

Parent–Adolescent Reciprocity in a Conflictual Situation Predicts Peer Interaction in Adolescents With ASD

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Abstract: Parent–child reciprocity plays a significant role in shaping children’s social interaction skills. The development of conflict management skills throughout childhood and adolescence impacts the individual’s social adjustment. The increase in conflictual interaction with one’s parents during adolescence affects the transformation of parent–adolescent interaction into a more mutual, equal relationship. Adolescents with ASD and their parents may struggle in this type of interaction due to the adolescents’ social and regulatory impairments, in addition to their dependence on their parents’ involvement and guidance. The current study aimed to evaluate differences in the way adolescents with and without ASD interact with their parents in a conflictual situation. In addition, the association between parent–adolescent reciprocity and the adolescent’s social interaction with an unfamiliar peer was examined in the ASD group. Thirty adolescents with ASD and their parents and 30 typically developing (TD) controls were assessed during a standardized conflict interaction. In addition, adolescents with ASD took part in a conversation with an unfamiliar peer. Interactions were videotaped and coded. Results revealed that during the conflictual interaction, compared to their TD peers, adolescents with ASD were more involved in the conversation and less withdrawn from the parent, while their parents were more sensitive and less intrusive toward them. Parent–adolescent reciprocity was poorer in the ASD (compared to the TD) dyad and was positively associated with the adolescents’ social-conversational skills with a peer. These findings emphasize the different developmental trajectory parent–adolescent relationship takes in adolescents with ASD, and its impact on the adolescent’s social skills. *Autism Research* 2019, 12: 263–273. © 2018 International Society for Autism Research, Wiley Periodicals, Inc.

Lay Summary: The development of conflict management skills throughout childhood and adolescence impacts the individual’s social adjustment. The ability of parents to engage in reciprocal social interaction with the children plays a significant role in shaping children’s social interaction skills with peers and with other adults. The transition to adolescence is characterized by an increase in conflictual interaction with one’s parents, which transforms the interaction between adolescents and their parents into a more mutual, equal relationship. Adolescents with ASD and their parents may struggle in this type of interaction due to the adolescents’ social and emotional difficulties, and their dependence on their parents’ involvement and guidance. However, the nature of parent–adolescent interaction, and particularly conflict management has rarely been studied. This study evaluated the way parents and their adolescents with ASD interact in a conflictual conversation, compared to parents and their typically developing adolescents. In addition, we examined how this type of interaction associated with adolescents’ social conversation skills with a peer, in the ASD group. A videotaped interaction between adolescents and their parents indicated that parents and their adolescents with ASD engaged more positively in the conflict, but were less reciprocal with each other. In addition, higher reciprocity among parents and their adolescents with ASD was associated with better conversation skills with an unfamiliar peer. These findings demonstrate the different ways parent–adolescent relationships evolve in families affected by ASD, and the important role parents have in shaping the adolescent’s social communication skills.

Keywords: Autism spectrum disorder; adolescence; parenting; conflict; social-communication; peer-interaction; observational-measures

Introduction

Autism spectrum disorder (ASD) is characterized by social communication impairments as well as restricted and repetitive behavior patterns [American Psychiatric

Association, 2013]. These deficits influence the acquisition and employment of sophisticated social strategies, including social problem solving [Goddard, Howlin, Dritschel, & Patel, 2007]. The interaction of individuals with ASD with significant others and with peers has been studied

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extensively, but mostly in a positive interaction context [Bauminger, Shulman, & Agam, 2003; Humphrey & Symes, 2011]. Nevertheless, the ability to manage a conflict is a central social skill, which has been scarcely studied in ASD.

A conflictual interaction is defined as a dyadic state where mutual opposition has a key role [Laursen & Collins, 1994]. In order to handle interpersonal conflicts, the individual needs to down-regulate immediate negative emotion, to identify the tensed situation, to find alternative options, to discuss the conflict with one's opponent, and to collaboratively decide on an adequate solution (D'Zurilla, Chang, Edward, & Sanna, 2004). Studies have described deficits on each and every component of this process in individuals with ASD, suggesting that conflict handling should be a significant challenge for them [Channon, Charman, Heap, Crawford, & Rios, 2001; Grandin, 2006; Jahromi, Meek, & Ober-Reynolds, 2012; Memari et al., 2013; Uljarevic & Hamilton, 2013; Mussey, Travers, Klinger, & Klinger, 2015].

The acquisition of conflict handling skills has been characterized as a developmental process [Viikinsalo, Crawford, Kimbrel, Long, & Dashiff, 2005]. In typically developing children, the limited cognitive and regulatory capacities make it hard for children to down-regulate their negative emotion, produce alternative solutions and understand their consequences [Diamond & Lee, 2011; Diaz & Berk, 2014; Weaver, Shaw, Crossan, Dishion, & Wilson, 2015]. Therefore, typically developing children may react impulsively in conflictual situations without acknowledging social consequences that may arise [Rubin & Rose-Krasnor, 1992]. More sophisticated conflict handling skills and capacities are acquired during adolescence [Steinberg, 2005], including the ability to discuss disagreements in a reciprocal conversation, while maintaining an autonomous stance [Feldman, Bamberger, & Kanat-Maymon, 2013].

Developmentally, parent-child conflictive interaction provides a unique opportunity for children to learn how to handle conflicts [Allison & Schultz, 2004]. Acquiring the ability to handle conflicts in the parent-child relationship impacts adjustment to the environment [Feldman, 2010] and promotes acquisition of crucial social skills [Rubenstein & Feldman, 1993]. Contemporary theories propose that child's, parent's and dyadic factors shape the nature of parent-child conflictive interaction [Berlin, Zeanah, & Lieberman, 2008; Feldman, Masalha, & Derdikman-Eiron, 2010].

Young children are more dependent on their parents, who lead and direct the relationships [Yau & Smetana, 2003]. In adolescence, rapid transitions triggered by cognitive, physical, biological, and social changes, lead to significant changes in the balance of parent-adolescent interaction [Freitag, Belsky, Grossmann, Grossmann, & Scheuerer-Englisch, 1996; Maljaars, Boonen, Lambrechts,

Van Leeuwen, & Noens, 2014]. In this period, different expectations arise between adolescents and parents regarding to the adolescents' pursuit of autonomy [Branje, van Doorn, van der Valk, & Meeus, 2009; De Goede, Branje, & Meeus, 2009]. Gradually, the interaction between the parent and the adolescent transform from a hierarchical relationship, in which the parent is clearly the authority figure, into a more equal relationship [Lerner & Steinberg, 2009], while parents are required to adjust their new parental role, and to enable the autonomy the adolescent seeks [Steinberg & Silk, 2002]. A longitudinal study assessing the mother-child relationship at six different time points from 3 months to 13 years revealed that, compared to childhood, conflict interaction with parents during adolescence was characterized by decreased social engagement of the adolescent, lower maternal sensitivity, and reduced dyadic reciprocity [Feldman, 2010].

Dyadic reciprocity, defined as the capacity to engage in social exchange that integrates inputs from multiple partners into a unified social event, is a cornerstone of adaptive social life [Feldman, Bamberger, & Kanat-Maymon, 2013].

Studies have shown that both parent-child and parent-adolescent reciprocity during a conflict situation predict social reciprocity with a friend in childhood [Feldman, Gordon, Influx, Gutbir, & Ebstein, 2013] and in early adolescence [Feldman, Bamberger, & Kanat-Maymon, 2013]. These findings highlight both the changing nature of parent-child interaction and the role it plays in shaping adolescent-peer interaction in typical development.

Studies examining the nature of parent-child conflict handling in children and adolescents with genetic and psychiatric conditions have reported lower parent-child reciprocity in children with depression, compared to children without depression [Priel, Djalovski, Zagoory-Sharon, & Feldman, 2018]; lower child engagement and mother-child reciprocity in children living in a zone of continuous war, compared to families who were not continuously exposed to war [Halevi et al., 2017]; and lower parent-child reciprocity in children with velocardiofacial syndrome and developmental delays, compared to matched TD controls [Weisman et al., 2015]. These findings indicate that parent-child interaction is altered in families that deal with developmental psychopathology. However, the focus of these studies has been on childhood, with little attention given to the transition to adolescence, and to the developmental changes it pertains. In the current study, we examined the nature of parent-adolescent interaction in adolescents with ASD, a neurodevelopmental condition in which social interaction and reciprocity form a fundamental challenge.

The ability to engage in dyadic reciprocity in ASD has received a lot of attention through the lens of joint attention [Mundy, Sullivan, & Mastergeorge, 2009; Schertz & Odom, 2007], that is, the ability of two interaction

partners to adopt a common frame of reference to share experiences [Mundy, 2016]. Joint attention, which in early development often focuses on a shared reference to an external object, underlies the capacity to share ideas and to take the perspective of the other, that is characteristic of dyadic reciprocity. Research indicates that parents play a major role in the development of both processes. Indeed, despite their extensive social difficulties, young children with ASD are able to positively interact and to gain significant support from their parents [Hirschler-Guttenberg, Golan, Ostfeld-Etzion, & Feldman, 2015; Ostfeld-Etzion, Golan, Hirschler-Guttenberg, Zagoory-Sharon, & Feldman, 2015]. Studies have shown that parent-child reciprocity in preschoolers with ASD, which was lower than that of their TD peers [Hirschler-Guttenberg et al., 2015], still predicted higher social skills in childhood [Haven, Manangan, Sparrow, & Wilson, 2014]. In addition, compared to mothers of TD children, mothers of children with ASD scored higher on a questionnaire examining positive parenting, including scales measuring positive involvement and problem solving [Maljaars et al., 2014]. During adolescence, these positive findings remained stable among mothers to adolescents with ASD, while the scores of mothers of TD children declined as the child grew-up [Maljaars et al., 2014]. In addition, parents of adolescents with ASD reported they used more permissive parenting, and less control toward their adolescents, compared to parents of TD adolescents [Hutchison, Feder, Abar, & Winsler, 2016]. These studies addressed the parent-child relationship within a positive or neutral interaction. A recent study, which examined parent-adolescent interaction during a conflictual interaction revealed that mothers of adolescents with ASD were involved in a more sensitive and empathic way when handling a conflict with their adolescent child, compared to mothers of TD adolescents [van Esch, Vanmarcke, Ceulemans, Van Leeuwen, & Noens, 2018].

These results may indicate that, unlike their TD peers, the dependence of children with ASD on their parents' involvement and guidance is maintained in adolescence. It should be pointed out that the findings regarding adolescents with ASD mostly relied on self-report questionnaires. In addition, to the best of our knowledge, there have been no studies addressing parental, adolescent and dyadic factors within a conflictual interaction, or studies linking the interaction of parents and their adolescents with ASD with the adolescents' social interaction with peers. The current study addressed these two questions: (a) are their differences in the way adolescents with and without ASD handle conflicts with their parents; and (b) do parent-adolescent factors within a conflictual interaction predict social interaction abilities with peers among adolescents with ASD. We hypothesized that in comparison to the way TD adolescents interact with their parents, parents and their adolescents with ASD will

show greater positive interaction in a conflictual situation, retaining the childlike pattern of a hierarchical and dependent relationship. In addition, we hypothesized that the parent-adolescent dyad will be less reciprocal among adolescents with ASD due to their characteristic difficulties in socio-emotional reciprocity. Finally, following Feldman, Bamberger, and Kanat-Maymon [2013], we hypothesized that parent-child reciprocity will predict social interaction abilities among adolescents with ASD, while interacting with a peer.

Method

Participants

Two groups took part in the study. The ASD group comprised 30 adolescents with ASD (28 males, 2 females), aged 12–17 ($M = 13.16$, $SD = 0.99$) with a preexisting diagnosis of ASD and without comorbid intellectual impairment ($IQ > 70$), and their parents (27 mothers, 3 fathers). They were recruited through the *Bait-Echad* ASD clinical centers of the association for children at risk, as part of a larger clinical trial. Participants' ASD diagnosis was confirmed using the Autism Diagnostic Observation Scale, 2nd edition (ADOS) [Lord et al., 2012]. Their intellectual functioning was assessed using four subscales from the fourth edition of the Wechsler Intellectual Scale for Children (WISC-IV) [Wechsler, 2003]: Vocabulary, Similarities, Block Design, and Matrix Reasoning. Participants' performance on all four subscales fell within the normative range.

The TD group included 30 adolescents (28 males, 2 females), aged 12–17 with no reported neurodevelopmental, psychiatric, or intellectual disability, and their parents (27 mothers, 3 fathers), who have taken part in a longitudinal parent-child interaction study [Feldman, Bamberger, & Kanat-Maymon, 2013]. They were matched to the ASD group on adolescents' age and gender, as well as on parents' gender and years of education. Despite the careful selection of participants, parents from the ASD group were significantly older than parents from the TD group. The groups' background characteristics are summarized in Table 1.

Measures

Conflict paradigm—coding of interactive behavior.

This observational assessment was designed to test parental, adolescents', and dyadic factors during a conflictual interaction between a parent and an adolescent. Parents and adolescents were videotaped having a 5-min discussion about a common conflict of their choice. The discussion was coded using the Coding Interactive Behavior manual (CIB) [Feldman, 1998]. The CIB is a global rating system for social interactions that includes 52 codes rated

Table 1. Participant Demographic Data

	ASD		TD
	Mean (SD)	Mean (SD)	
<i>Demographics</i>			
Adolescent gender (m:f)	28:2	28:2	$\chi^2(1) = 0.00$
Parent gender (m:f)	3:27	3:27	$\chi^2(1) = 0.00$ t(58)
Adolescent age (years)	13.16 (0.99)	12.90 (0.45)	1.28
Parent age (years)	46.83 (5.27)	39.37 (3.66)	6.35***
Parent education (Years)	16.5 (1.87)	16.5 (1.67)	0.00

Note: $P > 0.1$ for all comparisons, except parent's age (*** $P < 0.001$).

on a scale of 1–5, which are aggregated into several composites. Higher scores represent greater amount of specific behavior. The system has been validated in multiple longitudinal studies of normative and high-risk populations in infancy, preschool, and adolescence interacting with mother and father, [Feldman, 2010; Feldman, Bamberger, & Kanat-Maymon, 2013], including preschoolers with ASD and their parents [Feldman, Golan, Hirschler-Guttenberg, Ostfeld-Etzion, & Zagoory-Sharon, 2014; Hirschler-Guttenberg et al., 2015]. Originally developed in Israel, the CIB has been cross-culturally validated across the Middle East, Europe and America [Feldman et al., 2010; Viaux-Savelon et al., 2014; Lebowitz et al., 2016]. Interactions were coded by two raters trained to 90% reliability with the instrument's developer. In the current study, the following factors were used:

Parent sensitivity. This factor addressed the extent to which the parent is able to employ the adolescents perspective, to elaborate the adolescents statements, and to provide a warm and confident presence. The factor included five codes: parental elaboration of communication, resourcefulness in handling child's distress/expanding the interaction, empathy, and supportive presence ($\alpha = 0.72$ in the current study).

Parent intrusiveness. This factor addressed the extent to which the parent demonstrates intrusive, hostile and judgmental behavior, and displays negative affect toward the adolescent. The factor included 4 codes: intrusiveness, hostility, criticism, and negative affect ($\alpha = 0.75$ in the current study).

Adolescent involvement. This factor addressed the extent to which the adolescent is ready to take part in the task, brings up ideas and solutions which could contribute to the conflicts resolution, looks at the parent and exhibits an effort to complete the task. The factor included four codes: motivation, initiation, gaze to parent, and persistence in task ($\alpha = 0.77$ in the current study).

Adolescent withdrawal. This factor addressed the extent to which the adolescent demonstrates intrusive, critical or avoidant behavior toward the parent and expresses negative and hostile affect. The factor included four codes: negative affect, intrusiveness toward parent, avoidance of parent, and criticism toward parent ($\alpha = 0.66$ in the current study).

Dyadic reciprocity. This factor addressed the extent to which the dyad is moving in harmony, with both sides engaged and adapting to changing states or interactive cues. The factor included three codes: reciprocity, adaptation regulation, and fluency ($\alpha = 0.93$ in the current study).

Dyadic negative states. This factor addressed the extent to which the interaction is limited in terms of content and the level of discomfort the parent and adolescent have with each other. The factor included two codes: constriction and tension ($\alpha = 0.69$ in the current study).

Contextual assessment of social skills. This observational assessment was designed to test social interaction abilities among adolescents and young adults with ASD. In the current study, it was administered to the ASD group only. In the contextual assessment of social skills (CASS) [Ratto, Turner-Brown, Rupp, Mesibov, & Penn, 2011], the participant is introduced to an interested and engaged Confederate, and the two are asked to get to know each other in the next few minutes. The three confederates were undergraduate female students in their first year. The CASS is videotaped and coded on the number of questions asked and the number of topic changes made by the participant, as well as on ratings on a 1–7 Likert scale of participants' vocal expressiveness, gestures, positive affect, posture, kinesics arousal, social anxiety, involvement in the conversation, quality of rapport, and an overall score. Higher scores represent better performance and social skills. The CASS has another condition, involving a bored and disengaged confederate, which was not administered in the current study. The CASS was found to be a valid and reliable measure among youth with ASD [Dolan et al., 2016; Ratto et al., 2011; White, Scarpa, Conner, Maddox, & Bonete, 2015]. Videotaped interactions were and coded by two trained raters, who had an average inter-rater agreement of 0.86. Internal consistency for CASS items for this study was $\alpha = 0.82$.

Procedure

Ethical approval for the study was provided by the Beer-Yaacov mental health center's Helsinki committee for participants with ASD, and by the Bar-Ilan University ethics committee for TD participants. In order to ensure participants from the ASD group met research criteria, families took part in a 2 hr pre-assessment. Adolescents'

preexisting diagnosis of ASD was validated using module four of the Autism Diagnostic Observation Scale, 2nd edition (ADOS-2) [Lord et al., 2012], and intellectual functioning was assessed by two verbal (vocabulary, similarities) and two nonverbal (block-design, matrix-reasoning) subtests, taken from the 4th edition of the Wechsler Intelligence Scale for Children (WISC-IV) [Wechsler, 2003]. Next, families from the ASD group were invited to a second meeting in which the CIB conflict paradigm [Feldman, 1998] and the CASS engaged condition [Ratto et al., 2011] were administered.

Families from the TD group took part in a longitudinal parent-child interaction study (Feldman, Bamberger, & Kanat-Maymon, 2013), in which various CIB paradigms, including the conflict paradigm, were administered. All families were compensated at each assessment for their time and effort.

Results

To examine the extent to which adolescents with ASD and their parents interacted differently than TD adolescents and their parents, three MANOVAs were conducted, one for the two adolescent factors, one for the two parent factors, and one for the two dyadic factors. In each MANOVA, group (ASD, TD) was the between-group variable. Since the groups were not matched on parents' age, this variable was entered as a covariate in all analyses. Table 2 details means and standard deviations of all the CIB factors in the two groups.

The adolescent factors MANOVA has yielded a significant overall group effect ($F_{\text{Wilks}}[2,56] = 5.36, P < 0.01, \eta^2 = 0.16$). Univariate analyses, detailed in Table 2, indicated that during a conflictual interaction with their parents, adolescents with ASD were more involved and less withdrawn than their TD peers. The parent factors MANOVA has also yielded an overall group effect ($F_{\text{Wilks}}[2,56] = 5.53, P < 0.01, \eta^2 = 0.17$). Univariate analyses, detailed in Table 2, indicated that during a conflictual interaction, parents from the ASD group were more sensitive and less intrusive toward their adolescents, compared to parents from the TD group. The dyadic factors MANOVA has also revealed significant group effect ($F_{\text{Wilks}}[2,56] = 8.65, P < 0.001, \eta^2 = 0.24$). Univariate analyses, detailed in Table 2 showed that during a conflictual interaction, reciprocity between adolescents with ASD and their parents was lower than the reciprocity between parents and adolescents in the TD group. The groups did not differ on the negative states factor.

An examination of the inter-correlations between the CIB factors in the ASD and TD groups, detailed in Table 3, indicated that in the ASD group, dyadic reciprocity was negatively linked to parent intrusiveness and to dyadic negative states, and that parent sensitivity

Table 2. Means (SD) of Adolescent, Parent, and Dyadic Factors in the ASD and TD Groups

	ASD	TD	$F(1,57)$	η^2
<i>Adolescents factors</i>				
Involvement	3.62 (0.82)	3.00 (0.73)	4.79*	0.08
Withdrawal	1.29 (0.36)	1.77 (0.71)	7.15**	0.11
<i>Parent factors</i>				
Sensitivity	3.46 (0.81)	2.84 (0.64)	7.94**	0.12
Intrusiveness	1.48 (0.70)	2.1 (0.72)	8.29**	0.13
<i>Dyadic factors</i>				
Reciprocity	3.61 (1.00)	4.28 (0.57)	4.46*	0.07
Negative states	1.70 (0.90)	1.66 (0.64)	0.34	0.00

* $P < 0.05$

** $P < 0.01$

CIB, coding interactive behavior.

correlated negatively with parent intrusiveness and positively with children involvement. In the TD group, dyadic reciprocity did not correlate with any parent or adolescent factor but was negatively correlated with the dyads negative states. In addition, the adolescent withdrawal was negatively correlated with parent sensitivity, positively linked with parent intrusiveness, and negatively correlated with the dyads negative states. Adolescent involvement in the TD group was not correlated with any other factor.

In order to evaluate the extent to which the adolescent, parental, and dyadic factors predict conversation skills with a peer among adolescents with ASD, we first examined the correlations between these factor scores and the CASS total score (detailed in Table 3). As hypothesized, the only significant association with the CASS total score was found for parent-adolescent reciprocity, indicating that high dyadic reciprocity between adolescents and their parents, was associated with better conversational skills with a peer.

Next, a hierarchical regression was conducted for CASS total scores in the ASD group. Adolescents' age, WISC vocabulary scores, and ADOS comparison scores were entered in the first block. Age was included, as it was expected to positively correlate with the adolescent's conversational skills. In the absence of an overall IQ or a verbal composite score, the WISC vocabulary score was entered, in order to control for participants' verbal ability. The ADOS comparison score was entered in order to control for participants' level of ASD symptoms. Next, in the second block, dyadic reciprocity was entered into the regression. The analysis model reached statistical significance ($R^2 = 0.51, F(4,25) = 6.69, P < 0.001$). Dyadic reciprocity between parents and their adolescents ($\beta = 0.36, P < 0.05$), and adolescent age ($\beta = 0.47, P < 0.01$) came out significant, indicating that increased reciprocity between parents and their adolescents with ASD in a conflictual situation (and older age) predicted better conversational skills with a peer (Table 4).

Table 3. Intercorrelations Between CIB Factors and CASS Scores in the TD (top) and the ASD (bottom) Groups

	1	2	3	4	5.	6.	7.
1. CASS- Total Score		–	–	–	–	–	–
2. CIB- Parental Sensitivity	0.10						
3. CIB- Parental Intrusiveness	–0.10	–0.58**					
4. CIB- Adolescent Involvement	0.02	0.52**	–0.17				
5. CIB- Adolescent Withdrawal	–0.09	–0.29	0.23	–0.24			
6. CIB- Dyadic Reciprocity	0.33*	0.09	–0.31*	–0.01	–0.12		
7. CIB- Dyadic Negative States	–0.19	–0.14	0.28	0.06	0.20	–0.83***	

Note: Correlations with the CASS were only available for the ASD group.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

Table 4. A Hierarchical Regression Analysis, Predicting Adolescents' Social Communication Skills in the ASD Group

	B	SE	β	R^2
<i>Step 1</i>				0.39**
Adolescent age	2.50	0.78	0.53**	
Vocabulary	–0.11	0.24	–0.08	
ADOS comparison	–0.59	0.47	–0.20	
<i>Step 2</i>				0.52**
Adolescent age	2.24	0.72	0.47**	
Vocabulary	–0.29	0.23	–0.20	
ADOS comparison	–0.63	0.41	–0.22	
Dyadic Reciprocity	1.68	0.68	0.36*	

* $P < 0.05$.

** $P < 0.01$.

CIB, coding interactive behavior; CASS, contextual assessment of social skills.

Discussion

This study examined the way adolescents with ASD and their parents handle arguments as compared to TD adolescents and their parents. In addition, we examined whether adolescents', parents' and dyadic behaviors observed during a parent–adolescent interaction, predict the way adolescents with ASD interact with a peer. As hypothesized, our findings reveal that during an interaction which involves a discussion about a common conflict, the interaction style of parents to adolescents with ASD was more sensitive and less intrusive toward their child, compared to parents of typically developing adolescents. In addition, adolescents with ASD differed from their TD peers in argument handling, by showing more involvement in, and less withdrawal from, the interaction with their parents. The groups also differed on dyadic reciprocity during the conflictual situation: adolescents with ASD and their parents were less reciprocal compared to TD adolescents and their parents. Finally, as hypothesized, greater parent–adolescent reciprocity in the ASD group predicted adolescent's social conversation skills with a peer. These findings highlight the different relationships adolescents with ASD have with their

parents, as well as their effect on adolescents' social interaction with peers.

Parent–child interaction has received a lot of attention in ASD research, due to the key role parents have in supporting the development of their children [Karst & Van Hecke, 2012]. However, the vast majority of these studies have addressed parent–child relationship in infancy, toddlerhood, and preschool years. To the best of our knowledge, this is the first study to behaviorally examine the role of parental, adolescent, and dyadic factors while handling an argument among adolescents' with ASD. Most of previous studies of adolescents and their parents have relied on parent and self-report questionnaires [Maljaars et al., 2014; Orsmond, Seltzer, Greenberg, & Krauss, 2006]. These studies suggested that adolescents with ASD remain dependent on their parents, and require continued support, a role that in typical development is handed over from parents to peers [Seltzer, Shattuck, Abbeduto, & Greenberg, 2004]. Our study took a closer look at the manifestation of parent–adolescent relationship through the lens of argument handling.

We found that during the conflictual interaction, parents exhibited more positive parenting behaviors, that is, were more sensitive and less intrusive toward their adolescents' with ASD, compared to the parents of TD adolescents. These findings replicated an observational study, indicating that mothers of adolescents with ASD exhibit more sensitivity while handling a conflict, compared to mothers of TD adolescents (van Esch et al., 2018). Our findings also correspond with reports of mothers to children with and without ASD [Maljaars et al., 2014]. According to these reports, significant changes occur in the transition from childhood to adolescence: whereas mothers of typically developing children show a significant reduction in the use of positive parenting strategies, mothers of adolescents with ASD continue to exhibit positive parenting during adolescence, as they have done throughout childhood. According to Orsmond et al. [2006], compared to parents of TD adolescents, parents to adolescents with ASD show greater warmth, lower criticism, and less intrusion in their interaction with their

children not only throughout adolescence but also into adulthood.

van Esch et al. [2018] argued that mothers of adolescents with ASD develop sensitive and empathic parental strategies in order to deal with their child's negative affect while handling a conflict. We extend these finding by adding adolescent and dyadic factors, allowing for a more systemic view. The associations we found in the ASD group between parental factors and children involvement, as well as with dyadic reciprocity, demonstrate the important contribution parents to adolescents with ASD make toward the development of their children social communication skills. These findings correspond with previous literature on the pivotal role parents to children with ASD continue to play in their children's lives throughout adolescence, as a result of their developmental delays [Gerhardt & Lainer, 2011; Howlin, Goode, Hutton, & Rutter, 2004]. Parents of adolescents with ASD acknowledge their child's need for their care and guidance, and therefore pay more attention to their child's skills, adjust their own behaviors as an attempt to compensate for the social limitations of their children, and continue to encourage them to make their own choices and to develop their problem solving skills [Maljaars et al., 2014; Meirsschaut, Warreyn, & Roeyers, 2011]. Similarly, parents of children with ASD mediate the acquisition of their children's self-regulation skills, using their own co-regulating skills through supporting presence and sensitive guidance [Kasari, Gulsrud, Wong, Kwon, & Locke, 2010; Ting & Weiss, 2017]. Thus, we would like to argue that parents of adolescents with ASD try to promote their adolescent-child's ability to handle a conflict, by elaborating their child's communication, reducing the child's distress, and offering their empathic support without demonstrating negative and hostile behaviors.

The examination of the adolescent's part in the interaction revealed that, in comparison to their TD peers, adolescents with ASD were highly engaged and more motivated to persist in the conflictual conversation with the parent. More specifically, the TD adolescents expressed more negative affect, and showed reduced initiation, compared to the adolescents with ASD. These findings seem surprising, in view of reports of less initiative and lower responsiveness of young children with ASD [Richmond, 2010; Swain, Eadie, Prior, & Reilly, 2015]. In the absence of other research regarding the interaction of adolescents with ASD with their parents, several different interpretations of these findings could be considered:

One option is that the adolescent with ASD responds to the parent's encouragement and enhanced involvement in a positive, childlike communication style, which is different than the withdrawn, disinterested stance of the TD adolescent. The correlations between parental sensitivity and adolescent involvement, which were found in the ASD group only, and between parental factors and

adolescent withdrawal in the TD group only, may support this claim. A communication style that is more characteristic of younger children is a common feature among individuals with ASD (Giovingo, 2008). Previous studies found various areas of childlike social skills and behaviors such as immature use of pragmatic language and humor [Fitzgerald, 2004; Naigles et al., 2016], participation in games which are too young for their age (Ballan, 2012) and acting inappropriately to their age [Orinstein et al., 2015]. Similarly, the neurodevelopmental delays of the adolescents with ASD may hinder their ability to handle an argument. In our study, the TD adolescents were more negative, and less cooperative, demonstrating the autonomous stance that is characteristic of parent-adolescent interaction [Branje et al., 2009]. It is possible to view the absence of this developmental process in the ASD group as an indicator of a developmental delay, rather than a deficit. However, future studies looking into the relationships of young adults with ASD with their parents are needed in order to empirically examine this argument.

Another explanation to the adolescents' behavior, which should also be tested in a future study, could be related to a perseverative cognitive style in the ASD group. Adolescents with ASD might have been more involved in, and less withdrawn from, the conflictual interaction due to their focus on the conversation's topic and on proving their point, while missing pertinent social cues regarding the parent's mental and emotional position [Golan, Sinai-Gavrilov, & Baron-Cohen, 2015].

A third explanation, looking at the adolescents' behavior in a social context, could be that the lack of supportive peers or access to social groups prevents adolescents with ASD from identifying with adolescent autonomy themes (e.g., smoking, drinking, defying parental boundaries, etc.), which for TD adolescents is often a source of tension with, and disengagement from, their parents. Consequently, adolescents with ASD can maintain a positive and engaged interaction with their parents, even in a potentially stressful context, such as discussing a common conflict.

It is difficult to disentangle parent and child behaviors in the current observation, though we believe the two are codependent. Therefore, during a conflictual interaction, the parent acknowledges the adolescent's difficulty to maintain an autonomous stance, and consequently adapts his behavior by facilitating the discussion, encouraging the adolescent to express himself, elaborating on what's been said and remaining positive, supportive and empathic. The adolescent with ASD, on his part, initiates arguments, and remains task-focused and positive, despite the conflictual nature of the situation. This process, however, does not result in better parent-adolescent reciprocity.

Indeed, an examination of the dyadic factors revealed that, despite the positive and engaging behaviors observed in both parents and adolescents with ASD, their dyadic reciprocity was found to be poorer than that of

the TD parent–adolescent dyad. This could be related to the fundamental impairment of individuals with ASD in a back-and-forth flow of social interaction [Ratto et al., 2011] due to deficits in the awareness to, and interpretation of, the emotional and interpersonal cues of others [Dziobek et al., 2006; Fridenson-Hayo et al., 2016]. A more fine-grained look into the items that are included in the dyadic reciprocity factor, revealed that the group difference was mostly affected by assessments of the dyad's fluency. Therefore, the ability of parents and adolescents with ASD to interact fluently seems to be hampered, in spite of the high involvement of both parties.

A possible explanation for this phenomenon could be related to a lack of synchrony between the parent and the adolescent with ASD. Parent–child synchrony is defined as a mutually regulated and harmonious interaction [Harrist & Waugh, 2002], in which both partners are attuned to one another's verbal and nonverbal behaviors and emotion responses [Davis, Bilms, & Suveg, 2017; Leclère et al., 2014], leading to a fluent dialogue. Parent–child synchrony is an important developmental mechanism which is linked to long-term social adjustment and communication skills in children with TD (Feldman, 2010; Leclère et al., 2014) and with ASD [Baker et al., 2015; Siller & Sigman, 2002]. Baker et al. [2015] have shown that parent–child bio-behavioral synchrony is negatively associated with child's level of autism symptoms. Feldman et al., [2014] reported that toddlers with ASD and their parents had lower social-gaze and touch synchrony, compared to TD toddlers and their parents, and that synchrony predicted oxytocin levels in toddlers of both groups [Feldman et al., 2014]. Future examinations of synchrony and its association with oxytocin in parent–adolescent with ASD dyads could shed light on the developmental nature of parent–child reciprocity in individuals with ASD. Looking closely at this developmental trajectory seems important, in view of the association, we found between parent–adolescent reciprocity in the ASD group and the adolescent's social conversation skills with a peer.

We found that parent–adolescent reciprocity predicted the adolescents' social skills, as observed in a conversation the adolescent with ASD conducted with an unfamiliar peer. In typical development, parent–child reciprocity is a key element of early social relationships, and sets the foundation for social communication, social adjustment, empathy, self-regulation, and other prosocial behaviors [Bottema-Beutel, Yoder, Hochman, & Watson, 2014; Feldman, Bamberger, & Kanat-Maymon, 2013; Thomasin & Suveg, 2014]. A longitudinal study has demonstrated an association between parent–child reciprocity and social functioning in TD adolescents [Feldman, Bamberger, & Kanat-Maymon, 2013]. Our finding replicated this association in adolescents with ASD. The association found suggests that although parent–adolescent dyads were less reciprocal in the ASD group, compared to the

TD group, they nevertheless maintain a significant role in shaping and expanding the social repertoire of adolescents with ASD. In other words, the relationship adolescents with ASD have with their parents may still give them an opportunity to practice important perspective taking, exchanging information, negotiation, and conflict resolution skills in a secure and enabling environment. These findings support the inclusion of parents as social coaches to their adolescents with ASD, which have shown to be effective in various social skills training studies [Karst & Van Hecke, 2012; Laugeson, Frankel, Mogil, & Dillon, 2009; Yoo et al., 2014; Rabin, Israel-Yaacov, Laugeson, Mor-Snir, & Golan, 2018]. However, our findings also highlight the importance of pre-intervention screening of parent–adolescent dyads, based on their level of reciprocity. Dyads that are characterized by poor reciprocity, or by a critical, judgmental position of the parent, may even be detrimental to the therapeutic process. The effect parent–adolescent reciprocity has on the effectiveness of parent-mediated interventions requires further inquiry.

There were several limitations to the current study, that were mainly related to the comparison of the ASD group with a sample of TD adolescents and their parents who participated in a longitudinal parent–child interaction study. First, we had to rely on TD parents' reporting that their children had no neurodevelopmental deficits, psychiatric diagnoses or intellectual functioning disability. In addition, TD adolescents were not measured on their conversational skills with a peer, which prevented us from associating TD adolescents' social abilities with a peer and their interaction with a parent. Due to the small sample of fathers in our study, we were unable to examine differential effects of father–adolescent and mother–adolescent interactions, which have been tested in TD adolescents [Feldman, Bamberger, & Kanat-Maymon, 2013], and should be examined in adolescents with ASD in future studies. Finally, although all raters reached 90% reliability with the CIB's developer, they were not blind to the participants' diagnosis (or lack of).

We conclude that despite their different developmental trajectory, the interactions adolescents with ASD have with their parents maintain an important role in shaping their ability to socialize and to handle arguments, which is also reflected in their peer interaction skills.

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