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The association between parenting behaviours of mothers of adolescents with autism spectrum disorder and adolescent and mother characteristics

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ABSTRACT

Background: Studies on parenting behaviours among parents of adolescents with ASD either used parenting behaviours that were supported in the general population, or specific ASD related parenting behaviours. This study aimed to identify which parenting components underlie parenting behaviours among parents of adolescents with ASD, and how these components relate to adolescent and mother characteristics.

Method: 35 children with ASD and 38 children without ASD (aged 12–16 years old) participated with their mother in this cross-sectional study. Parenting behaviour was measured based on observations. Principal components analyses (PCA) were carried out to construct parenting components. Pearson correlations were calculated for the ASD and General Population Control (GPC) group separately to investigate the relationship between the parenting components and adolescent and mother characteristics.

Results: In both groups, PCAs on observed parenting behaviours yielded the components Parental Support and Behavioural Control. However, in the ASD group, Negativity was generated as a third cluster. Results indicated that only verbal IQ was significantly correlated with parenting behaviour components.

Conclusions: This study suggests that the framework of parenting behaviours in the general literature is applicable to parents of children with ASD. Furthermore, associations between parenting behaviours and adolescent characteristics were rather modest in the ASD group.

1. Introduction

Parents of children and adolescents with autism spectrum disorder (ASD) face specific challenges in parenting. Firstly, problems associated with ASD, such as communication difficulties and repetitive behaviours can be stressful for parents (Bitsika & Sharpley, 2017; Lyons, Leon, Phelps, & Dunleavy, 2010). Moreover, children with ASD are more likely to exhibit additional internalising and externalising behaviour problems (Brereton, Tonge, & Einfeld, 2006; Hartley, Sikora, & McCoy, 2008; Kanne & Mazurek, 2011). Despite the challenges, studies on the concrete parenting behaviours of these parents are rather limited. These studies either started

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from the same parenting behaviours and dimensions that were supported in the general population, or specific ASD related parenting dimensions that were derived from empirical research in families with a child with ASD. However, to our knowledge, only one study has investigated whether the general population dimensions also hold in families with a child with ASD, and how the ASD adapted parenting behaviours are related to the general parenting behaviours (van Esch, O'Nions, et al., 2018). With the current study we want to empirically identify which parenting components underlie parenting behaviours among parents of adolescents (aged 12–16 years) with ASD.

1.1. Parenting behaviours

In parenting research within the general population, parenting behaviours have been grouped together into parenting dimensions: parental support, behavioural control and autonomy support (Barber, 1997; Steinberg, Elmen, & Mounts, 1989). Parental support refers to parenting behaviours that parents express to show warmth, acceptance and support. Some authors argued that this parenting dimension represents a continuum with acceptance, affection and support on the one end and rejection, hostile and neglecting behaviours on the other (Rohner, 2016). Behavioural control refers to parenting behaviours that aim to regulate the child's behaviour, such as rule setting, rewarding and punishing. Lastly, autonomy support includes parenting behaviours that encourage the child's volitional functioning, e.g. by allowing choices (Joussemet, Landry, Koestner, 2013).

Considering parenting behaviours adapted to children with ASD, two dimensions were suggested by Lambrechts et al. (2015); stimulating the development and adapting the environment. Stimulating the development includes parenting behaviours that encourage the child to gain skills, e.g. explaining that persons can have a different opinion. Adapting the environment refers to parenting behaviours that parents apply to meet the child's needs, e.g. structuring the environment. Van Esch, O'Nions, et al. (2018) conducted semi-structured interviews with parents of adolescents with ASD. Reported parenting behaviours could be arranged into the general parenting dimensions parental warmth, behavioural control and autonomy support. However, ASD adapted parenting dimensions (Lambrechts et al., 2015) could not be differentiated from the general dimensions given the substantive agreements between the parenting behaviours. Therefore, an integrated framework was developed in which stimulating the environment was merged with autonomy support, and behaviours of adapting the environment were integrated within the different general dimensions. Parents reported adapting their behaviours at many levels, although these behaviours per se were not ASD specific.

1.2. Associations between parenting behaviours and child characteristics

Several characteristics of the child are known to be related to parenting behaviours. In particular behaviour problems have been repeatedly investigated. Studies on typically developing children have shown parental support was associated with lower levels of internalising and externalising behaviour problems (Atzaba-Poria, Pike, & Deater-Deckard, 2004; Swenson & Prelow, 2005). A longitudinal study by Serbin, Kingdon, Ruttle, and Stack (2015) found a reciprocal effect; internalising problems of the child was associated with more parental support and structure, which in turn decreased the level of internalising problems. Proactive behavioural control was associated with less externalising problems (Caron, Weiss, Harris, & Catron, 2006; Galambos, Barker, & Almeida, 2003), whereas harsh punitive control (Bender, Bauminger, & Solomon, 2013; Gershoff & Grogan-Kaylor, 2016; Lansford et al., 2011) was associated with more internalising and externalizing behaviour problems.

In line with studies in the general population, studies investigating the relation between parenting behaviours and behaviour problems in families with ASD concluded that proactive behaviour control (i.e. limit setting) was related to less behaviour problems (Osborne, McHugh, Saunders, & Reed, 2008) and reactive control (i.e. discipline and harsh punishment) was related to more internalising (Dieleman, De Pauw, Soenens, Beyers, & Prinzie, 2017) and externalising behaviour problems (Dieleman et al., 2017; Maljaars, Boonen, Lambrechts, Van Leeuwen, & Noens, 2014). However, higher levels of parental support and proactive control did not seem to be associated with lower levels of externalising problem behaviour in the ASD group; some findings even suggest the reverse. More rules (Maljaars et al., 2014) and more positive parenting (i.e. parental support and rules; Dieleman et al., 2017) were related to more externalising problems. In addition, Maljaars et al. (2014) found that internalising behaviour problems were only related to the ASD related parenting behaviours (i.e. adapting the environment and stimulating the development). Thus, only a few studies investigated the association between parenting behaviours and behaviour problems in families with a child with ASD. These first studies suggest that the associations differ from those commonly found in the general population.

1.3. Associations between parenting behaviours and mother characteristics

Furthermore, individual parent characteristics can play a role in parenting behaviours of parents with children with ASD. For example, a negative association was found between parenting stress and self-reported behaviour control (i.e. limit-setting) and support (i.e. communication and involvement; Osborne & Reed, 2010). Additionally, parenting stress was found to be positively related to self-reported material rewarding, harsh punishment and observed negativity in children aged 6–12 years old (Boonen et al., 2015).

1.4. Associations between mother and child characteristics

Studies have shown that characteristics of children and parents also mutually affect each other. Previous studies have found that parental stress and depression were associated with child characteristics, such as children's behaviour problems (Barker et al., 2011;

Bauminger, Solomon, & Rogers, 2010; Peters-Scheffer, Didden, & Korzilius, 2012) and ASD characteristics (Bitsika & Sharpley, 2017; Ekas, Lickenbrock, & Whitman, 2010; Lyons et al., 2010). Furthermore, research indicates that the severity of the child's ASD is associated with behaviour problems of the child (Dominick, Davis, Lainhart, Tager-Flusberg, & Folstein, 2007; Hartley et al., 2008; Kanne & Mazurek, 2011). Therefore, ASD characteristics of the child could be related to parenting behaviours, although this has not been directly investigated in previous studies.

Thus, the literature on parenting behaviours among parents of a child with ASD is limited. Little is known on how these behaviours can be grouped together into parenting dimensions. Furthermore, the rather limited findings on the associations with child and mother characteristics are inconsistent. The first aim of this study is to empirically identify which parenting components are underlying the parenting behaviours among parents of adolescents with ASD. The second aim is to examine whether the same components emerge in a control group with parents of adolescents without ASD, using the same methods. Thirdly, we investigate whether the constructed parenting components are related to IQ, ASD characteristics and behaviour problems of the child, or parenting stress and mental health problems of the mother, both in the ASD group and in the control group. Lastly, since parenting stress seems to be related to both child characteristics and parenting behaviours, we repeat all analyses while controlling for parenting stress because parenting stress could be driving the association between child/parent characteristics and parenting behaviours.

2. Method

2.1. Participants

The present study built upon the study of van Esch, Vanmarcke, et al. (2018) in which parenting behaviours were compared between the ASD and the general population control group (GPC). All adolescents were between 12 and 16 years old. Adolescents with ASD and their mother were recruited through the Autism Expertise Centre of the university hospital and from previous studies in our research group (Boonen et al., 2015; van Esch, O'Nions et al., 2018). Adolescents in the GPC group were recruited via regular secondary schools. A total number of 76 mother-child dyads participated in this study, of which 38 dyads (80% male children) were included in the ASD group, all diagnosed based on the DSM-IV-TR criteria, and 38 (76.3% male children) in the general population control group (GPC). In the ASD group three mothers did not fill out all questionnaires, therefore these mother-child dyads were excluded from this study. Estimated total IQ scores ranged from 78 to 125.5 in the GPC group and 80 to 123 in the ASD group. In the ASD group 14 participants had a co-occurring condition (e.g. dyslexia, dyscalculia, AD(H)D or DCD), in the GPC group 4 participants had a co-occuring condition.

In the ASD group, additional tests were carried out to confirm the diagnosis. Firstly, the Autism Diagnostic Observation Schedule, second edition module 3 (ADOS-2; De Bildt, Greaves-Lord, & De Jonge, 2013; Lord et al., 2012) was administered. Of the 61 children in this group, 54 had a total score equal to or greater than the autism spectrum cut-off of 7. Secondly, the Diagnostic Interview for Social and Communication Disorder (DISCO; Van Berckelaer-Onnes, Noens, & Dijkxhoorn, 2008; Wing, 2006) was conducted with the mothers. Based on this interview, 57 children received a score above the ASD classification threshold, applying the ICD-10 algorithm. All children obtained a score above the classification threshold on ADOS or DISCO, therefore no children were excluded from the study.

Children in the ASD group demonstrated significantly more ASD characteristics than children in the GPC group, as assessed by the Social Responsiveness Scale filled out by their mother (SRS; Constantino et al., 2003; Roeyers, Thys, Druart, De Schryver, &

Table 1
Characteristics of the ASD and control group.

	ASD (n = 35) M (SD)	GPC (n = 38) M (SD)	
Child characteristics			**test statistic**
Age (years)	13.9 (1.0)	13.7 (1.0)	$t_{(71)} = 0.92$
VIQ	101.7 (11.7)	107.3 (11.0)	$t_{(71)} = -2.08^{*}$
PIQ	99.3 (13.9)	98.1 (13.8)	$t_{(71)} = 0.37$
TIQ	100.5 (10.2)	102.7 (10.8)	$t_{(71)} = -0.89$
SRS total score	77.1 (21.8)	23.3 (16.0)	$t_{(62.1)} = 11.91^{**}$
Internalising behaviour problems	14.1 (8.8)	4.76 (5.2)	$t_{(54.5)} = 5.4^{**}$
Externalising behaviour problems	14.6 (10.9)	3.13 (3.2)	$t_{(39.5)} = 6.0^{**}$
Maternal characteristics			**test statistic**
Age (years)	45.0 (4.4)	44.3 (4.2)	$t_{(71)} = 0.65$
Parenting stress	29.6 (12.1)	17.82 (6.3)	$t_{(50.2)} = 5.1^{**}$
Mental health problems	24.3 (5.2)	21.37 (3.2)	$t_{(55.1)} = 2.9^{**}$
Family composition	%	%	**test statistic**
Nuclear family	74.3	78.9	$\chi^2_{(2)} = 0.71$
Reconstituted family	17.1	10.5	
Single-parent family	8.6	10.5	

VIQ: verbal IQ, PIQ: performance IQ, TIQ: total IQ.
* $p < 0.05$.
** $p < 0.01$.

Schittekate, 2011). Moreover, the ASD and GPC group differed significantly on internalising and externalising behaviour problems (Table 1), measured by the Child Behavior Checklist (CBCL: Achenbach & Rescorla, 2001; Verhulst, van der Ende, & Koot, 1996). In addition, the GPC group obtained higher scores on verbal IQ, as measured by the abbreviated version (Sattler, 2001) of the Wechsler Intelligence Scale for Children-III (WISC-III-NL; Kort et al., 2005), but equal scores on performance and total IQ (Table 1).

Mothers of children with ASD reported significantly more parenting stress, indicated by a higher score on the parent domain of the Nijmegen Parental Stress Index, short version (NOSIK; de Brock, Vermulst, Gerris, & Abidin, 1992). Furthermore, mothers of adolescents with ASD reported significantly more mental health problems than mothers in the GPC group, based on the sum score on the General Health Questionnaire (GHQ-12; Golderberg & Williams, 1988; Koeter & Ormel, 1991).

2.2. Materials & design

2.2.1. Parenting behaviour

Parenting behaviour was measured during video recorded mother-child interactions. Four tasks were administered to the mother-child dyads. After giving the instructions, we checked whether the participants understood everything clearly, so they could carry out the task without interruptions. They were asked to perform each task for ten minutes and they were informed that they would get a warning when the time was almost over. In the first task, mother and adolescent had to co-operate to guide a marble through a maze. For the second task, they were told to watch a fragment of a soap series together and answer questions on emotion recognition and social insight (e.g. what could Tom do to make him feel better). The third task was a discussion task, in which they had to resolve a recent discussion. Lastly, they were asked to build a 'vehicle of the future' with K'Nex (construction toy). The first, middle and last minute of the four tasks were coded, resulting in twelve coded minutes per participant. This methodology has the advantage above a macro coding that it can take variations across the task into account. We selected these minutes because different parenting strategies are being observed during the start, ongoing and end of the task. However, in the ASD group, observations of ten participants were coded for less than twelve minutes, because they spent less than 3 min on one (n = 7) or two tasks (n = 1) or because they did not complete one task (n = 2). The duration of the fragments ranged from two to twenty minutes. Durations of the interactions varied much because researchers tried to intervene as little as possible. Some durations were especially short in the complex social scene and the discussion task, because the mother-adolescent dyads decided they had answered the questions after spending little time discussing them. The building task on the other hand yielded long durations, because mothers struggled to effectively end the task after multiple reminders of the researcher.

Two different coding systems were used to measure several parenting practices. Firstly, the Coparenting and Family Rating System (CFRS; Karreman, van Tuijl, van Aken, & Dekovic, 2008; McHale, 1995) was used to rate seven scales of parenting behaviours on a 7-point Likert scale: Warmth (e.g. eye contact, compliments), Negativity (e.g. critical comments, ignoring), Investment (e.g. taking the lead), Limit Setting (e.g. stopping challenging behaviour), Sensitivity and Timing (e.g. reacting to the needs of the child), Provision of Structure (e.g. providing guidance and explanation), and Creativity (e.g. making jokes, using fantasy). The second rating system measured Autonomy Support (Grolnick, Frodi, & Bridges, 1984; Whipple, Bernier, & Mageau, 2011). This scale consists of four subscales, that were rated on a 5-point Likert scale: Flexibility and Perspective-Taking (e.g. trying different strategies to keep the child focused), Following the Child's Pace and Giving the Child the Opportunity to make Choices (e.g. giving the child the opportunity to play an active role), Behaving to Support Child's Sense of Competence (e.g. adapting the task to create an optimal challenge), and Mother's Verbalizations (e.g. encouragement, giving hints). A score on each scale was attributed to every minute, based on maternal verbal and nonverbal behaviours. The subscales Limit setting and Flexibility and Perspective-Taking could only be coded if the child deviated from the tasks. Because this did only occur in 4 out of 73 participants, these subscales were excluded in further analyses.

All observations were double coded. The coders attended several training sessions. Video tapes from previous research in younger participants were used to train the coders during the first two training sessions (Boonen et al., 2015), so results would be comparable across studies. From day three on, coders observed and scored fragments from our own data set, since the interpretation of certain subscales may differ with other tasks and an older age group, excluding the firqt, middle and last minute. Training was ended when coders reached an exact inter-rater agreement of at least 80%. When coding the recorded mother-child interactions, the percentage adjacent inter-rater agreement (Stemler, 2004) ranged from 0.69 to 0.96 over the scales. The scales of parenting behaviour were averaged over the two coders, and averaged again over the different minutes. For most participants, the average score of all 12 min could be calculated, whereas for 10 participants this was averaged over 9, 10 of 11 min (as explained above). For Autonomy Support, the scores were subsequently averaged again over the three subscales. Because this scale was on a 5-point Likert scale whereas the other dimensions on a 7-point Likert scale, scores were rescaled by the formula (x - 3) * 1.5 + 4. This formula was used so 1 (minimum score) remained 1 and 5 (maximum score) became 7. This resulted in one score per participant on seven parenting scales. Average scores and standard deviations of the observed parenting behaviours are presented in Supplementary Table 1.

2.2.2. Child characteristics

The Child Behaviour Checklist (CBCL: Achenbach & Rescorla, 2001; Verhulst et al., 1996) was completed by mothers as a measure of their child's behaviour problems. This questionnaire consists of 118 statements about child behaviour, rated on a 3-point Likert scale. Two subscales were generated: internalising and externalising. The ASD symptoms were estimated by the use of two instruments. The Social Responsiveness Scale (SRS; Constantino et al., 2003) was filled out by the mother. This questionnaire contains 65 items about a child's social awareness, social information processing, capacity for reciprocal social communication, social anxiety/avoidance, and autistic preoccupations, that mothers rated on a 4-point Likert scale. In addition, the Autism Diagnostic Observation

Schedule, second edition, module 3 (ADOS-2; Lord et al., 2012) was administered, but only in the ASD group. The total severity score (min = 3, max = 19) was used in the analyses.

2.2.3. Maternal characteristics

The mother characteristics of interest were parenting stress and mental health problems. Mothers completed the Nijmegen Parental Stress Index, short version (NOSIK; de Brock et al., 1992), based on the Parenting Stress Index (PSI; Abidin, 1983), to measure maternal stress. This questionnaire consists of 25 statements that mothers rated on a 6-point Likert scale. The questionnaire is divided into a parent domain and a child domain to determine the source of the experienced stress. In this study the sum score of the parent domain was used. In addition, maternal mental health problems were assessed by the use of the Dutch version of the 12-item General Health Questionnaire (Golderberg & Williams, 1988; Koeter & Ormel, 1991). Mothers rated twelve statements about their feelings of the last two weeks on a 4-point Likert scale. In data analyses, the sum score was used, with a higher total score indicating more mental health problems.

2.3. Data analyses

This study aimed to identify which parenting components underlie parenting behaviours among parents of adolescents with ASD. All analyses were performed using IBM SPSS Statistics 24. The seven observed parenting scales were entered in a principal components analysis (PCA), with promax rotation, because we assumed that the parenting components would be related to each other. The second research question was to investigate whether the components found in the ASD group were similar to the components found in the control group. Therefore, we conducted PCAs for the ASD group and the GPC group separately. Tucker congruencies (T) were calculated to explore similarities across the groups, with values below 0.85 indicating poor similarity, values in the range 0.85 – 0.94 indicating fair similarity and values higher than 0.95 indicating good similarity, suggesting that component structures in de groups can be considered equal (Lorenzo-Seva & ten Berge, 2006).

Composite scores were calculated for each component of parenting behaviour, by averaging over the included subscales. The third research question pertains to the relationship between the child and mother characteristics and the parenting components. Therefore, Pearson correlations were calculated for the two groups (ASD and GPC) separately with the different components of the observation. We were interested in the correlations with child characteristics (i.e. gender, age, verbal IQ, ASD-characteristics, and behaviour problems) and mother characteristics (i.e. parenting stress and mental health problems). In order to investigate the final research question, partial correlations were calculated, controlling for parenting stress.

3. Results

3.1. Principal component analysis

A PCA with promax rotation was carried out on the subscales of the observation for the ASD and GPC group separately. The KMO measure was 0.61 in the GPC group and 0.72 in the ASD group. The Bartlett's test of sphericity was significant in both groups ($p < 0.001$). Hence, the assumptions for PCA were met. Inspecting the screeplots, a two-component solution would be proposed in the GPC group, whereas a three-component solution would fit better in the ASD group. Therefore, both solutions are presented in Table 2. Initial eigenvalues were 3.65 (% of variance = 52.16), 1.35 (% of variance = 19.28) and 0.87 (% of variance = 12.45) in the GPC group and 4.45 (% of variance = 63.60), 1.12 (% of variance = 16) and 0.67 (% of variance = 9.57) in the ASD group. Component correlations were 0.41 in the GPC group and 0.35 in the ASD group for the two-component solution. The component correlation matrix for the three component solution is presented in Table 3.

Similarities and dissimilarities could be noted in the components solutions. The two-component solution resulted in poor similarities between the groups ($T = 0.25$ to 0.75). The three-component solution yielded a similar first component ($T = 0.97$). The second component of the ASD group was similar to the third component of the GPC group ($T = 0.93$). However, a poor similarity was found between the second component of the GPC group and the third component of the ASD group ($T = 0.75$). In both groups,

Table 2
Pattern component loadings of observed parenting behaviours.

	Two-component solution				Three-component solution					
	GPC (*n = 38*)		ASD (*n = 35*)		GPC (*n = 38*)			ASD (*n = 35*)		
	1	2	1	2	1	2	3	**1**	2	3
Creativity	**.67**	−.10	**.90**	−.29	**1.01**	−.38	.09	**1.08**	−.16	.25
Sensitivity and timing	**.93**	.03	**.81**	.25	**.64**	.43	.02	**.73**	.13	−.26
Autonomy support	**.94**	−.16	**.75**	.29	**.65**	.39	−.17	**.75**	.03	−.31
Negativity	**−.47**	−.30	.13	**−1.00**	.31	**−1.03**	−.05	.10	.04	**1.00**
Warmth	**.77**	.18	**.98**	−.18	.29	**.66**	.08	**.64**	.42	.19
Investment	−.05	**.97**	**.86**	−.08	−.04	.10	**.93**	−.04	**1.04**	.15
Structure	−.03	**.93**	**.74**	.24	.08	−.01	**.92**	−.03	**.88**	−.18

Table 3
Component correlation matrix for the ASD group (n = 61; upper side) and the control group (n = 74; lower side).

	1	2	3
1		0.69	−0.32
2	0.54		−0.34
3	0.27	0.35	

Warmth, Sensitivity and Timing, Creativity and Autonomy Support loaded high on the same component. However, the three-component solution suggested that for parents of the ASD group, Negativity was independent of being sensitive and warm, whereas in the GPC group these variables seemed the opposite ends of the same continuum. Secondly, Investment and Structure scored high on the same component in both groups. However, this component was relatively independent of the first component in the GPC group, whereas in the ASD group, Warmth and Sensitivity were more closely related to the parenting behaviours Investment and Structure. This is confirmed in the two-component solution in which they loaded highly on the same component as opposed to Negativity as a second component.

Common parenting dimensions for the two groups were extracted. Three components were defined, since this solution is most comparable and interpretable across the two groups. The first dimension was named Parental Support, including the subscales Warmth, Sensitivity and Timing, Creativity and Autonomy Support. The second dimension we identified was Behavioural Control, including Investment and Structure. Since Negativity seemed to be independent of the other behaviours in the ASD group, this behaviour was defined as a distinct, third, dimension.

3.2. Child and mother characteristics related to parenting behaviours

Pearson correlations were calculated between the observation dimensions, mother and adolescent characteristics (Table 4). Results indicated that only verbal IQ was significantly correlated with the parenting behaviour scales; a positive correlation with Parental Support in the GPC group (r = 0.40; p = .01) and a negative correlation with Negativity in the ASD group (r = -0.39; p = .02). In addition, the parenting dimensions were related to each other, especially in the GPC group. Controlling for parenting stress yielded similar results (Table 5). Only the correlations with mental health became non-significant in both groups, along with the correlation between internalising problems and ASD symptoms.

4. Discussion

In this study, we aimed to empirically identify which parenting components are underlying the parenting behaviours among parents of adolescents with ASD (age = 12–16 years old). Parenting behaviours were assessed by the use observations. In addition, we aimed to examine whether the same components emerge in a general population control group.

4.1. Parenting components

In both groups the observed parenting behaviours two components could be identified: Parental Support and Behavioural Control.

Table 4
Pearson correlations between parenting behaviours, child and mother characteristics for the ASD group (n = 35; upper side) and the control group (n = 38; lower side).

	1	2	3	4a	4b.	5	6	7	8	9	10	11
1. Gender		.06	−.09	−.19	−45**	.11	.06	.09	−.25	.15	.12	.23
2. Age (months)	−.06		−.41*	−.07	−.05	−.12	−.12	−.12	.06	.04	.13	−.02
3. Verbal IQ	−.04	.09		−.12	.10	−.17	−.31	−.42*	−.27	.32	−.39*	.25
ASD characteristics												
4a. SRS mother report	−.01	−.28	.01		.18	.38*	.47**	.26	.05	.06	.30	−.11
4b. ADOS severity score	–	–	–	–		.05	−.13	.04	.20	−.09	−.15	−.16
5. Internalising problems	−.15	−.22	−.10	.16	–		.67***	.36*	.15	.06	.08	.17
6. Externalising problems	−.04	−.29	−.29	.27	–	.72***		.56***	.37*	−.13	.20	.00
7. Parenting stress	.03	−.46**	−.03	.38*	–	.27	.46**		.49**	−.26	.15	−.22
8. Mental health problems	−.16	−.15	.11	.33*	–	.23	.23	.27		−.24	.02	−.05
9. Parental support	−.02	.09	.40*	−.16	–	−.04	.01	−.08	.16		−.28	.73***
10. Negativity	−.11	−.09	−.25	.20	–	.20	.22	.12	.01	−.49**		−.24
11. Structure	.16	< .01	−.04	−.08	–	−.06	.03	.05	.13	.36*	−.35*	

* $p < 0.05$.
** $p < 0.0$.
*** $p < .001$.

Table 5
Pearson correlations between observed parenting behaviours, child and mother characteristics for the ASD group (n = 35; upper side) and the control group (n = 38; lower side) after controlling for parenting stress.

	1	2	3	4a	4b.	5	6	7	8	9	10
1. Gender		.07	−.05	−.22	−.45**	.09	.01	−.34	.18	.11	.26
2. Age (months)	−.05		−.51**	−.04	−.05	−.09	−.06	.14	.01	.15	−.04
3. Verbal IQ	−.04	.08		−.01	.13	−.03	−.10	−.09	.24	−.37*	.18
ASD characteristics											
4a. SRS mother report	−.02	−.13	.02		.18	.32	.41*	−.09	.14	.27	−.06
4b. ADOS severity score						.04	−.19	.21	−.09	−.16	−.16
5. Internalising problems	−.17	−.11	−.09	.07			.61***	−.02	.17	.03	.27
6. Externalising problems	−.06	−.11	−.32	.12		.69***		.13	.03	.14	.15
7. Mental health problems	−.18	−.03	.12	.26		.17	.13		−.14	−.06	.06
8. Parental support	−.02	.06	.40*	−.14		−.02	.06	.19		−.26	.71***
9. Negativity	−.11	−.04	−.25	.16		.18	.19	−.02	−.48**		−.22
10. Structure	.16	.03	−.04	−.11		−.08	.00	.12	.36*	−.35*	

* $p < 0.05$.
** $p < 0.01$.
*** $p < .001$.

However, in the GPC group, Warmth and Negativity were identified together into one component with opposite loadings, in line with the acceptance-rejection theory (Rohner, 2016), whereas Negativity seemed to be independent from the other subscales in the ASD group. Furthermore, the dimensions Behavioural Control and Parental Support were closely related in the ASD group. This may indicate that mothers of children with ASD apply more discipline in order to support their child, which could be explained by the greater need for structure and predictability. In contrast with the general framework of parenting dimensions, but in line with other research findings (Janssens et al., 2015), in both groups Autonomy Support could not be distinguished from Parental Warmth with the available indicators. This can possibly be explained by the very specific way autonomy support is operationalised in our study, namely the extent to which the mother follows the pace of the child and allows choices within the observation tasks. It is possible that there are other unmeasured factors of autonomy support that would lead to a distinction between these two dimensions.

4.2. Associations with child and mother characteristics

Furthermore, we investigated whether the constructed parenting components were related to age, IQ, ASD characteristics and behaviour problems of the child, or parenting stress and mental health problems of the mother, both in the ASD group and in the control group. Lastly, we repeated all analyses while controlling for parenting stress, since parenting stress seemed to be related with both child characteristics and parenting behaviours. As expected, intercorrelations between child and mother characteristics were high, suggesting a complex interplay between characteristics and making it difficult to unravel unique contributions to parenting behaviours.

Only a few correlations were present with the observed parenting components (i.e. higher verbal IQ was associated with more Parental Support in the GPC group and with less Negativity in the ASD group). We expected parenting behaviours to be associated with behaviour problems of the child, but this could not be evidenced in our study. However, we have rarely noticed behaviour problems during the observations, which has an impact on the results. We can merely conclude that behaviour problems of their child, as reported by the mother, is not associated with parenting behaviours of mothers during observations in which their child does not show behaviour problems.

4.3. Limitations and suggestions for further research

Although this study brings us new insights into parenting adolescents with ASD, some limitations can be mentioned. An important limitation is that this study did not capture all parenting behaviours of importance in adolescence. In particular psychological control was not included and autonomy granting was only operationalised in a very specific way. Also, practices focusing on emotions, such as emotion socialization behaviours and emotion coaching (Johnson, Hawes, Eisenberg, Kohlhoff, & Dudeney, 2017; Lunkenheimer, Shields, & Cortina, 2007) have proven to be related to internalising behaviour problems, so including these parenting behaviours would have been valuable, especially given the elevated levels of internalising problems in the ASD group. Furthermore, the ecological validity of the observation tasks can be questioned. We have rarely noticed any behaviour problems during the observations, although more than one third of the children in the ASD group scored within the clinical range of externalising problems, as reported by their mother, suggesting that behaviour problems occur often in daily life. This indicates that adolescents' behavioural problems may not necessarily surface in this artificial setting. Also, we do not know whether these tasks per se are representative for real-life situations. In addition, the presence of the camera can influence the interaction, especially since participants were in secondary school already. The fact that little correlations with the observed parenting behaviours were significant, could be related to these problems. It would be interesting to further examine the associations with parenting behaviours in situations where parents have to deal with these behaviour problems in real life. A more naturalistic observation study could shed light on this issue. Furthermore, this

study could be subject to a respondent bias, since all questionnaires were filled out by the mother. This could explain the high correlations between mother and child characteristics (e.g. mothers with high stress levels could overemphasize the behaviour problems and ASD characteristics of their child). However, the meta-analysis of Yorke et al. (2018) on the association between behavioural problems in children with ASD and parental psychological distress noted that very few studies have different raters for child behaviour and parent characteristics. They concluded that while the associations dropped when alternative raters were used, the association between child behaviour and parental mental health remained significant. We tried to overcome this limitation by using observations to operationalise parenting behaviours. However, these observations also include several limitations. Most importantly, the coders were not blind for group status. In addition, coding parenting behaviours is not always straightforward. However, the raters were thoroughly trained and they were not allowed to code the mother-child dyads that they had tested themselves, in order to increase objectivity. Furthermore, only mothers were included in this study, therefore, the results cannot be generalised over fathers or other caregivers. Finally, the cross-sectional design of the study does not allow to make any causal inferences.

5. Implications

Despite these limitations, this study offers more insight in parenting children with ASD and can be clinically relevant. This study suggests that the framework of parenting behaviours in the general literature is also applicable to parents of children with ASD. This result could imply that ASD specific interventions are not necessary, as also evidenced by the meta-analysis of Postorino et al. (2017) in which parenting training is proved to be an effective intervention for disruptive behaviour in children with ASD. However, for challenges associated with ASD, parent education for ASD specifically could be relevant as well, as evidenced by Schultz, Schmidt, and Stichter (2011).

Although few correlations between parenting behaviours and parenting stress could be noted in this study, the impact of parenting stress can not be underestimated. Mothers of children with ASD reported significantly more parenting stress and mental health problems than mothers in the control group. Additionally, parenting stress was highly related to behaviour problems. If parents experience high stress levels, they may be less able to persist in interventions such as parent training. Therefore, counsellors should not only focus on the behavioural aspects, but also take parenting stress into account. The review of Da Paz and Wallander (2017) presents several interventions that improved parenting stress and mental health of parents of children with ASD. On the other hand, practical support and parenting advice to lower stress levels could be appropriate for parents who have specific parenting questions (e.g. how to handle specific characteristics of their child).

Given the great variation within the ASD group, it would be interesting for further research to investigate what works for who. Based on further research a tailored, individualised approach, taking into account mother and child characteristics and needs, could be proposed.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Conflict of interest

The authors declare that they have no conflict of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.rasd.2019.05.003.

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