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To cite this article: Nurussakinah Daulay (2021): The moderating effect of types of child's neurodevelopmental disorder on the relationship between Indonesian mothers' perception of child's maladaptive behaviour and maternal parenting stress, International Journal of Developmental Disabilities, DOI: [10.1080/20473869.2021.1880686](https://doi.org/10.1080/20473869.2021.1880686)

To link to this article: <https://doi.org/10.1080/20473869.2021.1880686>



Published online: 04 Feb 2021.



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The moderating effect of types of child's neurodevelopmental disorder on the relationship between Indonesian mothers' perception of child's maladaptive behaviour and maternal parenting stress

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This study aimed to examine the effect of mother's perception of child's maladaptive behaviour and types of child's neurodevelopment disorder on maternal parenting stress, and examine the role of types of child's neurodevelopmental disorder in moderating the relationship between mother' perception of child's maladaptive behaviours and maternal parenting stress. The mother' perception of child's maladaptive behaviours tested included internalizing and externalizing maladaptive behaviours, while the types of child's neurodevelopmental disorder included intellectual disability (ID), attention-deficit/hyperactivity disorder (ADHD), and autism spectrum disorder (ASD). A total of 163 mothers of children with different types of neurodevelopmental disorders were included in this study. The data were analysed with regression analysis, t-test, and ANOVA. The results showed that 1) there is an influence of the mother's perception of child's maladaptive behaviours and types of neurodevelopmental disorders on parenting stress; 2) types of child neurodevelopmental disorders moderate the relationship between the mother's perception of child's maladaptive behaviour and maternal parenting stress; 3) mothers of children with ASD experience higher levels parenting stress than mothers of children with ADHD and ID.

Keywords: mothers' perception of child's maladaptive behaviours; children with neurodevelopmental disorders; parenting stress; intellectual disability; autism spectrum disorder; attention deficit/hyperactivity disorder

1. Introduction

Neurodevelopmental disorders (NDD) are a group of conditions with onset in the developmental period and are characterized by developmental deficits that produce impairments of personal, social, academic, or occupational functioning (American Psychiatric Association 2013). This present study examined children with three different types of neurodevelopmental disorders including children with intellectual disability (ID), children with autism spectrum disorders (ASD), and children with attention-deficit/hyperactivity disorder (ADHD). These different types of disorders shed light on neurodevelopment from different perspectives. Children with ASD are characterized by deficits in social interaction and communication, and the presence of restricted and repetitive behaviours. Children with ID (intellectual developmental disorder) are characterized by deficits in

general mental abilities such as reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and experiential learning. Children with ADHD are characterized by impaired levels of inattention, disorganization, and/or hyperactivity-impulsivity (American Psychiatric Association 2013).

These limitations appear before the child turns 18 years old and position NDD children as individuals who are less independent, less able to adapt to the environment, and show decreased adaptive behaviours (Kalaivnai and Kalimo 2018). Sparrow *et al.* (2005) defined child's maladaptive behaviours as behaviours that are undesirable which include internalizing and externalizing behaviours and other types of behaviours that may interfere with their adaptive functioning in their daily life. Child's internalizing behaviours were described as including dependence, aloofness, eating and sleep difficulties, anxiety, feelings of rejection, mood swings, poor eye contact, lack of social interactions, and low energy in life. Child's externalizing

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behaviours were characterized by child's impulsivity, temper tantrums, disobedience, teasing, insensitivity to others, physical aggression, stubbornness, inappropriate language usage in public, and urging others inappropriately. Besides these traits, some other behaviours such as sucking fingers, bedwetting, overactivity, fingernail biting, tics, teeth grinding, short attention span, restlessness, running away, and ignoring people are also included in their definition.

Some studies related to maladaptive behaviours of children with NDD found that, for examples, 1) children with ID face lifelong challenges in areas such as self-care and learning and socializing abilities (Sun 2020); low independency (Van der Meulen *et al.* 2018); difficulties in different domains of learning, including academic, social, and practical knowledge (Bertelli *et al.* 2016), limitations in adaptive behaviours (Nankervis *et al.* 2020); 2) children with ASD display tantrums, aggressive behaviours, and inability to control emotions (Oubrahim and Combalbert 2019), and restricted and repetitive behaviours (Patriquin *et al.* 2020); 3) children with ADHD show hyperactivity and concentration difficulty (Lee *et al.* 2020) and behaviour problems (Climie and Mitchell 2017) that result in decreased well-being (Peasgood *et al.* 2020); has a lot of challenges (Climie and Henley 2018); increased anxiety and depression (Brammer *et al.* 2018), feelings of hopelessness (Alamdarloo and Majidi 2020); and increased parenting stress on the part of parents (Korpa *et al.* 2017).

Mothers who have a child with NDD may, of course, experience other types of stressors, just as all mothers do. Other life stressors include financial problems (Romney *et al.* 2020) related to the cost of therapy and treatment of children (Rogge and Janssen 2019); unemployment (McCall and Starr 2018); perceived social support (Johnson 2019); and ineffective parental coping strategies (Pepperell *et al.* 2018). The discrepancy between the expected role of the mother as a parent and the child's characteristics can lead to parenting stress. Parenting stress can be defined succinctly as a set of processes that lead to aversive psychological and physiological reactions arising from attempts to adapt to the demands of parenthood. This often is experienced as negative feelings and beliefs toward and about the self and the child (Deater-Deckard 2004). Those parents who show high levels of parental stress usually perceive their children as difficult and show patterns of ineffective disciplining and dysfunctional parenting, frequently leading to greater difficulties in the child (Abidin 1992). Parenting stress and children's behaviour problems have been shown to have a bidirectional relationship (Neece *et al.* 2012) in that the child's problematic behaviours lead to parenting stress, which, in turn, affects parenting behaviours, which then increase the child's problem behaviours (Davis and Neece 2017).

Potentially relevant child characteristics that may serve as stressors in this domain include level of dependency in self-help tasks, cognitive and/or developmental level, frequency, and severity of the maladaptive behaviour, diagnosis or type of developmental disorder, age, and gender (Kısa *et al.* 2019). Nieto *et al.* (2017) which also proved that sensory characteristics are explaining greater percentage of variance in the parental stress. Parent's mental health problems, poor overall family quality of life, and financial hardship are related to the presence of psychiatric diagnoses and maladaptive behaviours in a large sample of youth with severe special needs. Various types of NDD, such as ASD, ID, and ADHD can play a role in parenting stress (Zaidman-Zait *et al.* 2017). Some earlier studies have demonstrated that parents of children with ASD experience higher levels of parenting stress than parents of children with ID or ADHD (Depape and Lindsay 2015, Lee and Chiang 2017, Samadi *et al.* 2014). The various studies mentioned above confirm that maladaptive behaviours in children with NDD plays a role in parenting stress but the absence of research that examines the influence of the types of children's NDD on parenting stress and the role of types of NDD as a moderating variable of the relationship between child maladaptive behaviours and parenting stress makes this present study different from previous studies in that it aimed to determine the relationship between the mother's perception of child's maladaptive behaviours and maternal parenting stress as moderated by types of child neurodevelopmental disorder, and the role of the moderating variable in strengthening or weakening the relationship between mothers's perception of child's maladaptive behaviour and maternal parenting stress. The research hypotheses were as follows: 1) mothers's perception of child's maladaptive behavior is a predictor of maternal parenting stress. Following Sparrow *et al.*'s (2005) theory that child maladaptive behaviour consists of two dimensions, internalizing maladaptive behaviour and externalizing maladaptive behaviour, this hypothesis was thus broken down into two: 1.a.) mother's perception of child's internalizing maladaptive behaviour correlates positively with parenting stress and 1.b.) mother's perception of child's externalizing maladaptive behaviour correlates positively with parenting stress; 2) types of child's neurodevelopmental disorder affect maternal parenting stress, and moderate the relationship between the mother's perception of child's maladaptive behaviours and maternal parenting stress; 3) mothers of children with ASD experience higher parenting stress than mothers of children with the other two types of NDD (ID and ADHD).

2. Methods

2.1. Participants

The participants of the study were 163 mothers of children with NDD at 2 public and 1 private special schools

Table 1. Sample demographics.

Characteristics	Categories	No.(%) of participants	Mean	SD
Age of mother, yr	18 – 40 (early adulthood)	112 (68.71)	38.12	12.578
	41- 60 (middle adulthood)	51 (31.28)	34.76	12.352
Mother's education	Primary or less	3 (1.84)	40.86	12.014
	High school	28 (17.17)	35.47	11.088
	Diploma	9 (5.52)	49.83	8.702
	University (bachelor or higher)	123 (75.46)	30.78	12.082
Types of child's neurodevelopmental disorders	Intellectual disability	89 (54.60)	33.93	10.778
	ADHD	22 (13.49)	33.02	10.586
	Autism spectrum disorder	52 (31.90)	49.22	7.495
Age of child, yrs.	2 – 6	45 (27.60)	34.61	11.781
	7 – 13	96 (58.89)	37.61	12.041
	14 – 18	22 (13.49)	36.27	13.796
Child's gender	Male	88 (53.98)	38.63	12.22
	Female	75 (46.01)	32.23	12.31
	Total	100%		

in Medan, Indonesia, including 89 mothers of children with ID, 52 mothers of children with ASD, and 22 mothers of children with ADHD. The participants were selected with a purposive sampling technique based on a set of criteria, including being the biological mother of a child with NDD; raises the child by herself instead of placing them in a boarding school for children with special needs, and has an education level of junior high school at a minimum.

2.2. Procedures

This study began with literature study and followed with a preliminary study in which the researcher carried out interviews with mothers of children with NDD to know what the mothers feel and experience in caring for a child with NDD. The interviews were carried out with ten mothers (including 4 mothers of children with ID, 4 mothers of children with ASD, and 2 mothers of children with) in 2 public and 1 private special schools in Medan, Indonesia. The interviews concerned the mothers' condition, including sources of stress they felt, factors that cause them stressed, what they did to deal with the sources of stress. The preliminary study results confirmed that the mother's perception of child's maladaptive behaviours plays a role in maternal stress. This can be seen from the results of interviews with mothers with NDD children which found that mothers of children with ASD admitted that their children are often tensed and hyperactive, beat others, and sometimes hurt themselves (biting their hands, for example), while the four mothers of children with ID revealed that their children have problems with grasping school lessons and the mothers have difficulty to help their children understand, and the children are also less able to meet their personal needs (such as eating, bathing). Hyperactive behaviour and inability to focus on one thing were revealed from interviews with both mothers of children with ADHD. All these preliminary findings indicate that the mothers' perception of child's maladaptive behaviours results in mothers having difficulty in caring for their children which, in turn, leading to

parenting stress. Further investigation of the relationship between the mother's perception of child's maladaptive behaviours and parenting stress as moderated by the child's type of NDD was thus justified to carry out.

The data collection began with the researcher asking permission to conduct research from the selected schools. To provide an overview of the benefits of this research, the researcher also held a two-hour parenting seminar for mothers at each of the 3 selected special schools. This seminar was also intended to provide mothers with information about parenting children with special needs in addition to their involvement as research respondents. The seminar activity began with the researcher building rapport with the mothers and explaining the aims and objectives of the research, then asking their willingness to participate in this research. All seminar participants indicated their willingness to be involved voluntarily in this study by signing an informed consent form. Furthermore, the researcher gave them two scales, namely the child maladaptive behaviour scale (Sparrow *et al.* 2005) and the parenting stress scale (Abidin 1995), and a form of mother's and child' demographic data to complete. During the process of completing the scales, the researcher accompanied the respondent to help explain items they found unclear. The scales completion process lasted approximately 30 min continued with the delivery of seminar material by the researcher (Table 1).

2.3. Measures

The study data were collected with two scales, namely the child maladaptive behaviours scale and the parenting stress scale, whereas the types of child's neurodevelopmental disorders (NDD) served as a moderating variable. Moderating variables are variables that influence the direction or strength of the relationship of variables of interest (Mash and Wolfe 2010). The variable of types of child's NDD serves as a moderating variable because it was viewed as the determinant of the magnitude of the relationship between the mother's

perception of child's maladaptive behaviour and parenting stress.

2.3.1. The Parenting Stress Scale (PSI)

Parenting stress was measured by the Parenting Stress Index (PSI) scale that consists of three subscales (Abidin 1995), namely parental distress (PD), difficult children (DC), and parent-child dysfunctional interaction (PCDI). The PD subscale is intended to measure the distress a parent feels due to personal factors related to parenting, such as lack of social support or parental depression. The PCDI subscale is intended to assess whether the parent perceives their interactions with the child as either positive (i.e. rewarding) or negative (i.e. unsatisfying). The DC subscale is intended to measure behavioural characteristics of the child that make him or her easy or difficult to manage, due to either temperament and/or noncompliant, defiant, or demanding behaviour. This scale consists of 36 items each of which has five alternative options to choose, ranging from 5 (very suitable) to 1 (very unsuitable). The total PSI-SF score is seen as an indicator of the parent's overall experience of parenting stress. The Cronbach's alpha of the Parenting Stress Index was 0.823.

2.3.2. The Maladaptive Behaviour Index-Vineland Adaptive Behaviour Scales (MBI-VABS)

The Maladaptive Behaviour Index-Vineland Adaptive Behaviour Scale (MBI-VABS, Sparrow *et al.* 2005) is a structured interview administered to a caregiver to assess the child's internalizing and externalizing domains of the maladaptive behaviour to measure the maladaptive behaviours of children with developmental disorders. A total of 21 questions with a 3-point scale, ranging from 0 (never) to 2 (usually) were used for this present study. Higher scores on this scale indicate that the subjects perceive more maladaptive behaviours in their children. Overall, the internal-consistency reliabilities of the internalizing and externalizing subscales met the requirement value of above 0.80 because their alpha coefficients ranged from 0.85 to 0.91. For the sample of this study, the reliability (Cronbach's alpha) of the Maladaptive Behaviour Index-Vineland Adaptive Behaviour Scale was 0.863.

2.4. Data analysis

The data analysis techniques used included a regression analysis to examine the effect of the mother's perception of child's maladaptive behaviours and types of child's neurodevelopmental disorders on parenting stress, a sub-group regression analysis to test the role of the moderating variable, and t-test and ANOVA for testing differences (ANOVA).

Table 2. Regression analysis of perceived internalizing and externalizing maladaptive behaviours on parenting stress.

Dimensions	Unstandardized		Standardized Beta	t	p
	B	Std.Error			
Internalizing	1,15	0,18	0,385	6,17	<0,01
Externalizing	1,11	0,23	0,293	4,70	<0,01

3. Results

3.1. The mother's perception of child's maladaptive behaviours and maternal parenting stress

Based on the theory of Sparrow *et al.* (2005), child's maladaptive behaviour consists of two behavioural dimensions, namely internalizing maladaptive behaviour and externalizing maladaptive behaviour. In this study, these two dimensions were measured separately based on the mother's perception of internalizing maladaptive behaviours and externalizing maladaptive behaviours in their children. The results showed that the dimension of mother's perception of child's internalizing maladaptive behaviours correlate positively with parenting stress ($r = 0.385, n = 163, p < 0.01$), while the dimension of mother's perception of child's externalizing maladaptive behaviour correlate positively with parenting stress ($r = 0.293, n = 163, p < 0.01$) (Table 2).

Both behavioural dimensions of maladaptive behaviours as perceived by the mothers also correlated positively with each of parenting stress aspects (see Table 3).

Based on these results, the hypothesis that the mother's perception of child's internalizing maladaptive behaviour correlates positively with parenting stress was confirmed, and so was the hypothesis that the mother's perception of child's externalizing maladaptive behaviour correlates positively with parenting stress.

3.2. Types of child's NDD and parenting stress

The three types of child's neurodevelopmental disorders, namely ASD, ADHD, and ID are the predictors of parenting stress (Table 4). There were differences in maternal parenting stress between the three types of child's NDD ($F(2,160) = 37.193, p = 0.00$). The magnitude of the adjusted R squared value of 0.466 means that 46.6% of the variability in the parenting stress can be explained by the variability of the types of child's NDD. Thus the hypothesis that the types of child's NDD affect parenting stress was confirmed.

The magnitude of differences in the parenting stress between types of child's neurodevelopmental disorders can be seen in the Tukey Post Hoc analysis output (see Table 5). The mean difference in the parenting stress between mothers of children with ID and mothers of children with ADHD was 0.9061 ($p < 0.00$), between mothers of children with ID and mothers of children

Table 3. Pearson's product-moment correlation between the mother's perception of child's maladaptive behaviour dimensions and parenting stress indicators.

Maladaptive Behaviour Dimensions	Parenting Stress Indicators		
	Parental Distress	Difficult Child	Dysfunctional Interaction
Internalizing	0,383**	0,584**	0,429**
Externalizing	0,328**	0,593**	0,387**

** $p < 0.01$.**Table 4. The ANOVA results to determine the differences between types of child's neurodevelopmental disorders in parenting stress.**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9549,426 ^a	3	3183,142	37,193	0,00
Intercept	421637,529	1	421637,529	3921,452	0,00
Types of child's NDD	9549,426	3	3183,142	37,193	0,00
Error	12458,286	159	78,354		
Total	443645,000	163			
Corrected Total	22007,471	162			

^aR Squared = 0.472 (Adjusted R Squared = 0.466).**Table 5. Post hoc analysis results.**

	Type of child disorder (I)	Type of child disorder (J)	Mean difference (I-J)	Std. Error	Sig.	95% confident interval	
						Lower Bound	Upper Bound
Tukey HSD	ADHD	ID	0,9061	1,83131	0,960	-3,8301	5,6423
		ASD	-19,6473*	1,64739	0,000	-19,5515	-11,0304
	ID	ADHD	-0,9061	1,83131	0,960	-5,6423	3,8301
		ASD	-16,1970*	1,97736	0,000	-21,3110	-11,0831
	ASD	ID	16,1970*	1,97736	0,000	11,0831	21,3110
		ADHD	19,6473*	1,94182	0,000	14,6523	24,6694

Note. ID = Intellectual Disability; ASD = Autism Spectrum Disorder; ADHD = Attention deficit/hyperactivity disorder.

with ASD was 16.1970 ($p < 0.00$); and between mothers of children with ADHD and mothers of children with ASD was 19.6473 ($p < 0.00$).

Overall, the differences in the parenting stress between types of child's neurodevelopmental disorder indicated that the mean score of parenting stress of mothers of children with ASD is higher than that of mothers of children with the other two types of NDD. This confirmed the hypothesis that mothers of children with ASD experience higher parenting stress than mothers of children with the other two types of NDD (ID and ADHD).

3.3. Types of child's neurodevelopmental disorders moderate the relationship between the mother's perception of child's maladaptive behaviours and parenting stress

The results of the analysis of the influence of child's maladaptive behaviour and types of child's neurodevelopmental disorders on parenting stress then raised a question of whether the types of child's NDD can strengthen or weaken the relationship between the mother's perception of child's maladaptive behaviour and parenting stress. To answer this, the moderating variable was tested to determine the role of each type of child's NDD in moderating the relationship between mother's perception of child's maladaptive behaviours and parenting stress. A moderating variable is a variable

that explains the additional variance in a criterion of interest beyond that of the selected predictor variable due to its nonlinear (i.e. interactive) association with the predictor variable (Shultz *et al.* 2014) (Figure 1).

The moderating variable testing was carried out by means of sub-group analysis where the sample was broken down into several sub-groups on the basis of the third variable, namely the variable that was hypothesized to be the moderator. Sub-group analysis is an analysis of the relationship between a predictor variable and a criterion variable which is carried out separately for different sub-groups to determine whether or not the moderating variable differentially influence the predictor-criterion relationship across subgroups (Shultz *et al.* 2014). The results of the regression analysis are shown in Table 6.

The moderating variable testing results shown in Table 7 were derived from the sub-groups regression analysis of the types of child's NDD that was carried out in stages, including: (1) the variable of mother's perception of child's maladaptive behaviours in mothers of children with ID that resulted in Model 1; (2) in mothers of children with ADHD that resulted in Model 2; and (3) in mothers of children with ASD that resulted in Model 3.

Table 6 shows the comparison of the coefficients of determination (R^2) of each model according to which a model with higher R^2 value is considered to have a

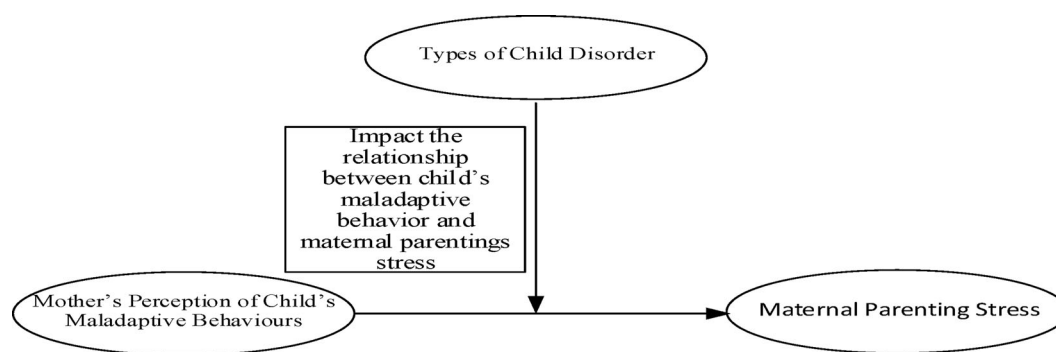


Figure 1. Types of Child's Neurodevelopmental Disorders Moderates the Relationship between Mother's Perception of Child's Maladaptive Behaviours and Maternal Parenting Stress.

Table 6. Summary of the analysis of types of child's neurodevelopmental disorder as moderating variable.

Model 1	Model 2		Model 3		
R Square	F	R Square	F	R Square	F
0,123	6,191*	0,260	33,386**	0,414	33,150**

Note.
 * = $p < 0,05$;
 ** = $p < 0,01$.

Table 7. Summary of results of sub-group analysis.

Models		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta	t	Sig.
1	(Constant)	23,128	2,095	0,510	11,040	0,000
	Maladaptive_ID	0,864	0,150			
2	(Constant)	26,507	3,007	0,351	8,816	0,000
	Maladaptive_ADHD	0,768	0,309			
3	(Constant)	41,293	3,550	0,281	11,631	0,000
	Maladaptive_ASD	0,409	0,177			

better predictive value. Judging from Tables 6 and 7, the predictive value of type of child's NDD of ADD was higher ($n = 52$, $R^2 = 0.414$, $p < 0.05$) than that of ADHD ($n = 22$, $R^2 = 0.260$, $p < 0.05$) and ID ($n = 89$, $R^2 = 0.123$, $p < 0.05$). The regression equation value between sub-groups of types of child's NDD was significant and proved that the variable of types of child's neurodevelopmental disorder did serve as a moderating variable.

3.4. Parenting stress in mothers of children with neurodevelopmental disorders

The data collected from this study showed that mothers of children with ASD experienced higher parenting stress ($n = 52$, $M = 21.45$, $SD = 10.94$) than mothers of children with the other two types of neurodevelopmental disorders (ID, $n = 89$, $M = 18.24$, $SD = 6.82$); (ADHD, $n = 22$, $M = 19.37$, $SD = 8.76$), and this difference proved to be significant ($F(2,160) = 37.193$, $p = 0.00$). Based on the level of parenting stress the mothers experienced, the hypothesis that mothers of children with ASD experience higher parenting stress than mothers of children with ID and ADHD was supported (Table 8).

As for the mother's perception of child's maladaptive behaviours, it was found that child's maladaptive behaviour was perceived higher by mothers of children with ASD ($n = 52$, $M = 19.39$, $SD = 5.15$) than that of children with ID ($n = 89$, $M = 12.12$, $SD = 5.12$) or ADHD ($n = 22$, $M = 12.49$, $SD = 6.35$).

4. Discussion

A child with a neurodevelopmental disorder which include dysfunctions in their cognitive, emotional, and social aspects, and in their limbs, is a factor that causes difficulty to the mother to accept their child's condition (Stanford *et al.* 2020). Almost all mothers expect positive things to happen to their children, but the discordance between such an expectation and the actual condition of having a child with different development plus difficulties they experience related to childcare because of maladaptive behaviours their child often display can lead to parenting stress on the part of the mother (Horsley and Oliver 2015). This present study aimed to determine the relationship between mother's perception of child's maladaptive behaviours and types of children's neurodevelopmental disorders and maternal parenting stress, and to test the role of types of child's neurodevelopmental disorders as a moderating

Table 8. Mother's perception of child's maladaptive behaviours and parenting stress in mothers of children with different types of neurodevelopmental disorders.

Types of child's neurodevelopmental disorder	n	Perceived maladaptive behaviour		Parenting stress	
		Mean	SD	Mean	SD
ID	89	12.12	5.12	18.24	6.82
ADHD	22	12.49	6.35	19.37	8.76
ASD	52	19.39	5.15	21.45	10.94

variable for the relationship between the mother's perception of child's maladaptive behaviours and parenting stress. The results of this study support the proposed hypotheses. The first hypothesis was supported when this study revealed, using the Pearson product-moment correlation analysis, that the mother's perception of both child's internalizing and externalizing maladaptive behaviours correlates positively with maternal parenting stress (Alamdarloo and Majidi 2020); Stone *et al.* (2016). The studies by Bader *et al.* (2015); Stone *et al.* (2016); and Zheng *et al.* (2019) have also confirmed that parents experience high degree of parenting stress due to their children's externalizing maladaptive behaviours. More specifically, mothers tend to experience parenting stress due to their children's internalizing maladaptive behaviours (Rodriguez 2011).

The second hypothesis stated that there is an effect of types of child's neurodevelopmental disorders (NDD) on maternal parenting stress and that the types of child's NDD moderate the relationship between the mother's perception of child's maladaptive behaviours and parenting stress. Types of NDD describe the child's characteristic conditions, including the severity of the disability, the severity or frequency of challenging behaviours exhibited by children with NDD, and the presence of other comorbid disorders. This means that the more severe the child's NDD, the lower the mother's perception of the child's adaptive behaviours and the higher the mother's perception of the child's maladaptive behaviours. Previous studies found that the severity of disability relates to the emerging maladaptive behaviours in children with NDD (Lee *et al.* 2020). Other research found that child's characteristics and symptom severity are strongly associated with the experience of parenting stress in mothers of children with ASD (Brobst *et al.* 2009, Ekas and Whitman 2010, Estes *et al.* 2009), mothers of children with ADHD (Leitch *et al.* 2019), and mothers of children with ID (Biswas *et al.* 2015).

The importance of factors that influence parenting stress in parents of children with NDD is reflected in the items of PSI-SF scores, and Zaidman-Zait *et al.* (2010), for example, used item-response theory to examine the discriminability of PSI-SF items in a sample of parents of young children with ASD who experience varying levels of parental stress. In this present study, this is supported by the results of the analysis of the mean differences of each PSI-SF subscale scores

which indicated that mothers of children with ASD experience higher levels of parenting stress. In the Parental Distress Subscale, the items that indicate the mother is experiencing a stressful condition with a high score are item 2 ("Gave up my life for children's needs"); item 4 ("Unable to do new and different things"); and item 8 ("Having a child caused problems with my spouse"). The Difficult Child Subscale reveals how mothers experience stress caused by children's behaviour. High scores on this subscale were found in statements such as: "Child cries or fusses more often than other children" (item 25); "Child does things that bother me a great deal" (item 28); "Child's sleeping or eating schedule hard to establish" (item 31). The more negative the mother perceives the child's maladaptive behaviour, the more stressed the mother becomes. Next, the Parent-Child Dysfunctional Interaction Subscale assesses whether the mother perceives her interaction with the child is positive (i.e. reinforcing) or negative (i.e. unsatisfying). This study found that mothers perceived their interactions with their children to be negative, as revealed by item 15 (Child smiles at me less than expected); item 18 (Child doesn't learn as quickly as other children); and item 20 (Child isn't able to do as much as expected).

The importance of the influence of the types of child's neurodevelopmental disorders in causing parenting stress is demonstrated in this present study through the multiple regression analysis carried out to examine the effect of the mother's perception of child's maladaptive behaviours and types of child's NDD on parenting stress. Through sub-group regression analysis, this study also shows that the types of child's NDD can moderate the relationship between the mother's perception of child's maladaptive behaviours and maternal parenting stress or, in other words, the level of maternal parenting stress is influenced by the types of child's NDD. The types of child's NDD correlate with the severity of the symptoms they experience. This means that the more severe the child's symptoms, the more severe the child's maladaptive behaviour, and vice versa. The results of previous research showed that autism symptom severity was positively and significantly correlated with inattention/impulsivity, indicating that children with more severe symptoms of ASD tended to have higher scores on the measure of inattention/impulsivity (Tureck *et al.* 2015). It means that an ASD child who displays maladaptive behaviours more often than

adaptive behaviours would be more likely to give rise of negative perception on the part of parents which in turn make them more susceptible to parenting stress. In this present study, the severity of child's symptoms was indicated by the higher parenting stress experienced by mothers of children with ASD children compared to mothers of children with other types of NDD (ID and ADHD).

This also supports the third hypothesis that mothers of children with ASD experience higher parenting stress than mothers of children with other neurodevelopmental disorders (ID and ADHD). The results of this present study are in line with that of a meta-analytic study conducted by Hayes and Watson (2013) in showing that children with ASD children experience higher parenting stress than parents of with other developmental disorders as well as parents of children with normal development. This meta-analytic study did not only found and report differences in parental stress but also sought to reveal the cause of the difference and found that the dominating causing factor of stress is the child's characteristics. Autism spectrum disorders (ASDs) are characterized by deficits in social interaction and communication, and the presence of restricted and repetitive behaviours (American Psychiatric Association 2013). While the prevalence of ASDs is growing rapidly, affecting approximately 1 in 59 American children according to the United States Centre for Disease Control (CDC 2018), the prevalence of children with autism in Indonesia in 2013 was 1 in 50 children (Autism Service Centre Development in Indonesia 2014). Tureck *et al.* (2015) explained that ASD is a developmental disorder that is classified as severe because children experience obstacles in almost all aspects of their development, therefore mothers of children with ASD are more susceptible to stress due to the severity of developmental disorders their children suffer, and self-harm behaviour, hyperactivity, and low adaptive behaviour they display (Golya and McIntyre 2018). Children with ASD present with sensory processing disorders (SPDs) that impact daily functioning (Alkhalifah 2019). Besides, children with ASD also have comorbid disorders (Simonoff *et al.* 2008) so that their neurodevelopmental disorder is more severe and they display more maladaptive behaviours.

The findings of this study further emphasize that parenting stress is influenced by the types of child's neurodevelopmental disorder that has to do with the severity of the neurodevelopmental disorders' symptoms which has an impact on the increase of child's maladaptive behaviours (Lee *et al.* 2020). This is also confirmed by several other studies that have proven that the problematic behaviours in children with ASD (Harrop *et al.* 2016, Zaidman-Zait *et al.* 2014), the low adaptive ability of children with ADHD (Peasgood *et al.* 2020), and the increased maladaptive behaviour

of children with ID (Giltaij *et al.* 2015) has an impact on maternal parenting stress. Low independence and increased maladaptive behaviours in children with neurodevelopmental disorders are conditions that mothers see and deal with in their daily life. Such a difficult condition will likely reduce the psychological well-being of the mother, especially when the mother has a dual role of being wife to her husband and being mother who has to take care of a child (or children) with developmental disabilities and their siblings.

5. Conclusions, implications, and limitations

The findings of this study indicate that the mother's perception of child's maladaptive behaviours and types of child's neurodevelopmental disorders influence the emerging maternal parenting stress, and that maternal parenting stress is influenced by the types of child's NDD disorder in that mothers of children with ASD experience higher parenting stress than mothers of children with other types of NDD. Children with ASD experience complex developmental disorders, one of the causes is abnormalities in the structure and biochemistry of the brain and impaired sensory integration. The complexity of developmental disorders experienced by children with ASD causes them to be unable to display adaptive behaviour and instead display maladaptive behaviours, such as tantrums, hyperactivity, self-harm behaviour, and lack of independency.

The implication of this research is to provide new information that types of NDD prove to be able to serve as a moderating variable for the relationship between the mother's perception of child's NDD and maternal parenting stress and that the severity of NDD symptoms have an effect on the severity of child's maladaptive behaviours. The complexity of problem the mother has to face leads to her susceptibility to experiencing stress, but she has to go with it and respond it positively so that the stress does not bring negative impact (distress) and become pathological. Thus, it is necessary to conduct training to increase mothers' psychological well-being, mindfulness (Chan and Neece 2018), and gratitude (Timmons 2015) and thus empower them (Bradshaw *et al.* 2018). Education institutions and professionals (physicians, psychologists) who are involved in the development of children with NDD are expected to provide parenting support and intervention that can be delivered either with individual or group approach to increase knowledge and skills of mothers who raise children with NDD. The importance and benefits of parenting support have been investigated by Schultz *et al.* (2011); Sankey *et al.* (2019) that parenting support intervention delivered with parent support group and psycho-education methods contributes to minimizing parenting stress.

Although this study is able to contribute by providing new information regarding the factors that influence

parenting stress experienced by mothers of children with NDD in Indonesia, it still has several limitations. First, this study was only conducted on mothers who had children with NDD, so the generalizability of its finding is limited and it cannot be generalized to fathers who also play an important role in the development of children with NDD. Therefore, based on the results of this study, future research is suggested to examine the relationship between variables from the fathers' perspective. Second, this research was conducted in only one city in Indonesia, the City of Medan in North Sumatra Province, and thus did not cover subjects in other provinces in other islands in Indonesia. Further research is expected to provide a more comprehensive picture of maternal parenting of mothers of children with NDD in various regions in Indonesia.

Suggestions that can be given based on the findings of this study is that, given the importance of studying the influence of child's maladaptive behaviour on parenting stress, further research should not only conduct survey research but also provide training to parents on how to reduce parenting stress due to maladaptive behaviours in children with NDD, for example by utilizing the role of parent-child interaction therapy (Hansen and Shillingsburg 2016), music therapy (Salomon-Gimmon and Elefant 2019), joint attention and play intervention (Fahy *et al.* 2020, Mora *et al.* 2018), and dance movement therapy to improve child's communication (Sengupta and Banerjee 2020).

Acknowledgements

I wish to thank: 1) the research participants (mothers of children with neurodevelopmental disorders) and their families for their contribution to this research; 2) the selected special schools in Medan, Indonesia, for their cooperation.

Consent for publication

Each participant gave written informed consent.

Declaration of conflicting interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publications of this article.

Funding

The author received no external funding for this research.

References

- Abidin, R. R. 1992. The determinants of parenting behavior. *Journal of Clinical Child Psychology*, 21, 407–412.
- Abidin, R.R. 1995. *Parenting stress index: Professional manual*. 3rd ed. Odessa FL: Psychological Assessment Resources.

- Alamdarloo, G. H. and Majidi, F. 2020. Feelings of hopelessness in mothers of children with neurodevelopmental disorders. *International Journal of Developmental Disabilities*, 1–10.
- Alkhalifah, S. 2019. Psychometric properties of the sensory processing measure preschool-home among Saudi children with autism spectrum disorder: Pilot study. *Journal of Occupational Therapy, Schools, & Early Intervention*, 12, 401–416.
- American Psychiatric Association. 2013. *Diagnostic and statistical manual of mental disorders, 5th edition. (DSM-5 TM)*. Washington, DC: American Psychiatric Association.
- Autism Service Centre Development in Indonesia. 2014. *Pembangunan pusat layanan autis di Indonesia [Autism service centre development in Indonesia]*. Direktorat Pembinaan Pendidikan Khusus dan Layanan Khusus Pendidikan Dasar. Direktorat Jenderal Pendidikan Dasar. Kementerian Pendidikan dan Kebudayaan [Directorate of Special Education and Special Service Development at Primary Education Level, Directorate General of Primary Education, Ministry of Education and Culture].
- Bader, S. H., Barry, T. D. and Hann, J. A. H. 2015. The relation between parental expressed emotion and externalizing behaviors in children and adolescents with an autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, 30, 23–34.
- Bertelli, M. O., Munir, K., Harris, J. and Salvador-Carulla, L. 2016. "Intellectual developmental disorders": Reflections on the international consensus document for redefining "mental retardation-intellectual disability" in ICD-11. *Advances in Mental Health and Intellectual Disabilities*, 10, 36–58.
- Biswas, S., Moghaddam, N. and Tickle, A. 2015. What are the factors that influence parental stress when caring for a child with an intellectual disability? A critical literature review. *International Journal of Developmental Disabilities*, 61, 127–146.
- Bradshaw, J., Bearss, K., McCracken, C., Smith, T., Johnson, C., Lecavalier, L., Swiezy, N. and Scahill, L. 2018. Parent education for young children with autism and disruptive behavior: Response to active control treatment. *Journal of Clinical Child and Adolescent Psychology*, 47, S445.
- Brammer, W. A., Galán, C. A., Mesri, B. and Lee, S. S. 2018. Parental ADHD and depression: Time-varying prediction of offspring externalizing psychopathology. *Journal of Clinical Child and Adolescent Psychology*, 47, S137–S149.
- Brobst, J. B., Clopton, J. R. and Hendrick, S. S. 2009. Parenting children with autism spectrum disorders: The couple's relationship. *Focus on Autism and Other Developmental Disabilities*, 24, 38–49.
- Centre for Disease Control and Prevention (CDC). 2018. Prevalence of autism spectrum disorder among children aged 8 years: Autism and developmental disabilities monitoring network, 11 sites, United States, 2014. *Morbidity and Mortality Weekly Report*, 67, 1–23. <https://www.cdc.gov/media/releases/2018/p0426-autism-prevalence.html>.
- Chan, N. and Neece, C. L. 2018. Mindfulness-based stress reduction for parents of children with developmental delays: A follow-up study. *Evidence-Based Practice in Child and Adolescent Mental Health*, 3, 16–29.
- Climie, E. A. and Henley, L. 2018. Canadian parents and children's knowledge of ADHD. *Vulnerable Children and Youth Studies*, 13, 266–275.
- Climie, E. A. and Mitchell, K. 2017. Parent-child relationship and behavior problems in children with ADHD. *International Journal of Developmental Disabilities*, 63, 27–35.
- Davis, A. L. and Neece, C. L. 2017. An examination of specific child behavior problems as predictors of parenting stress among families of children with pervasive developmental disorders. *Journal of Mental Health Research in Intellectual Disabilities*, 10, 163–177.
- Deater-Deckard, K. 2004. *Parenting stress*. New Haven and London: Yale University Press.
- Depape, A. and Lindsay, S. 2015. Parents' experiences of caring for a child with autism spectrum disorder. *Qualitative Health Research*, 25, 569–583.
- Ekas, N. and Whitman, T. L. 2010. Autism symptom topography and maternal socioemotional functioning. *American Journal on Intellectual and Developmental Disabilities*, 115, 234–249.
- Estes, A., Munson, J., Dawson, G., Koehler, E., Zhou, X. and Abbott, R. 2009. Parenting stress and psychological functioning among mothers of preschool children with autism and developmental delay. *Autism*, 13, 375–387.

- Fahy, S., Delicâte, N. and Lynch, H. 2020. Now, being, occupational: Outdoor play and children with autism. *Journal of Occupational Science*, 1–19.
- Giltaij, H. P., Sterkenburg, P. S. and Schuengel, C. 2015. Psychiatric diagnostic screening of social maladaptive behaviour in children with mild intellectual disability: Differentiating disordered attachment and pervasive developmental disorder behaviour. *Journal of Intellectual Disability Research*, 59, 138–149.
- Golya, N. and McIntyre, L. L. 2018. Variability in adaptive behaviour in young children with autism spectrum disorder. *Journal of Intellectual & Developmental Disability*, 43, 102–111.
- Hansen, B. and Shillingsburg, M. A. 2016. Using a modified parent-child interaction therapy to increase vocalizations in children with autism. *Child & Family Behavior Therapy*, 38, 318–330.
- Harrop, C., McBee, M. and Boyd, B. A. 2016. How are child restricted and repetitive behaviors associated with caregiver stress over time? A parallel process multilevel growth model. *Journal of Autism and Developmental Disorders*, 46, 1773–1783.
- 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.
- Horsley, S. and Oliver, C. 2015. Positive impact and its relationship to well-being in parents of children with intellectual disability: A literature review. *International Journal of Developmental Disabilities*, 61, 1–19.
- Johnson, J. 2019. Family therapy. In: R. Rieske, ed. *Handbook of interdisciplinary treatments for autism spectrum disorder. Autism and child psychopathology series*. Switzerland: Springer, pp.423–444.
- Kalaivnai, P. and Kalimo, K. M. 2018. A Study on psychological problems faced by the parents of autism children. *Arts and Social Sciences Journal*, 09, 1–5.
- Kısa, S., Zeyneloğlu, S. and Sergek Verim, E. 2019. The level of hopelessness and psychological distress among abused women in a Women's Shelter in Turkey. *Archives of Psychiatric Nursing*, 33, 30–36.
- Korpa, T., Pervanidou, P., Angeli, E., Apostolakou, F., Papanikolaou, K., Papassotiropoulos, I., Chrousos, G. P. and Kolaitis, G. 2017. Mothers' parenting stress is associated with salivary cortisol profiles in children with attention deficit hyperactivity disorder. *Stress*, 20, 149–158.
- Lee, J. K. and Chiang, H. M. 2017. Parenting stress in South Korean mothers of adolescent children with autism spectrum disorder. *International Journal of Developmental Disabilities*, 64, 120–127.
- Lee, K. S., Choi, Y. J., Lim, Y. H., Lee, J. Y., Shin, M. K., Kim, B. N., Shin, C. H., Lee, Y. A., Kim, J. I., Hong, Y. C. 2020. Dietary patterns are associated with attention-deficit hyperactivity disorder (ADHD) symptoms among preschoolers in South Korea: A prospective cohort study. *Nutritional Neuroscience*, 1–9.
- Lee, V., Duku, E., Zwaigenbaum, L., Bennett, T., Szatmari, P., Elsabbagh, M., Kerns, C., Miranda, P., Smith, I. M., Ungar, W. J., Vaillancourt, T., Volden, J., Waddell, C., Zaidman-Zait, A., Thompson, A. and Georgiades, S. 2020. Temperament influences the relationship between symptom severity and adaptive functioning in children with autism spectrum disorder. *Autism*, 24, 2057–2070.
- Leitch, S., Sciberras, E., Post, B., Gerner, B., Rinehart, N., Nicholson, J. M. and Evans, S. 2019. Experience of stress in parents of children with ADHD: A qualitative study. *International Journal of Qualitative Studies on Health and Well-Being*, 14, 1690091.
- Mash, E. J. and Wolfe, D. A. 2010. *Abnormal child psychology*. 4th ed. USA: Wadsworth.
- McCall, B. P. and Starr, E. M. 2018. Effects of autism spectrum disorder on parental employment in the United States: Evidence from the National Health Interview Survey. *Community, Work & Family*, 21, 367–392.
- Mora, L., van Sebille, K. and Neill, L. 2018. An evaluation of play therapy for children and young people with intellectual disabilities. *Research and Practice in Intellectual and Developmental Disabilities*, 5, 178–191.
- Nankervis, K., Ashman, A., Weekes, A. and Carroll, M. 2020. Interactions of residents who have intellectual disability and challenging behaviours. *International Journal of Disability, Development and Education*, 67, 58–72.
- Neece, C. L., Green, S. A. and Baker, B. L. 2012. Parenting stress and child behavior problems: A transactional relationship across time. *American Journal on Intellectual and Developmental Disabilities*, 117, 48–66.
- Nieto, C., Lopez, B. and Gandia, H. 2017. Relationships between atypical sensory processing patterns, maladaptive behaviour and maternal stress in Spanish children with autism spectrum disorder. *Journal of Intellectual Disability Research*, 61, 1140–1150.
- Oubrahim, L. and Combalbert, N. 2019. Frequency and origin (reactive/proactive) of aggressive behavior in young people with intellectual disability and autism spectrum disorder. *International Journal of Developmental Disabilities*, 1–8.
- Patriquin, M., MacKenzie, D. and Versnel, J. 2020. Occupational therapy interventions for restricted and repetitive behaviors in children with autism spectrum disorder. *Occupational Therapy in Mental Health*, 36, 85–104.
- Peasgood, T., Bhardwaj, A., Brazier, J. E., Biggs, K., Coghill, D., Daley, D., Cooper, C. L., De Silva, C., Harpin, V., Hodgkins, P., Nadkarni, A., Setyawan, J., and Sonuga-Barke, E. J. S. 2020. What is the health and well-being burden for parents living with a child with ADHD in the United Kingdom? *Journal of Attention Disorders*, 1–15. doi:10.1177/1087054720925899
- Pepperell, T. A., Paynter, J. and Gilmore, L. 2018. Social support and coping strategies of parents raising a child with autism spectrum disorder. *Early Child Development and Care*, 188, 1392–1404.
- Rodriguez, C. M. 2011. Association between independent reports of maternal parenting stress and children's internalizing symptomatology. *Journal of Child and Family Studies*, 20, 631–639.
- Rogge, N. and Janssen, J. 2019. The economic costs of autism spectrum disorder: A literature review. *Journal of Autism and Developmental Disorders*, 49, 2873–2900.
- Romney, J., Austin, K., Fife, S. T., Sander, D. and Snyder, H. 2020. Stress experienced and meaning-making of couples with children with autism spectrum disorder: A phenomenological study. *The American Journal of Family Therapy*, 49, 37–56.
- Salomon-Gimmon, M. and Elefant, C. 2019. Development of vocal communication in children with autism spectrum disorder during improvisational music therapy. *Nordic Journal of Music Therapy*, 28, 174–192.
- Samadi, S., McConkey, R. and Bunting, B. 2014. Parental wellbeing of Iranian families with children who have developmental disabilities. *Research in Developmental Disabilities*, 35, 1639–1647.
- Sankey, C., Girard, S. and Cappe, E. 2019. Evaluation of the social validity and implementation process of a psychoeducational program for parents of a child with autism spectrum disorder. *International Journal of Developmental Disabilities*, 1–11.
- Schultz, T. R., Schmidt, C. T. and Stichter, J. P. 2011. A review of parent education programs for parents of children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 26, 96–104.
- Sengupta, M. and Banerjee, M. 2020. Effect of dance movement therapy on improving communication and body attitude of the persons with autism, an experimental approach. *Body, Movement and Dance in Psychotherapy*, 15, 267–279.
- Shultz, K. S., Whitney, D. J. and Zickar, M. J. 2014. *Measurement theory in action. Case studies and exercises*. 2nd ed. New York: Routledge Publisher.
- Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T. and Baird, G. 2008. Psychiatric disorders in children with autism spectrum disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 921–929.
- Sparrow, S. S., Cicchetti, D. V. and Balla, D. A. 2005. *Vineland adaptive behavior scales*. 2nd ed. Woodland Road, Circle Pines, MN: American Guidance Service.
- Stanford, C. E., Hastings, R. P., Riby, D. M., Archer, H. J., Page, S. E. and Cebula, K. 2020. Psychological distress and positive gain in mothers of children with autism, with or without other children with neurodevelopmental disorders. *International Journal of Developmental Disabilities*, 1–6.
- Stone, L. L., Mares, S. H., Otten, R., Engels, R. C. and Janssens, J. M. 2016. The co-development of parenting stress and childhood internalizing and externalizing problems. *Journal of Psychopathology and Behavioral Assessment*, 38, 76–86. <https://doi.org/10.1007/s10862-015-9500-3>
- Sun, X. 2020. Behavior skills training for family caregivers of people with intellectual or developmental disabilities: A systematic review of literature. *International Journal of Developmental Disabilities*, 1–27.

- Timmons, L. 2015. *The effectiveness of a gratitude intervention at improving well-being for parents of children with autism spectrum disorder*. Fort Worth, TX: Christian University.
- Tureck, K., Matson, J. L., Cervantes, P. and Turygin, N. 2015. Autism severity as a predictor of inattention and impulsivity in toddlers. *Developmental Neurorehabilitation*, 18, 285–289.
- Van der Meulen, A. P. S., Taminiau, E. F., Hertogh, C. C. M. P. and Embregts, P. P. J. C. M. 2018. How do people with moderate intellectual disability evaluate restrictions in daily care? *International Journal of Developmental Disabilities*, 64, 158–165.
- Zaidman-Zait, A., Mirenda, P., Duku, E., Szatmari, P., Georgiades, S., Volden, J., Zwaigenbaum, L., Vaillancourt, T., Bryson, S., Smith, I., Fombonne, E., Roberts, W., Waddell, C., Thompson, A. and Pathways in ASD Study Team. 2014. Examination of bidirectional relationships between parent stress and two types of problem behavior in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 44, 1908–1917.
- 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., Elsabaggh, M. and Thompson, A. 2017. Impact of personal and social resources on parenting stress in mothers of children with autism spectrum disorder. *Autism : The International Journal of Research and Practice*, 21, 155–166.
- Zaidman-Zait, A., Mirenda, P., Zumbo, B. D., Wellington, S., Dua, V. and Kalynchuk, K. 2010. An item response theory analysis of the Parenting Stress Index-Short Form with parents of children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 51, 1269–1277.
- Zheng, L., Grove, R. and Eapen, V. 2019. Predictors of maternal stress in pre-school and school-aged children with autism. *Journal of Intellectual & Developmental Disability*, 44, 202–211.