

# Association between child behavioural problems and parenting stress in autism spectrum disorders: the role of parenting self-efficacy

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**Introduction:** The present study build on previous research that found a bidirectional relation of parenting stress and negative behavioural outcomes in children with Autism Spectrum Disorders.

**Aim:** To investigate the mediating role of parenting self-efficacy in the relationship of parenting stress and children's behavioural and emotional problems.

**Materials and methods:** The sample included 32 young children and their families. Sociodemographic and clinical data were collected. Hierarchical regression analysis revealed direct and indirect mediating effects.

**Results:** Parenting self-efficacy mediated the relationship between parenting stress and children's behavioural and emotional problems in fathers only.

**Conclusions:** We discuss potential ways targeted parenting self-efficacy intervention can support fathers. Results contribute to gain father-informed knowledge in, a research branch generally focused on mothers.

**Keywords:** autism, parenting self-efficacy, parenting stress, behavioural problems, emotional problems

## Introduction

Autism spectrum disorders (ASD) are a group of neurodevelopmental disorders characterized by core deficits in two domains: social communication, and restrictive, repetitive and/or sensory behaviours or interests (American Psychiatric Association, 2013). These disorders provoke a variable degree of impairment among individuals and impact on psychological well-being of affected families. Specifically, the burden of psychological symptoms (i.e. stress, depression, and anxiety) found in parents of children with ASD is a well-known condition (Bitsika and Sharpley 2004). Not surprisingly, over the last decade, interest in developing effective psychological supporting interventions for parents has increased (McConachie and Diggle 2007, Oono *et al.* 2013, Rojas-Torres *et al.* 2020).

Among parents of children with ASD, parenting stress is one of the most reported distress conditions. Indeed, parenting stress is consistently reported on significantly higher levels in parents of children with ASD

than those with typical development (Davis and Carter 2008, Estes *et al.* 2009, Giovagnoli *et al.* 2015) or with other neurodevelopmental disorders (Craig *et al.* 2016, Estes *et al.* 2009, Hou *et al.* 2018). These research findings have been confirmed in a meta-analysis (Hayes and Watson, 2013). In ASD, parental stress is reported, as clinical significant, in more than 70% of mothers (Kiami and Goodgold 2017).

Although, parenting stress is a well-documented problem in parents with children with ASD, inferring variables are still partially unknown. A research branch investigated the impact of child's emotional and behavioural problems in children with ASD on poor psychological well-being reported in parents. As such, behavioural problems of children with ASD predicted high parenting stress levels (Argumedes *et al.* 2018, Hou *et al.* 2018) and lower quality of life (McStay *et al.* 2014). A meta-analysis performed by Yorke *et al.* (2018) highlighted a strong relationship between child's emotional and behavioural problems and parents' well-being, including parental stress. However, longitudinal studies results are more controversial, not indicating a linear relationship between these factors. Future studies

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with longitudinal design and larger samples may shed light on this aspect (Yorke *et al.* 2018). Interestingly, Giovagnoli *et al.* (2015) found that child's emotional and behavioural problems may affect components of parenting stress differently, highlighting the hypothesis that, both, child and parent related variables, may inform parent training.

Thus, specific parent variables have been tested as possible predictors of psychological well-being in parents of children with ASD. Research findings include socioeconomic support and parental cognition demonstrating a higher predictive value on parents' psychological well-being than child related variables (Falk *et al.* 2014), with child's behavioural and emotional impairment being associated with overall level of distress, but not directly impacting parenting stress (Firth and Dryer 2013). Indeed, it is worthy to address parenting stress and psychological well-being during investigations of the population of interest, due to their value as potential intervention outcomes of parent training and support programs targeting parents of children with ASD (Catalano *et al.* 2018).

Similarly, parenting self-efficacy has been identified as a possible intervention target in such parent training and support programs (Hohlfeld *et al.* 2018, Jones and Prinz 2005, Solish and Perry 2008). Self-efficacy is defined as one's own belief regarding their capability to successfully exercise control in specific situations, or regarding their capability to accomplish specific tasks (Bandura 1977). Thus, parenting self-efficacy concerns the ability of parents to face the multiple difficulties, that may appear, while successfully raising one's own children. An association between parenting self-efficacy and parents' mental health and child's behavioural problems has been demonstrated (Albanese *et al.* 2019). Insofar, outcome measures, as the increase in parenting self-efficacy and high quality child-mother interactions, or the decrease in parenting stress, had long been included in stress parent training programs as targets (Gross *et al.* 1995). Nevertheless, similar results failed to emerge in fathers.

Regarding mothers of children with ASD, previous findings indicate the association between mother's mental health and parenting self-efficacy. A significantly reduced parenting self-efficacy towards their child with ASD rather than their child with Typical Development (TD) has been found (Meirsschaut *et al.* 2010). Furthermore, high levels of parenting self-efficacy were associated with reduced stress and depression in mothers (Kuhn and Carter 2006, Meirsschaut *et al.* 2010), reduced parental anxiety and child's behavioural problems (Hastings and Brown 2002). In detail, Hastings and Brown (2002) demonstrated that child behavioural problems may affect maternal anxiety and depression through self-efficacy as mediator. Whilst, in fathers the relationship between child behavioural problems and

paternal anxiety may hold in presence of the poor self-efficacy, identified as a moderator. In addition, such differences between mother and fathers have been confirmed in parents of children with TD. Higher levels of self-efficacy may predict lower levels of parenting stress in fathers only, as a similar finding was not detected in mothers (Batool and Khurshid 2015, Sevigny and Loutzenhiser 2010).

Although, parenting self-efficacy has been addressed in studies regarding parent-training programmes, results are controversial. A person-centered approach to parent training and support, aiming to enhance the quality of parent-child relationship in ASD, may benefit from a separated analysis of variables that may be differentially of impact in father and mothers.

Considering the analysis of previous findings, our study has a threefold aim:

1. To confirm and describe the relationship between child's behavioural and emotional problems and parenting stress in mothers and fathers of children with ASD.
2. To investigate potential mediating role of parenting self-efficacy affecting the relationship between child's behavioural and emotional problems and parenting stress in mothers and fathers of children with ASD.
3. To tackle some of the differences found in mothers and fathers, thus, analyses have been performed on subsamples of mothers and fathers, separately.

## Materials and methods

### Setting and procedures

Participants in this study were 32 families (32 mothers and 30 fathers) with children with ASD. All children and families were enrolled in early intensive behavioural intervention (EIBI) and were recruited from the treatment providers database. Procedures of recruitment and study conduct were implemented in accordance with the principles of the Declaration of Helsinki. A member of the research team (the second author) made initial telephone and email contact with 54 eligible families and requested their collaboration. After being informed about the objectives, the parents signed the consent forms to participate in the study, and they were fully aware that they could drop out if they so desired. Eligible parents had the following characteristics: (1) were at least 18 years of age; (2) served as primary caregivers for at least one eligible child enrolled in a EIBI program at the *Umbrella* center; and (3) had not received a diagnosis of dementia or severe cognitive impairment, compromising the self- and proxy-report procedures implemented. A total of 38 families gave their written informed consent to participate in the cross-sectional study (approximately 69%, including a single mother household). Lastly, 32 families (approximately 84%) completed questionnaire survey over a

**Table 1. Sociodemographics of parents and children.**

Parents' variables	Fathers (N = 30)	Mothers (N = 32)	Children's variables	Children (N = 32)
Age in years (mean (SD))	44.53 (05.61)	41.28 (05.04)	CA in months (mean (SD))	70.75 (28.27)
Age group (N (%))			TSD in years (mean (SD))	2.81 (2.28)
30-34	2 (06.70)	3 (09.38)	Age group (N (%))	
35-39	3 (10.00)	10 (31.25)	Preschool age	19 (59.38)
40-44	9 (30.00)	12 (37.50)	School age	13 (40.63)
45-49	11 (36.67)	5 (15.63)	Gender (N (%))	
50-54	4 (13.33)	2 (06.25)	Male	27 (84.38)
55-59	1 (03.33)	0 (.)	Female	5 (15.63)
Educational level (N (%))			Male:female	5:1
High school or lower	16 (53.33)	10 (31.25)	ADOS-2 Severity (mean (SD))	
Collage or higher	14 (46.67)	22 (68.75)	ADOS composite	16.91 (05.81)
Employment status (N (%))			ADOS classification	6.81 (01.87)
Employed	29 (100.00)	25 (78.13)	ADOS-2 Severity level (N (%))	
Not employed	0 (.)	7 (21.88)	Low	2 (06.25)
Family economic status (N (%))			Moderate	19 (59.38)
Low	2 (06.25)		High	11 (34.38)
Middle-Low	3 (09.38)		ABAS II composite (mean (SD))	
Middle	8 (25.00)		General Adaptive Domain	59.29 (13.58)
Middle-High	12 (37.50)		Conceptual Domain	63.17 (18.44)
High	7 (21.88)		Social Domain	64.71 (12.03)
			Practical Domain	59.50 (15.62)

SD = standard deviation; N = sample size; Family Economic Status: refer to the text for description of measure and definition of classes; CA = Chronological Age; TSD = Time Since Diagnosis; ADOS-2 = Autism Diagnostic Observation Schedule-Second Edition; ABAS II = The Adaptive Behavior Assessment System-Second Edition.

one-month period. All questionnaires were implemented in their validated Italian version and no additional translation was performed by the research team.

### Participants

Most of the children were male (27), and ages ranged from 3 to 11, with a mean age of 70.75 months (SD = 28.27). The clinical diagnosis of an autism spectrum disorder has been confirmed in the Child Psychiatry Unit in paediatric hospitals in the Rome area approximately within a recent 3-year period (mean time since diagnosis 2.81 years (SD = 2.28)). Diagnosis was made according the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) utilizing the Autism Diagnostic Observation Schedule-Second Edition ADOS-2 (ADOS-2, Lord *et al.* 2012), and/or the Autistic Diagnostic Interview – Revised (ADI-R, Rutter *et al.* 2003). Generally, the children had a moderate to severe autism severity level (as indicated by the ADOS-2) with extremely low overall, conceptual, social and practical adaptive functioning (as indicated by the Adaptive Behavior Assessment System II; ABAS II, Harrison and Oakland 2003). All children attended regular school classes with varying degrees of additional support.

Concerning parents, a total of 62 parents (32 mothers and 30 fathers) were included in the analysis. Mothers' mean age was 41.28 (5.04) years, fathers' mean age was 44.53 (5.61) years, with an age range from 32-58 years. The majority of parents had obtained a university degree and was employed, with a lower distribution in the mother sample. See Table 1 for child and parents' sociodemographic characteristics.

### Measures

#### Family demographic information

Sociodemographic information of parents was collected through questionnaires for: age, gender, educational level, employments status and family economic status. To measure family economic status each family was asked to quantify whether their monthly income covers all expenses (this question was selected and adapted from the Italian survey of the Statistics on Income and Living Conditions project (<https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>)). The answer options were as follow: with very much difficulty, with difficulty, with mild difficulty, easily, or very much easily. Then level of family economic status was inversely recoded as follow: low, middle-low, middle, middle-high and high.

#### Measurement of stress

Parenting stress was measured using the *Parenting Stress Index – Short Form* (PSI-SF; Abidin 1995, adapted to Italian by Guarino *et al.* 2016). The instrument consists of 36 items comprising four subscales: defensive responding (DR, an internal integrity check-scale), parental distress (PD, distress due to personal factors, conflicts in partnership, and demands due to their role as parents), parent-child dysfunctional interaction (PCDI, parents feeling and degree of frustration regarding the interactions with their child) and difficult child (DC, parents perception of their child's self-regulatory abilities), as well as a total parenting stress score (PS) by adding up PD, PCDI and DC scores. According to the scoring manual, raw scores are transformed in percentile scores and values  $\geq 85$  are considered clinically significant. Cronbach's alpha internal consistency coefficients in our sample demonstrated satisfactory

internal consistency for total PS (.93), and each subscale (PD = .89, PCDI = .80, DC = .85).

### Measurement of child behavioural problems and problem-related parenting self-efficacy

The *Child Adjustment and Parent Efficacy Scale-Developmental Disability* (CAPES-DD) was used to assess emotional and behavioural problems of children, as well as caregivers' self-efficacy in managing these problems (Emser *et al.* 2016: adapted to Italian by Benedetto and Calderone, 2018). The questionnaire comprised 24 items divided into three subscales: behavioural problems (BP), emotional problems (EP) and prosocial behaviour (PB) and 3 additional items contributing to the Children's Total Problems measure (CTP). In addition, Parenting Self-Efficacy scale (PSE) is the sum of the parents' confidence rates in managing EP and BP (from item 1 to item 16). Higher scores indicate greater levels of child's EP and BP, PSE and PB. Cronbach's alpha internal consistency coefficients in our sample demonstrated excellent internal consistency for PSE (.93), and this value is line with previous studies (Benedetto and Calderone 2018, Emser *et al.* 2016, Mazzucchelli *et al.* 2018), a good internal consistency for both CTP (.73) and the subscale BP (.66), and a relatively low value for EP (Cronbach's Alpha = .53). We are aware about the low internal consistency of the EP subscale; however, it is also important to note that very few parent-reported measures of self-efficacy in managing challenging behaviours of children with ASD are available, and none has been adapted to an Italian sample as for the CAPES-DD (Benedetto and Calderone 2018), so far.

Data from mothers and fathers was analysed separately. No statistically significant differences among mothers and fathers regarding levels of parenting stress, ratings of child's behavioural problems and perceptions of parenting self-efficacy were found (see supplementary information Table S1).

### Statistics

The Statistical Package for the Social Sciences (SPSS) software (version 25; IBM Corp.) was used. Differences between mother and fathers, regarding sociodemographic characteristics, the component measures of the PSI-SF (defensive responding, parental distress, parent-child dysfunctional interaction and difficult child) and the CAPES-DD (behavioural problems, emotional problems, prosocial behaviour and parenting self-efficacy) have been tested using one-way ANOVAs. The internal consistency for the CAPES-DD questionnaire was determined by computing the Cronbach's alpha coefficient. An acceptable coefficient alpha is set typically at 0.70 (Kline 2005). The correlative relations between the components of PSI-SF, CAPES-DD and ADOS severity have been

explored via Pearson's correlations, for fathers and mothers separately. Regression analysis has been performed based on correlation results, maintaining PSI-SF and CAPES-DD components, and excluding ADOS severity measures due to lacking relation. Multiple linear regression analysis was conducted to evaluate the relations between the dependent variable (components of parenting stress) and explanatory variables (sociodemographic variable, child problems, parenting self-efficacy). In mediation models we assume a third variable (mediator; M = parenting self-efficacy) that influence the indirect relationship between the independent variable (X = child's behavioural problems) and the dependent variable (Y = parenting stress). In the current paper we followed the four-step approach (Baron and Kenny 1986, Holmbeck 2002): (1) a linear regression is conducted with X predicting Y. This confirms the presence of a path c, a direct or indirect effect that may be mediated; (2) a linear regression is conducted with X predicting M. This confirms the presence of a path a, checking the relation of the mediator with the causal variable; (3) a linear regression is conducted with M predicting Y. This confirms the presence of a path b, confirming a potentially independent relation with the outcome variable; and (4) a linear regression is conducted with M predicting the X-Y relationship. This confirms a *full mediation*: the effect X on Y on the path c (should be zero) is indirect in nature and fully controlled by M. In case, the first three steps are met but not the fourth, *partial mediation* is detected. A Sobel test was then conducted to examine the significance of indirect and direct effect of the mediator (parenting self-efficacy). Additionally, to further explain the mediation, the proportion of the total effect that was mediated was calculated by multiplying the unstandardized regression coefficients of paths a and b and dividing by the unstandardized regression coefficient of path c (Baron and Kenny 1986). The statistical significance of the model was set at the 0.05  $\alpha$  level.

### Results

#### **Associations among demographic variables, ASD symptoms, child behavioural problems parenting stress and parenting self-efficacy**

Associations between demographic factors and the study variables were analysed via ANOVA for dichotomous variables (gender, educational level, family economic status, employment status, child's current diagnosis) and via Pearson product-moment correlation analysis for continuous variables (age, time since diagnosis). In mothers, a statistically significant association was found between child's gender and the parent-child dysfunctional interaction subscale,  $F(29) = 4.712, p = .038$ ; between educational level and parenting stress,



**Table 2. Intercorrelation of the primary variables of interest in mothers and fathers.**

	M-PSI PS	F-PSI PS	M-CAPE- DD PSE	F-CAPE- DD PSE	M-CAPE- DD CTP	F-CAPE- DD CTP	ADOS composite Severity
M-PSI PS	1	.664**	-.437*	-.329	.458**	.332	.164
F-PSI PS	—	1	-.480*	-.771**	.362	.614**	.128
M-CAPE- DD PSE	—	—	1	.469*	-.502**	-.130	-.179
F-CAPE- DD PSE	—	—	—	1	-.207	-.509**	.052
M-CAPE- DD CTP	—	—	—	—	1	.215	.165
F-CAPE- DD CTP	—	—	—	—	—	1	.006
ADOS composite Severity	—	—	—	—	—	—	1

Data analysis: Pearson correlation statistics \*Correlation is significant at the 0.05 level or less ( $p \leq .05$ ) \*\*Correlation is significant at the 0.01 level or less ( $p \leq .01$ ) M-PSI=Mothers' Parenting Stress Index; F-PSI=Fathers' Parenting Stress Index; M-CAPE-DD=Mothers' Child Adjustment and Parent Efficacy Scale-Developmental Disability; F-CAPE-DD=Fathers' Child Adjustment and Parent Efficacy Scale-Developmental Disability; ADOS=Autism Diagnostic Observation Schedule; PS=Parenting Stress; PSE=Parenting Self-Efficacy; CTP=Children's Total Problems.

F(29) = 7.664,  $p = .010$ ; and between parenting self-efficacy and time since diagnosis,  $r(27) = -0.424$ ,  $p = .027$ . Follow-up analyses revealed that mothers of girls reported more parent-child dysfunctional interactions ( $M = 31.80$ ) compared to mothers of boys ( $M = 25.81$ ), and that mothers with higher educational levels reported more parenting stress (PS ( $M = 34.05$ ) compared to mothers with lower educational levels ( $M = 25.20$ ).

In fathers, statistically significant associations were found between family economic status and parenting stress,  $F(22) = 2.843$ ,  $p = .049$ ; and between the emotional problem subscale and time since diagnosis,  $r(29) = 0.389$ ,  $p = .037$ . Follow-up analyses for parenting stress revealed no statistically significant differences in fathers. Sociodemographic factors that were found to have a significant relationship with dependent variables, were retained as covariate within the analyses described later.

Bivariate correlation between the study variables and parenting stress are shown in table 2, for fathers and mothers separately. Pearson product-moment correlation analysis confirmed the presence of statistically significant correlations between child total behavioural problems and parenting stress, both in mothers ( $p < .008$ ) and fathers ( $p < .001$ ), the parenting self-efficacy scale, both in mothers ( $p < .008$ ) and fathers ( $p < .008$ ), and between parenting stress and the parenting self-efficacy scale, both in mothers ( $p < .023$ ) and fathers ( $p < .0001$ ). No statistically significant relationships were found between the ADOS-2 severity and parenting stress, in mothers ( $p = .368$ ) and fathers ( $p = .516$ ), the child total behavioural problems, in mothers ( $p = .367$ ) and fathers ( $p = .975$ ), and the parenting self-efficacy scale, in mothers ( $p = .371$ ) and fathers ( $p = .799$ ). Due to the lacking association of ASD symptom severity with any of the study variables, ADOS-2 severity has not been included in subsequent analyses.

### Multiple regression analysis

To proceed with regression analyses, distributions of variables should be checked for skewness. Our data set

did not reveal skewed data, thus no squared root transformation has been applied.

Multiple regression analysis was carried out in both, the mother, and the father sample, to evaluate the relationship between the dependent variable of parenting stress and the explanatory variables, namely child behavioural problems and parenting self-efficacy. The results of the regression analysis indicated that each of the explanatory variables are statistically significant predictors (table 3). In mothers, an approximately 18% of variance in parenting stress was explained by child behavioural problems ( $\beta = .458$ ,  $p < .008$ ), parenting self-efficacy ( $\beta = -.437$ ,  $p < .023$ ). In fathers, an approximately 45% of variance in parenting stress was explained by child behavioural problems ( $\beta = .600$ ,  $p < .001$ ) and parenting self-efficacy ( $\beta = -.682$ ,  $p < .0001$ ).

### Mediation analysis controlling for parenting self-efficacy

Using the steps of mediation outlined by Baron and Kenny (1986) and Holmbeck (2002), a series of regression analyses were conducted to assess parenting self-efficacy as potential mediator, to examine the explanatory mechanisms underlying significant relation of child behavioural problems and parenting stress. Three series of regression analyses were conducted.

The first regression analysis examined the relationship between the predictor and the criterion (pathway c); the second regression analysis examined the relationship between the predictor (pathway a) and the potential mediator; the third regression analysis examined the relationship between the potential mediator and the criterion (pathway b); the fourth regression analysis examined the effect of the predictor and the potential mediator on the criterion. Additionally, to further explain the mediation, a sobel z was calculated; and the proportion of the total effect that was mediated was calculated by multiplying the unstandardized regression coefficients of paths a and b and dividing by the unstandardized regression coefficient of path c (Baron and Kenny 1986).

**Table 3. Multiple linear regressions to evaluate the relationship between the dependent variable and the explanatory variables.**

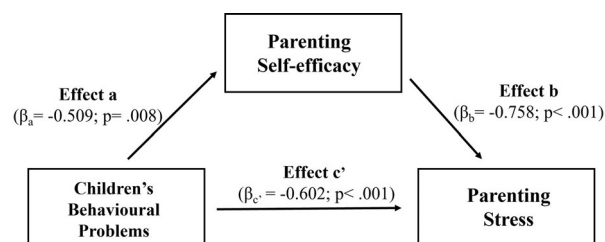
Model summary for parenting stress fathers					
		R <sup>2</sup>	Adjusted R <sup>2</sup>	F	p
		0.517	0.445	7.146	.002
Variables	Unstandardized coefficients		Standardized coefficient		
	B	SE	$\beta$	T	p
CTP	3.378	0.901	0.6	3.751	.001
PSE	-0.817	0.187	-0.682	-4.369	<.001
Model summary for parenting stress mothers					
		R <sup>2</sup>	Adjusted R <sup>2</sup>	F	p
		0.304	0.177	2.401	.081
Variables	Unstandardized coefficients		Standardized coefficient		
	B	SE	$\beta$	T	p
CTP	1.500	0.531	0.458	2.823	.008
PSE	-0.336	0.139	-0.437	-2.426	.023

Data analysis: Linear regressions; PSE = Parenting Self-Efficacy; CTP = Children's Total Problems.

Figure 1 shows a simple mediation model in which the parenting self-efficacy mediates the relationship between child behavioural problems and parenting stress, in fathers only. Detailed results of the multiple mediation analysis are available in table 4. Table 4 shows the results of the separate regression analyses testing the mediation hypothesis. In fathers, a statistically significant effect of the amount of child behavioural problems on paternal parenting stress ( $b_c = 2.82$ ,  $p = .01$ ) and of child behavioural problems on paternal parenting self-efficacy ( $b_a = -2.48$ ,  $p = .008$ ) was confirmed. After including the mediator variable (parenting self-efficacy,  $b_{c'} = -0.621$ ,  $p < .001$ ) into the model, the effect of child behavioural problems decreased to  $b_c = 1.51$ ,  $p = .051$ . The difference  $b_c - b_{c'} = 1.31$  was significant (Sobel test:  $z_s = 2.831$ ,  $p < .01$ ). Paternal self-efficacy was thus a significant full mediator of the association of child behavioural problems and paternal parenting stress. The original regression coefficient of the effect decreased by 54% when self-efficacy was included as mediator, hence 54% of the effect of child behavioural problems on paternal stress is mediated by paternal self-efficacy.

In mothers, such a mediation effect was not detected. A statistically significant effect of the amount of child behavioural problems on maternal parenting stress ( $b_c = 1.25$ ,  $p < .05$ ) and of child behavioural problems on maternal parenting self-efficacy ( $b_a = -1.63$ ,  $p < .05$ ) was confirmed. After including the mediator variable (parenting self-efficacy) into the model, no significant mediation effect of maternal self-efficacy has been detected ( $b_c = -0.20$ ,  $p = .081$ ).

In order to exclude possible alternative explanations and because of the cross-sectional nature of the study, the mediation analysis was repeated with reversed direction (testing parenting stress as mediator and self-efficacy as the outcome variable). After interchanging dependent and independent variables, a significant but smaller effect was obtained. Approximately a 12% of the original effect of child behavioural problems on paternal parenting self-efficacy was mediated by paternal parenting stress. The difference  $b_c - b_{c'} = -2.94$  was significant ( $z_s = 2.385$ ,  $p < .05$ ).



**Figure 1. Standardized regression coefficients for paths within the mediation model for fathers.**

Note: Analyses were controlled for family economic status.

## Discussion

The current study was carried out to explore the relational strength of child behavioural problems and parenting stress among parents of children with autism. Results partially supported our hypotheses. We found a consistent relationship of child's behavioural problems and perceived parenting stress, both in fathers and mothers. Some child-related and sociodemographic variables were differentially associated with parenting stress. Mothers with higher educational levels of female children perceived more parenting stress, whereas in fathers parenting stress was association with rates of lower economic status, with time since diagnosis and, specifically, higher emotional problems in their child. It appeared that child behavioural problems and parenting self-efficacy are salient predictors of stress among both, fathers, and mothers, indicating that increase in severity of challenging behaviour problems is directly related to an increase in parenting stress. Results coincide with previous finding (Bitsika and Sharpley 2017, Tomeny 2017). Furthermore, the lacking association of core symptomatology of ASD and parenting stress has been found in previous work (Ben-Sasson et al. 2013, Giovagnoli et al. 2015, Barroso et al. 2018, Yorke et al. 2018).

We found that parenting self-efficacy fully mediated the relationship between child behavioural problems and parenting stress, in fathers only. Mediation analysis showed that 54% of the effect of child behavioural problems on paternal parenting stress was mediated by paternal self-efficacy. In a control test of the reverse direction, self-efficacy mediated only 12% of the effect of child

**Table 4. Series of regression analyses for self-efficacy as mediator child's total problems and total parental stress in fathers and mothers.**

Regressions	Predictors in fathers	R <sup>2</sup>	Adjusted R <sup>2</sup>	Model p	F	B	SE	β	t
<b>Step 1</b> (predicting PS)	Family economic status, CTP	0.390	0.341	.002	7.994	2.817	0.759	0.591	3.710**
<b>Step 2</b> (predicting PSE)	CTP	0.260	0.229	.008	8.414	-2.475	0.853	-0.509	-2.901**
<b>Step 3</b> (predicting PS)	Family economic status, PSE	0.614	0.579	<.001	17.512	-0.782	0.137	-0.758	-5.697**
<b>Step 4</b> (predicting PS)	Family economic status (1) CTP (2) PSE	0.680	0.634	<.001	14.845	1.505 -0.621	0.727 0.150	0.299 -0.602	2.070 -4.149**
Regressions	Predictors in mothers	R <sup>2</sup>	Adjusted R <sup>2</sup>	Model p	F	B	SE	β	t
<b>Step 1</b> (predicting PS)	Mother's educational level, CTP	0.274	0.224	.010	5.465	1.254	0.541	0.383	2.319*
<b>Step 2</b> (predicting PSE)	Time since diagnosis, CTP	0.310	0.252	.012	5.382	-1.632	0.769	-0.394	-2.122*
<b>Step 3</b> (predicting PS)	Mother's educational level, Time since diagnosis, PSE	0.262	0.166	.067	2.726	-0.278	0.152	-0.362	-1.827
<b>Step 4</b> (predicting PS)	Time since diagnosis, Mother's educational level (1) CTP (2) PSE	0.304	0.177	.081	2.401	0.779 -0.204	0.680 0.165	0.244 -0.264	1.145 -1.235

Data analysis: Hierarchical regressions; Family economic status, mother's educational level and time since diagnosis were entered into the equations as control variables based on the ANOVA and correlations results. \* Significant at the 0.05 level ( $p \leq .05$ ) \*\* Significant at the 0.01 level ( $p \leq .01$ ) PS = Parenting Stress; PSE = Parenting Self-Efficacy; CTP = Children's Total Problems.

behavioural problems on paternal parenting stress. These results suggest that a high amount of child behavioural problems may lead to a sharp increase in paternal parenting stress, in part, through reduced paternal self-efficacy. Thus, paternal self-efficacy, or the strong belief in one's own capabilities to be able to control difficult situations, may function as a parameter of resilience when the child's challenging behaviours surface.

In mothers, as proposed by the mediation model, a statistically significant direct relation between child behavioural problems and parenting stress, and significant positive associations between maternal self-efficacy and child behavioural problems, parenting stress as well as paternal self-efficacy, has been found. Nevertheless, although child's behavioural and emotional problems contribute to maternal parenting stress, a mediating role of maternal parenting self-efficacy fails to emerge. Thus, self-efficacy in mothers may not exercise such a potentially protective effect, when child's behavioural problems arise. Similar findings can be found in past research that indicated a reduction of problem-focused coping strategies in mothers of children with higher symptom severity (Miranda *et al.* 2019).

### Practical implications

The results of this study highlight the differences of personal belief sets between mothers and fathers, of children with ASD, towards the capability to control child-related hassles and the relative efficacy to alleviate stress. This suggests that specific, parent training and parent support interventions aiming at reducing parenting stress, preserving mental health, and ameliorating well-being need to progress research findings

differentially for fathers and for mothers and need to engage strategies specific to mothers and fathers.

We acknowledged that there is a need of tailored interventions for parents, as there is a need of individualized interventions for children with ASD. Collecting information about their experiences as parents may contribute to overcome the lack of such practice.

### Strengths, limitations and future directions

To our knowledge the present study is the first one to explore parenting stress and parenting self-efficacy as a potential mediator separately in parents of children with ASD, characterized by a relatively moderate to severe symptomatology and by an extremely low overall, conceptual, social, and practical adaptive functioning. Thus, a sample of parents of children that demonstrate challenging behaviours and emotional problems with relatively high frequency and intensity.

Another strength of our study is the measurement of task-specific parenting self-efficacy rather than general parenting self-efficacy. Most of previous works that investigated parenting self-efficacy, primarily involved general measures of self-efficacy (Jones and Prinz 2005, Wittkowski *et al.* 2017). Our decision to specifically address task-specific self-efficacy is consistent with coping research showing that higher levels of problem-focused coping acts as a buffer when autism symptomatology reaches high severity levels (Smith *et al.* 2008).

Nonetheless, the study has several limitations. The small sample size and cross-sectional nature of the study design imply that results need to be considered preliminary and replication studies are needed. Again, the cross-sectional nature and the specific child characteristics who present severe levels of autism

symptomatology and an extreme low adaptive functioning, restrict generalizability. Although, the homogeneity of the sample increases specificity, no implication can be drawn for families of children with ASD without developmental disabilities, lower impacting ASD severity and higher adaptive functioning. Accessing a representative data pool is warranted. Additionally, most of the children were male. Although this represents the general population of children with autism, results may poorly represent parents with girls, especially as having a female child was significantly related to increased parenting stress in mothers. Information was obtained through parent self-report. Arguably, this is appropriate as permanent belief sets and personal perceptions are set in the definition of the study variables. However, some parents may either under- or overreport for a variety of cultural or personal reasons.

The limitations of this study provide directions for the future research. As only 45% of variance of the mediation model is accounted for by the study variables in fathers and 18% of variance in mothers, a 55% and 82% of variance, respectively, is unknown. A variety of potential factors, like active and avoidant coping (Hastings *et al.* 2005, Smith *et al.* 2008), social community support (Ekas *et al.* 2010), cognitive reframing (Benson, 2010, Benson, 2014) and family functioning (Rao and Beidel, 2009) may be included in such a future model. However, the analysis of parenting stress must be considered from a more complex perspective, through the examination of protective and risk factors, that may be involved differentially in fathers and mothers, due to the vast social, personal, and cultural differences. It would be parsimonious in future research to apply a multiple mediation model engaging potential mediators simultaneously and to examine pairwise contrast of indirect effects, rather than applying a single-mediation model, as used in the current study (Preacher and Hayes, 2008).

Another potential limitation is the measurement of the child behavioural problems and parenting self-efficacy variables on the same measure. The frequent problem of multicollinearity in regression analysis and mediation analysis may arise. That is when variables are highly correlated to one another, generally indicated by correlation of .75 or higher in correlation coefficient matrix'. Such high correlation coefficients are not present in the current data set, nor there are significant f-values for the equation while t-ratios of the coefficient are not significant. Generally, multicollinearity cannot be fully avoided in mediation analysis. Furthermore, the measurement instrument (CAPES-DD) has been implemented due to its unique characteristic in assessing task-specific parenting self-efficacy, a rating that each parent matches to specific child behavioural problems frequent in children with developmental disabilities. Nevertheless, future studies

may be able to assess a bigger sample size and conduct latent variable analysis to reduce effects of such correlated measurement errors.

Our research findings demonstrate distinct differences in mothers and fathers regarding potential variables that may affect mental health and well-being outcomes. Future studies, therefore, warrant the inclusion of samples of fathers and a separated data analysis for mothers and fathers.

The role of paternal self-efficacy, that is significantly affecting the relation between child behavioural problems and paternal parenting stress, is lacking in mothers. For fathers, in this study parenting self-efficacy appears to be differently accessible when needed to navigate challenges in parenting tasks. This may be culturally rooted in distinct involvement within the family, observable in households where most parenting tasks are organized by a manager-helper dynamic. That is when mothers primarily navigate the family life and fathers provide specific assistance through task completion (Daly 2002). Thus, a high perception of task-specific self-efficacy (in other words being a problem solver) may successfully counteract the relation between hassles and stress in fathers, whereas being an emotionally supported parent is more salient aspect of women's personal identity. One of the few longitudinal studies in ASD research demonstrated that persistent maternal stress is exacerbated when personal and social resources are insufficient. Active coping strategies acted as a resilience factor over time in mothers (Zaidman-Zait *et al.* 2016). Future research needs to examine the potential buffering effect of social and confidant support, the quality of intimate relations and coparenting that may be more closely related to parenting stress perceived in mothers. Such investigations are needed to untangle the complex mechanisms underlying mental health outcome in parents with children with ASD, thus providing implications for tailored parent training and parent support interventions.

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## Data availability statement

The authors have full access to all the data used in this study and takes responsibility for the integrity of the data and the accuracy of the data analysis.



## References

- Abadin, R. R. 1995. *Parenting stress index. Professional manual*. 3rd ed. Odessa: Psychological Assessment Resources.
- Albanese, A. M., Russo, G. R. and Geller, P. A. 2019. The role of parental self-efficacy in parent and child well-being: A systematic review of associated outcomes. *Child: Care, Health and Development*, 45, 333–363.
- American Psychiatric Association. 2013. *Diagnostic and Statistical Manual of Mental Disorders (DSM-V)*. 5th ed. Washington: American Psychiatric Association.
- Argumedes, M., Lanovaz, M. J. and Larivée, S. 2018. Brief report: Impact of challenging behavior on parenting stress in mothers and fathers of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 48, 2585–2589.
- Bandura, A. 1977. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.
- Baron, R. M. and Kenny, D. A. 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Barroso, N. E., Mendez, L., Graziano, P. A. and Bagner, D. M. 2018. Parenting stress through the lens of different clinical groups: A systematic review & meta-analysis. *Journal of Abnormal Child Psychology*, 46, 449–461.
- Batool, S. S. and Khurshid, S. 2015. Factors associated with stress among parents of children with autism. *Journal of the College of Physicians and Surgeons Pakistan*, 25, 752–756.
- Benedetto, L. and Calderone, C. 2018. September. Autoefficacia genitoriale e autismo: Una valutazione attraverso la child adjustment and parent efficacy scale – developmental disability (CAPES-DD). *Poster Session Presented at Sezione di Psicologia Dello Sviluppo e Dell'Educazione. Associazione Italiana di Psicologia, National Congress*, Torino, IT.
- Ben-Sasson, A., Soto, T. W., Martínez-Pedraza, F. and Carter, A. S. 2013. Early sensory over responsivity in toddlers with autism spectrum disorder as a predictor of family impairment and parenting stress. *Journal of Child Psychology and Psychiatry*, 54, 846–853.
- Benson, P. R. 2010. Coping, distress, and well-being in mothers of children with autism. *Research in Autism Spectrum Disorders*, 4, 217–228.
- Benson, P.R. 2014. Coping and psychological adjustment among mothers of children with ASD: An accelerated longitudinal study. *Journal of Autism and Developmental Disorders*, 44, 1793–1807.
- Bitsika, V. and Sharpley, C. F. 2004. Stress, anxiety and depression among parents of children with autism spectrum disorder. *Journal of Psychologists and Counsellors in Schools*, 14, 151–161.
- Bitsika, V. and Sharpley, C. F. 2017. The association between autism spectrum disorder symptoms in high-functioning male adolescent and their mother's anxiety and depression. *Journal of Developmental and Physical Disabilities*, 9, 461–473.
- Catalano, D., Holloway, L. and Mpofu, E. 2018. Mental health interventions for parent carers of children with autistic spectrum disorder: Practice guidelines from a critical interpretive synthesis (CIS) systematic review. *International Journal of Environmental Research and Public Health*, 15, 323–341.
- Craig, F., Operto, F. F., De Giacomo, A., Margari, L., Frolli, A., Conson, M., Ivagnes, S., Monaco, M. and Margari, F. 2016. Parenting stress among parents of children with Neurodevelopmental Disorders. *Psychiatry Research*, 242, 121–129.
- Davis, N. O. and Carter, A. S. 2008. Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: Associations with child characteristics. *Journal of Autism and Developmental Disorders*, 38, 1278–1291.
- Ekas, N. V., Lickenbrock, D. M. and Whitman, T. L. 2010. Optimism, social support and well-being in mothers of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 40, 1274–1284.
- Emser, T. S., Mazzucchelli, T. G., Christiansen, H. and Sanders, M. R. 2016. Child adjustment and parent efficacy scale-developmental disability (CAPES-DD): First psychometric evaluation of a new child and parenting assessment tool for children with a developmental disability. *Research in Developmental Disabilities*, 53–54, 158–177.
- Estes, A., Munson, J., Dawson, G., Koehler, E., Zhou, X.-H. and Abbott, R. 2009. Parenting stress and psychological functioning among mothers of preschool children with autism and developmental delay. *Autism : The International Journal of Research and Practice*, 13, 375–387.
- Falk, N. H., Norris, K. and Quinn, M. G. 2014. The factors predicting stress, anxiety and depression in the parents of children with autism. *Journal of Autism and Developmental Disorders*, 44, 3185–3203.
- Firth, I. and Dryer, R. 2013. The predictors of distress in parents of children with autism spectrum disorder. *Journal of Intellectual & Developmental Disability*, 38, 163–171.
- Giovagnoli, G., Postorino, V., Fatta, L. M., Sanges, V., De Peppo, L., Vassena, L., De Rose, P., Vicari, S. and Mazzone, L. 2015. Behavioral and emotional profile and parental stress in preschool children with autism spectrum disorder. *Research in Developmental Disabilities*, 45–46, 411–421.
- Gross, D., Fogg, L. and Tucker, S. 1995. The efficacy of parent training for promoting positive parent–toddler relationships. *Research in Nursing & Health*, 18, 489–499.
- Guarino, A., Laghi, F., Serantoni, G., Di Blasio, P. and Camisasca, E. 2016. *Parenting Stress Index – Fourth Edition (PSI-4)*. Firenze: Giunti OS.
- Harrison, P. and Oakland, T. 2003. *Adaptive behavior assessment system—second edition*. 2nd ed. San Antonio: Harcourt Assessment.
- Hastings, R. P. and Brown, T. 2002. Behavior problems of children with autism, parental self-efficacy, and mental health. *American Journal on Mental Retardation*, 107, 222–232.
- Hastings, R. P., Kovshoff, H., Brown, T., Ward, N. J., Espinosa, F. D. and Remington, B. 2005. Coping strategies in mothers and fathers of preschool and school-age children with autism. *Autism : The International Journal of Research and Practice*, 9, 377–391.
- Hayes, S. A. and Watson, S. L. 2013. The impact of parenting stress: A meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43, 629–642.
- Hohlfeld, A. S. J., Harty, M. and Engel, M. E. 2018. Parents of children with disabilities: A systematic review of parenting interventions and self-efficacy. *African Journal of Disability*, 7, 1–12.
- Holmbeck, G. N. 2002. Post-hoc probing of significant moderational and mediational effects. *Journal of Pediatric Psychology*, 27, 87–96.
- Hou, Y. M., Stewart, L., Iao, L. S. and Wu, C. C. 2018. Parenting stress and depressive symptoms in Taiwanese mothers of young children with autism spectrum disorder: Association with children's behavioural problems. *Journal of Applied Research in Intellectual Disabilities : JARID*, 31, 1113–1121.
- Jones, T. L. and Prinz, R. J. 2005. Potential roles of parental self-efficacy in parent and child adjustment: A review. *Clinical Psychology Review*, 25, 341–363.
- Kiami, S. R. and Goodgold, S. 2017. Support needs and coping strategies as predictors of stress level among mothers of children with autism spectrum disorder. *Autism Research and Treatment*, 2017, 1–10.
- Kline, R. B. 2005. *Principles and practice of structural equation modeling*. 2nd ed. New York: Guilford.
- Kuhn, J. C. and Carter, A. S. 2006. Maternal self-efficacy and associated parenting cognitions among mothers of children with autism. *American Journal of Orthopsychiatry*, 76, 564–575.
- Lord, C., Rutter, M., DiLavore, P. C., Risi, S., Gotham, K. and Bishop, S. 2012. *Autism diagnostic observation schedule (ADOS-2)*. 2nd ed. Torrance: Western Psychological Services.
- Mazzucchelli, T. G., Jenkins, M. and Sofronoff, K. 2018. Building Bridges Triple P: Pilot study of a behavioural family intervention for adolescents with autism spectrum disorder. *Research in Developmental Disabilities*, 76, 46–55.
- McConachie, H. and Diggle, T. 2007. Parent implemented early intervention for young children with autism spectrum disorder: A systematic review. *Journal of Evaluation in Clinical Practice*, 13, 120–129.
- McStay, R. L., Trembath, D. and Dissanayake, C. 2014. Stress and family quality of life in parents of children with autism spectrum disorder: Parent gender and the double ABCX model. *Journal of Autism and Developmental Disorders*, 44, 3101–3118.
- Meirsschaut, M., Roeyers, H. and Warreyn, P. 2010. Parenting in families with a child with autism spectrum disorder and a typically developing child: Mothers' experiences and cognitions. *Research in Autism Spectrum Disorders*, 4, 661–669.
- Miranda, A., Mira, A., Berenguer, C., Rosello, B. and Baixauli, I. 2019. Parenting stress in mothers of children with autism without

- intellectual disability. Mediation of behavioral problems and coping strategies. *Frontiers in Psychology*, 10, 464.
- Oono, I. P., Honey, E. J. and McConachie, H. 2013. Parent-mediated early intervention for young children with autism spectrum disorders (ASD). *Cochrane Database of Systematic Reviews*, 30.
- Preacher, K. J. and Hayes, A. F. 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879–891.
- Rao, P. A. and Beidel, D. L. 2009. The impact of children with high-functioning autism on parental stress, sibling adjustment and family functioning. *Behavior Modification*, 33, 437–451.
- Rojas-Torres, L. P., Alonso-Esteban, Y. and Alcantud-Marín, F. 2020. Early intervention with parents of children with autism spectrum disorders: A review of programs. *Children*, 7, 228–294.
- Rutter, M., Le Couteur, A. and Lord, C. 2003. *Autism diagnostic interview-revised*. Los Angeles: Western Psychological Services
- Sevigny, P. R. and Loutzenhiser, L. 2010. Predictors of parenting self-efficacy in mothers and fathers of toddlers. *Child: Care, Health and Development*, 36, 179–189.
- Smith, L. E., Seltzer, M. M., Tager-Flusberg, H., Greenberg, J. S. and Carter, A. S. 2008. A comparative analysis of well-being and coping among mothers of toddlers and mothers of adolescents with ASD. *Journal of Autism and Developmental Disorders*, 38, 876–889.
- Solish, A. and Perry, A. 2008. Parents' involvement in their children's behavioral intervention programs: Parent and therapist perspectives. *Research in Autism Spectrum Disorders*, 2, 728–738.
- Tomeny, T. S. 2017. Parenting stress as an indirect pathway to mental health concerns among mothers of children with autism spectrum disorder. *Autism: The International Journal of Research and Practice*, 21, 907–911.
- Wittkowski, A., Garrett, C., Calam, R. and Weisberg, D. 2017. Self-report measures of parental self-efficacy: A systematic review of the current literature. *Journal of Child and Family Studies*, 26, 2960–2978.
- Yorke, I., White, P., Weston, A., Rafla, M., Charman, T. and Simonoff, E. 2018. The association between emotional and behavioral problems in children with autism spectrum disorder and psychological distress in their parents: A systematic review and meta-analysis. *Journal of Autism and Developmental Disorders*, 48, 3393–3415.
- Zaidman-Zait, A., Mirenda, P., Duku, E., Vaillancourt, T., Smith, I.M., Szatmari, P., Bryson, S., Fombonne, E., Volden, J., Waddell, C., Zwaigenbaum, L., Georgiades, S., Bennett, T., Elsanaggh, M. and Thomson, A. 2016. Impact of personal and social resources on parenting stress in mothers of children with autism spectrum disorders. *Autism*, 1–12.