOPE								
Engagement	8	21.68	5.27	.827	.232*	.216*	.101	.152
Distraction	8	16.53	5.04	.780	.119	.205	.286**	.218*
Disengagement	6	7.84	2.89	.752	.073	.064	.192*	.185*
Reframing	6	18.95	3.43	.770	.298**	.238*	.251**	.242*
Caregiver Reaction Scale								
Caregiver Esteem	6	26.67	4.72	.801	.065	.058	-.048	.053
Disrupted Schedule	5	18.84	3.92	.763	.255**	.156	.197*	.227*
Lack of Family Support	5	14.15	4.72	.780	.152	-.056	.083	.059
Financial Problems	3	10.38	3.12	.781	.275**	.071	.038	.157
Health Problems	4	11.86	3.43	.780	.153	-.034	.175*	.117
Total CRA	23	80.54	13.8	.835	.251**	.105	.228*	.214*
ASD Care-Related Stress Scale	13	40.61	19.7	.908	.550**	.518**	.539**	.516**

The final four columns show partial correlations controlling for parent age and education, and age of child.

* $p < .05$; ** $p < .001$ (two-tailed).

Table 3. Partial correlation coefficients (controlling for parent age and education, and age of child) between parenting stress and the 14 coping subscales.

	Mean	SD	ASD Care-Related Stress scale	Total CRA
Cognitive Reframing	18.95	3.43	.398**	.472**
Acceptance	6.54	1.62	.172*	.099
Positive Reframing	5.95	1.84	.182*	.139
Religion	6.47	1.82	.625**	.376**
Disengagement	7.84	2.89	.331**	.359**
Denial	2.37	1.10	.211*	.210*
Substance abuse	2.72	1.47	.213*	.204*
Behavioral Disengagement	2.73	1.39	.332**	.343**
Distraction	16.53	5.04	.442*	.230*
Humour	4.33	2.15	.079	.081
Self-Blame	3.96	1.92	.361**	.319**
Self-Distraction	4.65	1.95	.435**	.126
Venting	3.67	1.63	.253*	.192*
Engagement	21.68	5.27	.207*	.013
Active Coping	5.86	1.72	.165*	.047
Emotional Support	4.41	1.83	.053	-.075
Instrumental Support	4.97	1.91	.132	.004
Planning	6.38	1.73	.270*	.069

Note: Means and standard deviations (*SD*) for the BriefCOPE subscales are also included.

* $p < .05$; ** $p < .001$.

obtained with the ASD Care-Related Stress scale, religion had the strongest relationship, while the next three strongest relationships involved maladaptive coping styles (behavioral disengagement, self-distraction, self-blame). Of note, both the specific (i.e., ASD Care-Related Stress scale) and general (i.e., CRA) stress scales share a similar pattern of relationships across the 14 coping styles.

Main effects of variables on parenting stress

Neither parent age nor level of education predicted parenting stress (see Table 4) for either of the ASD Care-Related Stress or the Total CRA scales. While the age of the child with ASD likewise failed to predict parenting stress, it is noteworthy that the ASD Care-Related Stress scale approached, but did not reach, statistical significance. Thus, it would be incorrect to argue the existence of evidence against an age effect, but rather that these data should be considered inconclusive.

Considering the linkages between the four AIM subscales and the ASD Care-Related Stress scale, significant positive relationships were noted for all but the social-emotional reciprocity scale. Table 4 (a) shows that as the restricted/ritualized behavior, communication/language, and odd/atypical behavior scales increase, so too do the scores on the ASD Care-Related Stress scale. For the Total CRA scores only the restricted/ritualized behavior scale was a significant predictor, with a positive association noted between the two.

With regard to the main effect of coping strategy on parenting stress, inspection of Table 4(a) reveals that, for both the ASD Care-Related Stress and Total CRA scales, the disengagement and reframing strategies achieved statistical significance. For the ASD Care-Related Stress scale, the mean difference between the low and high disengagement groups was 4.12, and for the Total CRA scale the mean difference was 1.19. For the cognitive reframing strategy, the mean difference between the low and high groups was 6.28 for the ASD Care-Related Stress scale, and 1.57 for the Total CRA scale. Noteworthy is the lack of significance between mean stress scores for both the low and high engagement strategy and distraction strategy groups.

Moderator analyses

Linear multiple regression modeling was employed to assess the moderating effects of coping strategies (i.e., cognitive reframing, disengagement, distraction, engagement) on the relationships

Table 4. Estimates of associations with parenting stress scores derived from linear multiple regression models, showing (a) main effects and (b) effect moderation interaction terms.

(a) Main effects		ASD Care-Related stress		Total CRA	
		Estimate	95% CI	Estimate	95% CI
Variable (reference category)	Category (or change)				
Age	(per year of age)	-0.08	(-0.37, 0.21)	-0.01	(-0.07, 0.04)
Education (Secondary)	Technical College	2.28	(-3.80, 8.35)	-0.24	(-1.35, 0.86)
	University	0.72	(-4.74, 6.18)	-0.02	(-1.00, 0.95)
Recipient Age	(per year of age)	-0.26	(-0.52, 0.00)	-0.04	(-0.08, 0.01)
Restricted/Ritualized Behavior	(per unit increase)	0.77	(0.37, 1.17)***	0.10	(0.03, 0.17)**
Communication/Language	(per unit increase)	0.75	(0.27, 1.23)**	-0.07	(-0.16, 0.02)
Social-Emotional Reciprocity	(per unit increase)	-0.02	(-0.56, 0.53)	0.02	(-0.08, 0.12)
Odd/Atypical Behaviour	(per unit increase)	0.81	(0.28, 1.34)**	0.00	(-0.09, 0.10)
Engagement (Low)	High	0.19	(-4.35, 4.74)	-0.13	(-0.96, 0.70)
Disengagement (Low)	High	5.96	(1.54, 10.38)**	1.19	(0.39, 2.00)**
Distraction (Low)	High	4.12	(-0.45, 8.70)	0.16	(-0.67, 0.99)
Reframing (Low)	High	6.28	(1.56, 11.01)*	1.57	(0.72, 2.42)***
(b) Effect moderations					
AIM subscale	COPE moderator[†]	Estimate	95% CI	Estimate	95% CI
Restricted/Ritualized Behavior	Engagement	-0.18	(-1.03, 0.66)	0.07	(-0.09, 0.23)
	Disengagement	-1.00	(-1.83, -0.16)*	0.01	(-0.14, 0.17)
	Distraction	0.44	(-0.38, 1.25)	0.07	(-0.09, 0.22)
	Reframing	0.11	(-0.73, 0.95)	-0.13	(-0.29, 0.02)
Communication/Language	Engagement	-1.44	(-2.45, -0.42)**	-0.14	(-0.33, 0.06)
	Disengagement	-0.22	(-1.29, 0.85)	0.05	(-0.15, 0.25)
	Distraction	0.64	(-0.37, 1.64)	0.15	(-0.04, 0.34)
	Reframing	-1.20	(-2.28, -0.12)*	-0.01	(-0.21, 0.20)
Social-Emotional Reciprocity	Engagement	1.08	(-0.10, 2.27)	0.11	(-0.12, 0.33)
	Disengagement	0.90	(-0.29, 2.10)	-0.01	(-0.23, 0.21)
	Distraction	-1.16	(-2.38, 0.06)	-0.20	(-0.43, 0.03)
	Reframing	-0.20	(-1.43, 1.02)	0.00	(-0.23, 0.23)
Odd/Atypical Behaviour	Engagement	0.10	(-1.08, 1.28)	-0.17	(-0.39, 0.06)
	Disengagement	0.90	(-0.32, 2.12)	-0.04	(-0.27, 0.19)
	Distraction	-0.71	(-1.80, 0.38)	-0.08	(-0.28, 0.13)
	Reframing	1.63	(0.47, 2.78)**	0.20	(-0.02, 0.42)

Notes: CI = confidence interval.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; [†]High vs Low.

between the four AIM subscales and the two parenting stress scores (i.e., ASD Care-Related Stress, Total CRA). In total, 16 moderator effects were estimated for each of the two parenting stress measures. Table 4(b) presents the estimated regression coefficients derived from the 16 interaction terms for each of the two parenting stress scales. Only the ASD Care-Related stress scale had significant moderating relationships between core symptoms and parenting stress. Specifically, disengagement moderated the relationship between restricted/ritualized behavior and stress ($B = -1.00$), engagement moderated the relationship between communication/language and stress ($B = -1.44$), and reframing moderated the relationship between both communication/language and stress ($B = -1.20$) and odd/atypical behaviors and stress ($B = 1.63$). Figure 1 presents the four significant interactions only, complete with 95% confidence bands.

Discussion

The primary objective of the present study was to investigate the relationships between parent-ratings of their child's ASD symptoms and two measures of parenting stress: one general and one specific. Stronger statistically significant relationships were evident between core ASD symptoms and the ASD specific stress measure than between ASD symptoms and a general stress measure. In relation to the specific ASD stress measure, the results showed there were strong relationships ($r > .5$) between ASD Care-Related Stress scores and core ASD symptoms, where an increase in the perceived severity of the ASD symptoms across all four domains was related to an increase in the

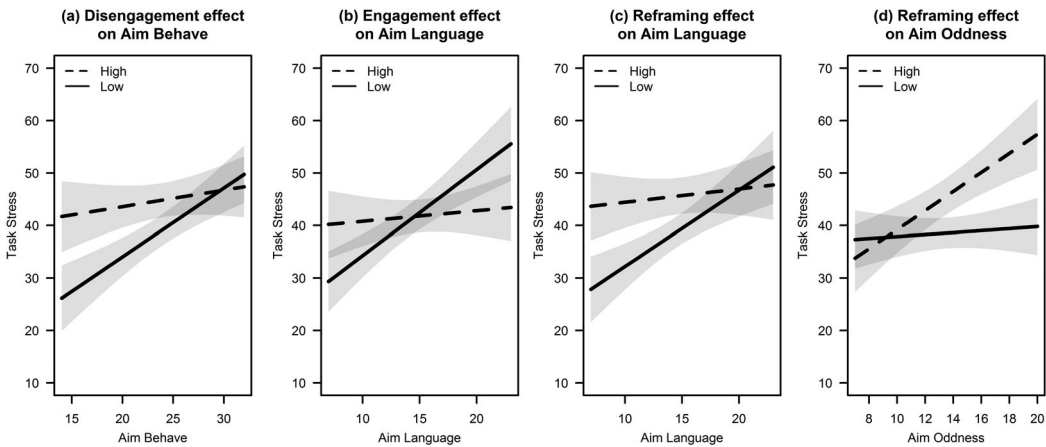


Figure 1. Plots illustrating the interaction between coping and ASD core symptoms on ASD Care-Related stress. These plots are those that exhibited statistically significant moderation effects.

parents' perception of stress. This finding is congruent with literature indicating that the stress experienced by parents stems from the complexity and severity of the ASD symptoms exhibited by the individual with ASD (e.g., Ludlow, Skelly, & Rohleder, 2011; Seymour, Wood, Giallo, & Jellett, 2013).

It is of note that in the regression analysis social-emotional reciprocity was the only AIM subscale failing to have a main effect on ASD Care-Related stress scores. While others have also reported no consistent relationship between parenting stress and ASD-related deficits in prosocial behaviors (e.g., Davis & Carter, 2008; Huang et al., 2014), this is not a common finding. Huang et al. (2014) point out that prosocial problems are typically peer-related and, furthermore, that most peer problems occur outside of parental care (e.g., school, workplace). This has relevance to the current sample as 75% of the children were of school age and 15% of working age. Thus the conceptualization of social interaction in the ASD literature may be too broad, and some (e.g., Davis & Carter, 2008) have dichotomized it into reciprocal social interaction and social relatedness. Furthermore, parents may also have to deal with negative and judgmental views from others while in public (Karst & Van Hecke, 2012), and as a result may restrict outings beyond the house, thus reducing social interactions.

In relation to general stress ratings, the Caregiver Reaction Assessment (CRA) subscales exhibited only small correlations with ASD core symptoms. All but the odd/atypical behavior scale were positively related to the disrupted schedule subscale, indicating that as the severity of behavioral, language, and prosocial symptoms increase, free time is diminished and time pressures increased. Additionally, stress from financial strain was positively correlated to the restricted/ritualized behavior subscale, possibly due to the fact that behavioral problems are more amenable to therapy and thus leads to greater financial burden due to intervention costs. For the Total CRA scores, small correlations were found for three-out-of-four AIM subscales, with the odd/atypical behavior being the exception. Regarding the regression analysis, it is noteworthy that only the restricted/ritualized behavior subscale had a main effect on Total CRA score, suggesting that the remaining three AIM subscales were not contributing to parenting stress in the general sense.

Taken together, both the correlational and regression analyses indicated that the specific parenting stress scale, the ASD Care-Related Stress Scale, is more related to core ASD symptoms than the general scale (i.e., the CRA scale). This has implications in terms of findings reported in the literature, specifically those studies reporting weak linkages between ASD core symptoms and parenting stress, as general stress scales (i.e., the Parenting Stress Index) may not be adequately capturing the unique stressors associated with the core symptoms of ASD. On the basis of the present results, it can be argued that general stress scales themselves lack the necessary precision to accurately measure ASD-related caring stress. Further, given the intuitive relationship between ASD core symptoms

and related adaptive behaviors, it could be reasonably argued that both would be expected to covary with parenting stress. We would argue that this covariance may be more apparent when a specific, rather than a general, measure of stress is employed.

In terms of parental coping strategies, partial correlational analyses indicated a pattern of small correlations ($r < .3$) between ASD core symptoms and the four coping dimensions identified by Benson (2010). Additionally, our results are consistent with previous studies indicating that a broad range of coping strategies are utilized by parents confronting ASD-related caregiving challenges (e.g., Hall & Graff, 2011). Cognitive reframing, involving a positive or constructive reinterpretation of the child's ASD, was positively associated with all four AIM subscales. Lai and Oei (2014) reported that parents of children with ASD were more inclined to use emotion-focused coping styles such as reframing than problem-focused coping, possibly because reframing may be the only effective coping strategy in the absence of resources available to mitigate the impacts of caring for an ASD child (Hastings et al., 2005).

Also of note is that Benson's (2010) "engagement" coping style was significantly related to the restricted/ritualized behavior and communication/language subscales, but not to the social-emotional reciprocity and odd/atypical behavior dimensions, while for the disengagement coping style the reverse was true. This finding may be explained by the perception that some facets of ASD are more amenable to interventions, for example behavioral or speech language therapy, than other facets (Bowker, D'Angelo, Hicks, & Wells, 2011). Thus, we speculate that the availability of appropriate interventions may, to a degree, be driving coping strategies.

The pattern of relationships between coping strategy and parenting stress was the same for both measures of parenting stress: the ASD Care-Related Stress scale and the CRA scale. Our regression analyses indicated that both disengagement and reframing strategies imparted a main effect on both stress outcome measures. Disengagement, whereby a parent distances themselves from the stressful situations using denial or substance abuse, was linked to increased levels of stress. This finding echoes others in the ASD literature reporting that those adopting disengagement strategies tended to be more vulnerable to stress (Hastings et al., 2005) and stress proliferation (Benson, 2014), indicating that this style of coping is not helpful in the caring context.

The positive association between cognitive reframing and parenting stress is not entirely consistent with previous reports in the literature (e.g., Lai et al., 2015), and as such is more difficult to interpret. Benson (2014) reported a negative relationship between cognitive reframing and distress (conceptualized as mood and anxiety), but not with stress proliferation. Likewise, Hastings et al. (2005) failed to find a relationship between positive coping (which included reframing) and stress, but did so for depression. Lai et al. (2015), while reporting a significant difference between parents of a child with ASD and those with "typically developing" children in relation to depression scores as-well-as the Parenting Stress Index total score and its subscales, noted no differences in positive coping. Obeid and Daou (2015) reported the same pattern of results, albeit using the General Health Questionnaire rather than the Parenting Stress Index. The implication may be that though individuals become more accepting and resilient in the face of parental challenges, the caring demands themselves do not actually become less stressful. Thus it may be that resilience increases with cognitive reframing, and when caring for a child with an unstable and intractable condition such as one on the spectrum (Benson, 2014), engagement strategies become less attractive and reframing becomes the positive coping strategy of choice, albeit one of last resort. These ideas have precedents in the literature (Folkman & Moskowitz, 2004; Hastings et al., 2005).

To date there has been little research that has explored the relationship between religious coping and parenting stress for those caring for children with ASD, and existing research suggest that religious belief is a complex construct in terms of its moderating effects on stress (Benson, 2010). It is interesting that our analysis suggested a significant relationship between religious coping and parenting stress. Having a child with ASD is a significant life event that may provoke existential questions and dilemmas for parents; questions as to the reasons they have a child affected by this condition, and the nature and justice of suffering and adversity. Affiliation to a religious belief may provide a

buffer – it helps make sense of or give meaning to negative or traumatic experiences and in a sense, is a means of cognitive or positive reframing. In many religions, suffering, while not pleasant, may be seen to bring with it opportunity for spiritual growth, learning, and positive outcomes (Tarakeshwar & Pargament, 2001). It is possible then that some parents in this study drew on their religious beliefs to reframe the meaning of their child's condition, and that this constituted a useful strategy to come to terms with their child's autism.

A central question of the analysis was whether coping moderated the impact of symptom severity on parenting stress. Benson (2014) indicated that coping strategies could moderate the effects of child ASD-related behavior on maternal depression, anger, and well-being. We found some evidence to support this proposition, albeit not always in the expected direction, and only when stress was measured specifically using the ASD Care-Related Stress scale. Consistent with the notion that coping buffers the effects of ASD-related challenges on parenting stress, we found the disengagement coping styles moderated the relationship between restricted/ritualized behavior symptoms and stress. Specifically, those in the high disengagement group exhibited greater stress across the majority of the symptom range, indicating that this is indeed a maladaptive strategy. Additionally, engagement coping moderated the relationship between communication/language deficits and stress. Those in the high engagement group reported relatively consistent levels of stress across symptom severity, with stress greater than the low engagement coping group at low symptom levels, but less at greater symptom severity. Furthermore, relatively lower stress levels at greater symptom levels may attest to the effectiveness of interventions and support networks accessed by the high engagement group. However, the additional investment of time, energy, and financial resources that are associated with high engagement strategies may be a factor driving stress levels above those of the low engagement group when the language/communication deficits are less severe.

With regards to the two significant models exhibiting a moderating effect of cognitive reframing, we note that the increase in use of cognitive reframing did not mitigate the effects of communication/language deficits and odd/atypical behaviors on parenting stress as might be expected. Benson (2010, 2014) reported that cognitive reframing buffered the impact of maladaptive child behavior on the distress of mothers of an ASD child. In Benson's studies distress was conceptualized as anxiety and depressed mood, and it may be that while cognitive reframing is impacting these domains of psychological wellbeing the strategy is not reducing stress. The findings of Hastings et al. (2005) and Lai et al. (2015) suggest that cognitive reframing may be more effective at targeting ASD care-related depression than anxiety and stress, with depression being a disorder most effectively targeted using cognitive interventions (Ruiz-Robledillo & Moya-Albiol, 2015). For the case of odd/atypical behaviors it is noted that, for the high reframing group, stress increases with symptom severity, while for the low reframing group it is relatively constant. It could be conjectured that for high reframers, attempting to re-interpret the reality of parenting a child with ASD may be consistently thwarted by ever-present, uncontrollable and severely stressful behavioral incidents (a "reality check" of sorts), while for the low reframing group other coping strategies are being more successfully applied (e.g., engagement strategies). Alternatively, it may be that the severity of the symptoms are driving the choice of coping strategy (Konstantareas & Papageorgiou, 2006), and cognitive reframing may act as a "survival mechanism" for those otherwise reluctant to engage the more maladaptive strategies.

The findings reported in the current study should be evaluated with reference to a number of limitations. First, as a cross-sectional study the ability to infer causative relationships between variables is limited. As Benson (2014) notes, ASD core symptoms, coping strategies, and the caring environment are all likely to change as the child ages. Second, Hastings et al. (2005) recommend analyzing maternal and paternal data separately, as coping strategies may differ across genders. Due to the small numbers of fathers in this study such analyses were not possible without violating statistical assumptions, however, preliminary descriptive analyses indicated similar patterns of coping and stress across genders. Third, we adopted a parents' perspective when measuring variables, including

core ASD symptoms. While some may argue that such measures are inferior to those obtained from trained therapists, frequent behavioral observations undertaken by parents may in fact endow them with superior lines of evidence when making decisions on symptom severity. Finally, the parents in this study were recruited through an ASD-related support organization, and thus families without a membership to this organization were unlikely to be aware of the study. Consequently, the results may not be generalizable to the greater population of parents of children with ASD.

In conclusion, the present results reiterate that stress in parents of an ASD child is a substantial issue with broad potential impacts. Furthermore, the study extends the previous literature by employing an ASD-specific measure of parenting stress alongside a more general parenting stress measure, and comparing the two. We found advantages to using specific measures to assess the stress associated with caring for a child with ASD, and while the utility of a general caregiving stress scales is clear, this may obscure the links between ASD symptomology and parenting stress. Thus clinicians consulting past research may be underestimating the impact of a child with ASD's behavior on parenting stress. Finally, parents engaged a variety of coping strategies, indicating that support efforts should focus on tailoring coping to the specific problems at hand. Further investigation of the use and benefits of cognitive reframing as a coping strategy is required, and it may be that cognitive reframing facilitates resilience via effects on psychological distress (e.g., depression), rather than by directly reducing parenting stress.

Disclosure statement

No potential conflict of interest was reported by the authors.

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