



Contents lists available at ScienceDirect

Research in Developmental Disabilities

journal homepage: www.elsevier.com/locate/redevdis

Empathy and perceptions of their brother or sister among adolescent siblings of individuals with and without autism spectrum disorder

Carolyn M. Shivers

Virginia Tech, 309 Wallace Hall, United States



ARTICLE INFO

Number of reviews completed is 3

This paper belongs to the special issue SI: Sib Relationships in DD

Keywords:

Siblings
Autism spectrum disorder
Empathy
Adolescence

ABSTRACT

Background: Although clinicians have hypothesized that siblings of individuals with intellectual and developmental disabilities, including autism spectrum disorder (ASD), may exhibit more empathy and understanding of others, no studies have yet examined empathy among siblings of individuals with ASD.

Aims: The current study examined self-reported empathy and feelings about adolescents' brothers or sisters with and without ASD.

Methods and Procedures: Adolescent siblings (age 12–18) of individuals with ($n = 26$) or without ASD ($n = 48$) completed an online survey with measures of empathy and their feelings about their brother or sister, as well as an open ended task asking them for three "magic wishes." Outcomes and

Results: Siblings of individuals with ASD (ASD-Sibs) reported significantly more perspective-taking than did siblings of typically-developing individuals (TD-Sibs). Perspective-taking was significantly related to feelings of positive affect toward the brother/sister for both groups. ASD-Sibs also were significantly more likely to report wishes related to their family, while TD-Sibs reported more wishes for themselves.

Conclusions and Implications: Findings suggest that potentially higher levels of perspective-taking ability among ASD-Sibs may contribute to better understanding of and therefore more positive affect toward their brother or sister with ASD. More research is needed to understand patterns of empathy among ASD-Sibs.

What this paper adds

This paper provides the first quantitative examination of empathy among adolescent siblings of individuals with autism spectrum disorder (ASD). It expands on the qualitative literature showing the potential benefits of having a brother or sister with ASD. Additionally, results show how greater use of perspective-taking can relate to more feelings of positive affect toward the brother or sister with ASD. This finding has implications for strategies for promoting healthy relationships between individuals with ASD and their siblings across the life course.

E-mail address: shivercm@vt.edu.

<https://doi.org/10.1016/j.ridd.2019.103451>

Received 1 December 2018; Received in revised form 15 May 2019; Accepted 11 July 2019

Available online 20 July 2019

0891-4222/ © 2019 Elsevier Ltd. All rights reserved.

1. Introduction

Autism spectrum disorder (ASD) is a developmental disability characterized by difficulties in social communication and restricted and repetitive interests (American Psychiatric Association, 2013); current prevalence estimates indicate that 1 in 59 children has a diagnosis of ASD (Centers for Disease Control & Prevention, 2018). Although it is important to understand the experiences of individuals with ASD, it is also essential to understand how the presence of an ASD impacts others, including family members such as typically-developing siblings.

Among family members of individuals with ASD, much of the existing literature discusses adult caregivers – particularly mothers (e.g., Hayes & Watson, 2013). However, siblings of individuals with ASD (ASD-Sibs), especially those living at home, may experience many of the same environmental factors and events that caregivers encounter. As the sibling relationship tends to be the longest-lasting relationship in a person's lifetime (Cicirelli, 1995), the individual with ASD and the ASD-Sib can play a large role in each other's lives. Thus, it is important to understand the experiences of ASD-Sibs in order to promote healthy relationships and development across the lifespan.

Existing research on ASD-Sibs has yielded mixed results. Some studies report no differences between ASD-Sibs and comparison groups (Rodgers, Warhol, & Fox, 2016); that is, ASD-Sibs fare no better or worse than siblings of individuals without ASD. Other studies report that ASD-Sibs have more behavior problems (Gau, Chou, & Lee, 2010), poorer social functioning (Verté, Roeyers, & Buysse, 2003), and greater levels of anxiety or depression (O'Neill & Murray, 2016) than siblings of individuals without ASD. A recent meta-analysis showed that, in aggregate, ASD-Sibs are more likely to experience poor psychosocial and behavioral functioning than siblings of individuals without ASD (Shivers, Jackson, & McGregor, 2018), though the overall difference is small in magnitude. What is still missing from the literature, however, is a more thorough examination of potential positive outcomes or experiences of ASD-Sibs.

One potential benefit that has been briefly explored among siblings of individuals with other intellectual and developmental disabilities (IDD), but not exclusively ASD, is increased empathy. It has been suggested that siblings of individuals with IDD may become more empathic, more patient, and more understanding of individual differences (Meyer & Holl, 2014), and some qualitative studies have supported this claim (Flaton, 2006; Grossman, 1972). However, to properly study empathy among ASD-sibs, it is important to understand the conceptualization of empathy in the literature.

Broadly, empathy is the collection of emotional and cognitive reactions to observing the experiences of others (Davis, 1980). As with most human developmental constructs, empathy can be broken down into multiple factors. One of the most common self-report measures of empathy, the Interpersonal Reactivity Index (IRI; Davis, 1980), assesses individuals on four subscales: perspective taking, empathic concern, fantasy, and personal distress. Perspective taking refers to a person's ability to anticipate the behavior and reactions of other people. Empathic concern encompasses emotional responses of sympathy and concern towards others, and fantasy refers to an individual's tendency to involve themselves with the feelings and actions of fictional characters. Finally, personal distress measures a person's self-directed feelings of fear or discomfort when observing other people's experiences. These aspects of understanding the emotions of others are closely tied to theory of mind (ToM), which refers to the more general ability to conceive of another's thoughts, desires, and behaviors (Bzdok et al., 2012). The capacity to correctly understand other's thoughts precedes the ability to anticipate their behavior and react in a prosocial way. While empathy is a prosocial trait in and of itself, the factor of perspective taking is most closely related to theory of mind (Davis, 1980), as it is the most cognitive-based of the four subscales of the IRI.

Because of this overlap with theory of mind, the issue of empathy among ASD-Sibs may be more complex than empathy among IDD-Sibs in general. Although having siblings, particularly older siblings, is associated with improved theory of mind (e.g. McAlister & Peterson, 2007; Perner, Ruffman, & Leekam, 1994), individuals with ASD have substantially impaired ToM, even when compared to individuals with other IDD (Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). Therefore, ASD-Sibs may not experience the same social learning benefits as siblings in the general literature in terms of developing theory of mind and empathy.

Although it is important to study siblings across the lifespan, adolescence can be a particularly trying time for siblings of individuals with IDD, including ASD. Compared to adult siblings, adolescent siblings of individuals with IDD reported more embarrassment in regards to their brother/sister with a disability and more concern with social stigma (Wilson, McGillivray, & Zetlin, 1992). Additionally, adolescent siblings experienced more conflict and less satisfaction with their sibling relationships when compared to adult siblings of individuals with IDD (Begun, 1989). Therefore, adolescence may be a particularly stressful time for siblings of individuals with ASD, and they may be more prone to experiencing more negative stances toward their brother or sister than siblings of typically-developing individuals.

Among adolescents, empathy is positively associated with altruistic behavior (Barr & Higgins-D'Alessandro, 2007), and low levels of empathic concern are related to bullying behavior (Gini, Albiero, Benelli, & Altoe, 2008). Specifically, perspective taking has been found to relate to higher levels of overall prosocial moral reasoning (Eisenberg, Zhou, & Koller, 2001), and perspective taking and empathic concern are related to lower levels of relational and overt aggression over time (Batanova & Loukas, 2011). However, other studies of empathy among adolescents reveal gender differences; for both males and females, higher levels of empathy predict greater prosocial behavior, but empathy only predicted lower levels of aggressive behavior for females (Laible, Carlo, & Roesch, 2004). Additionally, adolescent females typically report greater empathy than males in general (Laible et al., 2004; Van der Graaff et al., 2014). Therefore, it is important to consider gender when examining empathy.

Beyond implications for general social outcomes, empathy can play a significant role in the sibling relationship. The behavior of older siblings is important to the development of empathy among younger siblings (Tucker, Updegraff, McHale, & Crouter, 1999), and self-reported closeness between siblings is associated with higher levels of empathy (Lam, Solmeyer, & McHale, 2012). When it

comes to studying sibling empathy among families of children with illness or disability, however, many studies have focused on siblings of children with cancer or other chronic illness (e.g., Labay & Walco, 2004). Siblings of children with cancer report increased empathy and compassion (Alderfer et al., 2010), and higher levels of empathy in siblings of children with cancer are associated with better adjustment among such siblings (Labay & Walco, 2004). High levels of empathy among siblings of children with congenital heart disease were related to increases in the patients' perceptions of sibling acceptance and sensitivity (Janus & Goldberg, 1995). These studies suggest that empathy can play a role in the sibling relationship for siblings of non-typically developing individuals.

However, the specifics of ASD may have a different impact on the development of empathy in siblings. Individuals with autism can exhibit deficits in perspective taking, which can impair overall empathy and social interactions (e.g. LeBlanc et al., 2003). This potential impairment may be present in siblings through shared phenotypic traits, as first-degree relatives of individuals with ASD are more likely to show characteristics of the broader autism phenotype (Piven, Palmer, Jacobi, Childress, & Arndt, 1997). Additionally, because siblings provide socialization of empathy (Tucker et al., 1999), ASD-Sibs, particularly those younger than the individual with ASD, may not have as many chances to observe empathic behavior as siblings of individuals without ASD.

1.1. Current study

The current study is exploratory in nature, with the goal of examining patterns of self-reported empathy among adolescent siblings of individuals with ASD as compared to adolescent siblings of individuals with no intellectual or developmental disabilities. The analyses will examine two main research questions: 1) Do ASD-Sibs report any differences in types of empathy or total empathy as compared to TD-Sibs, and 2) How do patterns of empathy in ASD-Sibs and TD-Sibs relate to their perception of their brother or sister?

2. Method

2.1. Procedure

2.1.1. Ethical approval

The study received IRB approval from an R1 research university in the United States. Before answering any survey questions, participants were presented with consent and assent forms informing them that all participation was voluntary and they could stop at any time or skip any questions for any reason. The contact information for the lead researcher was provided, in case participants had any questions or concerns.

2.1.2. Screening

Participants for the current study were recruited through state and local organizations that serve people with intellectual and developmental disabilities (IDD) and their families. Inclusion criteria were as follows: families with two children, at least one of whom was between the ages of 12 and 18 and had no disabilities (the "sibling"). The second child ("target child") could be any age, but still had to live at home with the sibling. The broader age range for the target child was allowed to account for the fact that many individuals with IDD continue to live with their families beyond the age of 18. Similarly, the 12–18 age range for the siblings was chosen as the limit for adolescence to a) ensure that the siblings could read and comprehend all of the included measures and b) to limit the possibility that the siblings were living away from home (e.g., at university). The target child either had to have an intellectual or developmental disability or no disabilities at all. Because the data collection was conducted online and the original sample was open to families of individuals with any IDD, including ASD, the researchers relied on self-report rather than independent validation of diagnoses. That is, disability organizations were contacted, but, as with any online research, there was no guarantee that participants met the inclusion criteria beyond their own assertion.

2.1.3. Data collection

The recruitment materials included a link to the survey. Parents completed the first part of the survey, which included consent and permission forms. If neither of the children in the family had a disability, both were between the ages of 12 and 18, and both wanted to participate, the parent respondent was instructed to choose which would be designated the "target child" and which would be the "sibling." Siblings (the participant between 12 and 18 with no disabilities) would then complete the sibling self-report measures. The parent part of the survey (which included additional measures not pertinent to the current study; see Blinded for Review) took 20–25 minutes to complete; the sibling portion took 10–15 minutes.

2.2. Participants

A total of 97 parent-child dyads completed the survey – 48 families of target children with no disabilities, and 49 families of target children with IDD. Of the families of individuals with IDD, 26 reported that the target child had ASD. Therefore, the final sample size was 74 (26 in the ASD group and 48 in the TD group). The majority of the parent respondents were female (97.3%) and currently married (79.7%), with a mean age of 44.48 (SD = 6.06). The target child group was more male than female (56.8% male), with ages ranging from 3 to 19 (M = 13.95, SD = 3.20). The siblings were primarily female (63.5%), with a mean age of 14.35 (SD = 1.96). Full breakdown of demographic characteristics by group (ASD vs. TD) can be found in Table 1. The groups were significantly different on target child gender, with the target children in the ASD group having a significantly higher percentage of males. This is consistent

Table 1
Demographics by group.

	ASD n = 26 Mean (SD)/Percentage	TD n = 48 Mean (SD)/Percentage	χ^2 /t Value
Age	14.54 (1.96)	14.27 (2.01)	-.55
Gender (% Female)	53.8%	68.8%	1.61
Race/Ethnicity			4.45
White	73.1%	91.5%	
Black	–	–	
Hispanic	19.2%	6.4%	
Asian	7.7%	2.1%	
Older than Target Child (%)	50.0%	50.0%	.00
<i>Target Child</i>			
Age	13.92 (3.05)	14.00 (3.00)	.11
Gender (% Female)	19.2%	56.3%	9.42**
<i>Parent</i>			
Age	45.04 (6.04)	44.04 (5.97)	-.68
Gender (% Female)	96.2%	97.9%	.20
Marital Status			
Currently Married	73.1%	83.3%	1.94
Never Married	2.7%	4.2%	
Separated	7.7%	2.1%	
Divorced	11.5%	10.4%	

** p < .01.

with diagnostic rates of ASD by gender (CDC, 2016). There were no other demographic differences between the ASD group and the TD group.

2.3. Measures

2.3.1. Sibling empathy

Sibling empathy was measured using the Interpersonal Reactivity Index (IRI; Davis, 1980), a self-report measure of 28 items on a 5-point Likert scale (1 = does not describe me well to 5 = describes me very well). The IRI consists of four 7-item subscales: fantasy (e.g., “After seeing a play or movie, I have felt as though I were one of the characters”), empathic concern (e.g., “I am often quite touched by things I see happen”), perspective taking (e.g., “I believe there are two sides to every question and try to look at them both”), and personal distress (e.g., “Being in a tense emotional situation scares me”). The scores for each subscale ranged from 7 to 35, and the alpha values for the current sample ranged from .70 to .83.

2.3.2. Three wishes

To supplement the measure of empathy, siblings were asked to provide open-ended responses to the question “If you had three magic wishes, what would you wish for?” The Three Wishes task has been used in qualitative research with children as young as six (e.g., Dykens, Schwenk, Maxwell, & Myatt, 2007; Nereo & Hinton, 2003). Sharing “wishes” for other people or society in general can be seen as another expression of empathy and prosocial behavior. Specifically, the Three Wishes task allows for personalization – that is, siblings could “wish” for things important to them, including things specific to their family and environment. However, the question was presented first so as not to influence siblings with any of the other study variables.

Content coding was used to identify themes among the siblings’ responses to the “Three Wishes” question. To develop content codes for the siblings’ wishes, one researcher with graduate-level training in qualitative coding read through each answer, and developed a list of nine content codes. Codes were discussed with faculty advisors, and revisions and clarifications of definitions were made until the final nine codes and three categories were finalized. Codes and example responses can be found in Table 2. The nine codes were grouped based on the intended recipient of the wish: Self, Family, and Society. For each category, participants received a code of 1 (at least one of the sibling’s wishes contained this theme) or 0 (none of the sibling’s wishes contained this theme). Each wish was then assigned one code, so each respondent could have up to three assigned codes. A random selection of 30 responses was then presented to a second researcher for reliability coding, using the code definitions created by the first researcher. Across the 9 categories, median kappas equaled .96, with a range of .68–1.00. According to Cicchetti (1994), kappas above .75 indicate “excellent” inter-rater reliability, while kappas above .60 indicate “good” reliability.

2.3.3. Siblings relationship

In order to capture a broad range of potential emotions in the sibling relationship, the current study used the Multiple Affect Adjective Checklist – Revised (MAACL-R; Zuckerman & Lubin, 1965). Rather than assessing behavior between the siblings, as some sibling relationship measures do, the MAACL-R allows siblings to check off any and all emotions that they generally felt about their brother or sister. The MAACL-R is a list of 114 adjectives, all at a reading level of 6th grade or below (Zuckerman & Lubin, 1965).

Table 2
Three wishes content codes and examples.

Codes	Examples
<i>Self Codes</i>	
Material	"To have many kittens," "1 billion US dollars"
Aspirational	"To become a veterinarian (sic)" "Get a full scholarship to MIT"
Fantasy	"All superpowers" "Marry Josh Hutcherson!!!!!"
Physical	"To be taller" "To be thinner"
Family	"I wish I had a dad" "My sister to be nicer to me"
Other	"Happiness" "More time with friends"
<i>Family Codes</i>	
General Family	"My dad has less medical problems" "For our family to be happy"
Target Child	"I wish my brother could speak" "That my brother was normal"
<i>Society</i>	
Society	"Equal rights for all" "An end to world hunger"

Siblings marked off every adjective that applied to their general feelings toward their brother or sister, and t-scores were calculated based on age and gender of the participant, as well as total number of adjectives checked. The subscales include anxiety (e.g., "worried", "afraid"), depression (e.g., "low," "miserable"), hostility (e.g., "irritated," "furious"), and positive affect (e.g., "happy", "tender"). Chronbach's alphas for the current study ranged from .76 to .90. As a previous study reported on differences in the sibling relationship between ASD-Sibs and comparison groups ([redacted for blind review]), the current study used the MAACL-R for correlational analyses only.

2.3.4. Target child behavior problems

Behavior problems among the target children were assessed with the Behavior Problems Index (BPI; Peterson & Zill, 1986). Parents rated the target children on 30 items using a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true; Chronbach's alpha = .93 for the current sample). The BPI includes 14 "internalizing" behavior problems (e.g., "Worries too much," "Is too dependent on others") and 16 "externalizing" behavior problems (e.g., "Is impulsive, or acts without thinking," "Bullies or is cruel or mean to others").

2.4. Data analysis

For quantitative analysis of variables, t-tests were used to compare sibling empathy by sibling gender and by group (ASD vs. TD), and Pearson correlations were run to assess relationships among empathy, sibling age, and target child behavior problems. Finally, hierarchical linear regression was used to determine the collective relationship among sibling gender, sibling age, group (ASD vs. TD), and target child behavior problems. For the Three Wishes responses, chi-squares were run on each individual code and each coding category (self, family, and society) to compare results by gender and family disability status.

3. Results

3.1. Group comparisons

3.1.1. Empathy

T-tests revealed no significant differences between ASD-Sibs and TD-Sibs in overall empathy. However, ASD-Sibs reported significantly higher levels of perspective taking than did TD-Sibs ($t = -2.25$, $p = .028$), which corresponds to a medium effect size ($d = .55$). There were no differences in any of the subscales of empathy based on birth order (e.g., whether the sibling was older or younger than the target child), but females reported significantly higher levels of fantasy empathy ($t = -2.45$, $p < .05$), empathic concern ($t = -2.45$, $p < .05$), personal distress ($t = -2.14$, $p < .05$), and overall empathy ($t = -3.34$, $p = .001$) than did males. Means and standard deviations by group for the IRI can be found in Table 3.

Table 3
Means and standard deviations of empathy by group.

	ASD-Sibs (n = 26)	TD-Sibs (n = 48)	t-Values	Cohen's d
Fantasy	23.38 (5.97)	23.23 (5.69)	-0.11	.03
Perspective Taking	23.38 (5.87)	20.06 (6.19)	-2.25*	.55
Empathic Concern	26.92 (5.28)	26.10 (4.59)	-0.70	.17
Personal Distress	18.77 (5.26)	17.77 (5.02)	-0.80	.19
Total Empathy	92.46 (15.72)	87.17 (11.76)	-1.64	.38

* $p < .05$.

Table 4
Percentage of each sample who indicated wishes in each category.

	ASD-Sibs	TD-Sibs	χ^2 Values
<i>Self Codes (Any)</i>	84.6%	97.9%	4.74*
Material	50.0%	60.4%	0.75
Aspirational	42.3%	41.7%	0.00
Fantasy	11.5%	43.8%	7.99**
Physical	3.8%	10.4%	0.98
Family	23.1%	4.2%	6.26*
Other	19.2%	16.7%	0.08
<i>Family Codes (Any)</i>	50.0%	14.6%	10.73**
General Family	23.1%	12.5%	1.39
Target Child	42.3%	2.1%	20.08***
<i>Society</i>			
Society	19.2%	33.3%	1.65

* $p < .05$.
 ** $p < .01$.
 *** $p < .001$.

3.1.2. Three wishes

Of the specific codes, TD-Sibs reported significantly more self fantasy wishes than did ASD-Sibs ($X^2 = 7.99, p = .005$), and were slightly more likely than ASD-Sibs to report self-focused wishes overall ($X^2 = 4.74, p = .049$). In contrast, ASD-Sibs reported more wishes about the target child (e.g., “my sister could talk;” “my brother not to be disabled;” $X^2 = 20.08, p < .001$) and were more likely to report wishes about their family overall ($X^2 = 10.73, p = .002$), as well as self-directed family wishes (e.g., $X^2 = 6.26, p = .019$). A full breakdown of the percentage of participants in each group who indicated each category of wishes can be found in Table 4.

3.2. Correlation and regression of empathy variables

Although the subscales of the IRI correlated with each other, as expected, no factors of empathy were significantly correlated with target child behavior problems or sibling age. However, perspective taking was significantly correlated with sibling reports of positive affect toward their brother or sister ($r = .43, p < .001$). To determine if this correlation differed by group, a Fisher’s z comparison was analyzed, and the magnitude of correlation between perspective taking and positive affect did not differ between ASD-Sibs ($r = .42$) and TD-Sibs ($r = .48; z = .29, p = .772$). The full correlation matrix can be found in Table 5.

For overall empathy, the entire model (group, sibling gender, sibling age, target child gender, and target child behavior problems) accounted for 19% of the variance ($F = 3.13, p = .013$), with group ($\beta = .32, p = .035$) and sibling gender ($\beta = .37, p = .002$) independently predicting overall empathy. For perspective taking, the overall model was not significant ($R^2 = 0.13, F = 2.07, p = .08$), but group independently predicted perspective taking ($\beta = .44, p = .006$). Standardized beta values for both regression models can be found in Table 6.

Table 5
Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Fantasy												
2. Perspective Taking	.32**											
3. Empathic Concern	.33**	.57***										
4. Personal Distress	-.02	-.15	-.13									
5. Total Empathy	.68**	.75**	.72**	.26								
6. Externalizing Problems	.00	.01	-.05	.21	.07							
7. Internalizing Problems	.05	.04	-.03	.15	.08	.71***						
8. Total Behavior Problems	.02	.03	-.05	.20	.08	.95***	.90***					
9. Sibling Age	.15	.14	.12	-.07	.14	.10	.01	.07				
10. Anxiety	.07	.12	.02	.08	.12	.39**	.47***	.46***	.07			
11. Depression	.25	.05	-.04	.22	.20	.21	.36**	.30**	-.08	.63***		
12. Hostility	.04	-.18	-.15	.17	-.06	.27	.32**	.31**	-.09	.50***	.60**	
13. Positive Affect	.10	.43***	.29	-.35**	.21	-.27	-.27	-.29	.08	.13	-.02	-.04

* $p < .05$.
 ** $p < .01$.
 *** $p < .001$.

Table 6
Standardized beta values for regression models predicting perspective taking and total empathy.

	Total Empathy	Perspective Taking	Fantasy	Empathic Concern	Personal Distress
Group (ASD vs. TD)	.32*	.44**	.07	.21	.04
Sibling Age	.07	.10	.10	.07	-.12
Sibling Gender	.37**	.15	.26*	.32*	.19
Target Child Gender	.08	.12	.04	.00	.04
Target Child Behavior Problems	-.09	-.22	.01	-.16	.19
R ²	.19*	.13	.09	.13	.08

* $p < .05$.

** $p < .01$.

4. Discussion

The current study involved and exploratory analyses of patterns of empathy among adolescent ASD-Sibs and TD-Sibs. Although overall levels of empathy did not differ between groups, ASD-Sibs reported significantly higher levels of perspective taking than did TD-Sibs. Such perspective taking was significantly correlated with positive feelings toward the target child for both groups, but not behavior problems of the target child. Group (ASD vs. TD) significantly predicted both perspective taking and total empathy in regression analyses when controlling for sibling gender, sibling age, target child gender, and target child behavior problems. Additionally, in open-ended responses to the three wishes task, ASD-Sibs were significantly more likely to express wishes for their brother/sister or family overall and less likely to express wishes for themselves than TD-Sibs.

The apparent strength in perspective taking is surprising given the deficits in perspective-taking among individuals with ASD (LeBlanc et al., 2003) and the higher levels of autistic symptoms among ASD-Sibs (Piven et al., 1997). It should be noted, however, that most measures of autistic symptomatology do not explicitly address perspective taking; rather, they measure general social interest and social skills and restrictive and repetitive interests (e.g., Gerdtts, Bernier, Dawson, & Estes, 2013). Perspective taking can certainly help with socialization, but, as commonly measured in the literature, an increase in autistic symptoms among ASD-Sibs does not necessarily indicate a decrease in perspective taking ability. Indeed, in a study specific to theory of mind (specifically, the false belief task), ASD-Sibs did not exhibit any deficits in ToM compared to TD-Sibs (Shaked, Gamliel, & Yirmiya, 2006). In the broader literature on siblings of individuals with disabilities, it has been hypothesized that siblings may become more patient and understanding of individual differences (Meyer & Holl, 2014), behaviors that can relate to perspective taking ability, but no studies have borne out that difference (De Caroli & Sagone, 2013). The current results could provide support for that hypothesis – that siblings, seeing the struggles of their brother or sister with ASD, develop better perspective-taking skills to understand their brother/sister's behavior. This explanation (that siblings develop perspective to better understand their brother/sister) could also explain why the ASD-Sibs did not exhibit higher levels of any of the other IRI subscales. Personal distress and fantasy, in particular, would not benefit the sibling relationship, and empathic concern would not help the sibling understand their brother/sister. Regardless, the current results suggest a need for further research, both in terms of how autistic symptoms may or may not emerge among ASD-Sibs, as well as the broader potential benefits of having a brother or sister with intellectual and developmental disabilities.

For the entire sample, no subscale of empathy was significantly correlated with either the brother/sister's behavior problems or negative feelings toward the brother/sister (i.e., depression, hostility, anxiety). However, perspective taking and personal distress were correlated with positive affect toward the brother/sister, albeit in opposite directions. This finding seems to support the above hypothesis that perspective taking is developed partially to support the sibling relationship, in that siblings with higher levels of perspective taking also report greater positive feelings toward their brother or sister. Although perspective taking does not seem to protect against negative feelings, the increase in positive feelings is worth further exploration. Although these results are preliminary in nature, it is possible that promoting perspective taking skills could improve the sibling relationship among individuals with ASD and their siblings.

In regression analysis, group (ASD vs. TD) predicted both perspective taking and overall empathy. This is an important finding because the initial *t*-test did not yield a significant difference in overall empathy by group. However, when controlling for sibling age, sibling gender (which was a significant predictor), target child gender, and target child behavior problems, group emerged as a significant predictor of overall empathy. Although the groups are not large in size, the regression results suggest that adolescent ASD-Sibs may exhibit differences in general empathy compared to TD-Sibs. Sibling gender also predicted fantasy, empathic concern, and total empathy, aligning with the literature showing females report greater empathy than males (Van der Graaff et al., 2014). Future studies with larger sample sizes could help expand our understanding of empathy in female ASD-Sibs versus male ASD-Sibs.

In addition to significant differences in perspective taking, ASD-Sibs were more likely to report family-directed wishes and less likely to report self-directed wishes. However, these differences should be interpreted with caution, as many of the family-directed wishes, particularly those regarding the target child, could also benefit the sibling. For example, ASD-Sibs who reported that they wished their brother or sister “could talk” or “didn't have a disability” could be wishing for a playmate that better fit the sib's own goals. The lack of significant differences in society-directed wishes (e.g., “world peace,” “an end to hunger”) suggests that ASD-Sibs do not feel any more global concern than TD-Sibs, but without a corresponding measure of social desirability, we cannot accurately determine how true these wishes were. The three wishes task provides an interesting dimension to our analyses of empathy and the sibling relationship by potentially alluding to family-directed feelings of concern and compassion, rather than general feelings of

empathy overall.

In terms of the relationships among study variables, the correlation between empathy and the sibling relationship provides useful information for potential support strategies. ASD-Sibs in the current sample did not report any less positive affect toward their brother or sister than did TD-Sibs, but they report slightly more negative feelings overall ([Blinded for review], 2018). The current study shows that empathy is not significantly related to any negative feelings toward the brother or sister, but is correlated with positive affect. Specifically, greater use of perspective taking is associated with more positive feelings toward the brother/sister. Thus, the higher levels of perspective taking reported by the ASD-Sibs may help promote positive feelings toward the individual with ASD via a heightened ability or willingness to understand things from the brother or sister's point of view. The relationship between perspective taking and positive affect toward the brother/sister did not differ between groups, however, which suggests that perspective taking may promote positive sibling relationships in a more universal manner. Regardless, promoting healthy relationships between ASD-Sibs and their brother or sister with ASD can contribute to positive outcomes across the lifespan, so the potential benefits of examining and encouraging perspective taking are worth further exploration.

4.1. Future directions

The current study has several implications for research and practice. The potential benefit to ASD-Sibs in perspective taking deserves further research. First, larger studies are needed to determine if this phenomenon is generally found in ASD-Sibs and how pervasive it is. Then, careful examination of the parameters of perspective taking can help researchers better understand cognition and emotion in ASD-Sibs. For example, how is perspective taking different from, or perhaps spared from broader autism phenotype characteristics? Additionally, the relationship between empathy and the sibling relationship in families of individuals with ASD deserves further consideration. If strong perspective taking ability can contribute to more positive feelings toward the brother or sister with ASD, then clinicians and families could potentially use lessons on empathy to encourage healthy sibling relationships. It is also worth examining if these potential strengths in perspective taking are related to benefits in other social relationships. Although previous studies have shown that, on average, ASD-Sibs are more likely to report poor social outcomes (Shivers et al., 2018), perspective taking has been linked to lower levels of aggression (Li et al., 2015). Therefore, ASD-Sibs with higher levels of perspective taking ability may not exhibit the deficits in social functioning found on average. More research with larger sample sizes is needed to examine the social implications of perspective taking among ASD-Sibs.

4.2. Limitations

The current study has several limitations that inhibit generalizability. First, the sample size, particularly of the ASD group, is relatively small. To fully understand empathy among ASD-Sibs, more comprehensive studies are needed. Additionally, the sample was restricted to adolescent siblings in two-child families. Both of these inclusion criteria – age and sibship size – limit generalizability. The current results, therefore, cannot be applied to younger children or adults, and we do not know whether or not ASD-Sibs with multiple brothers or sister exhibit similar patterns of empathy. More specifically, the original study from which this data was drawn was not exclusive to ASD-Sibs; that is, families and siblings of individuals with any IDD were invited to participate. Thus, no ASD-specific measures (such as severity of ASD symptoms) were included. Future studies would benefit from analysis of how ASD-specific events and characteristics relate to sibling empathy. In particular, gathering data from the child with ASD (the target child) would greatly expand our current understanding of sibling interactions and outcomes. The present analyses do not include any self-report from the target children, which limits the perspective on the sibling relationship. Finally, the current study relied on self-report for diagnostic status. Thus, we cannot be sure of the brother or sister's ASD diagnosis or severity, nor did we measure the siblings for any shared genetics or phenotypic behaviors. The broader autism phenotype is particularly important for ASD-Sib researchers and deserves future consideration.

4.3. Conclusions

In the current sample, adolescent ASD-Sibs reported significantly greater levels of perspective taking and significantly more family-directed and sibling-directed wishes than did adolescent TD-Sibs. These findings, particularly that of perspective taking, were somewhat surprising and highlight an important area for future research. Perspective taking was significantly related to greater positive affect toward brothers and sisters; therefore, understanding and promoting perspective taking may prove beneficial for the sibling relationship across the lifespan. More research is needed to determine the full extent of empathic development among ASD-Sibs, and clinicians and families may be able to utilize these patterns to encourage health family relationships.

References

- Alderfer, M. A., Long, K. A., Lown, E. A., Marsland, A. L., Ostrowski, N. L., Hock, J. M., et al. (2010). Psychosocial adjustment of siblings of children with cancer: a systematic review. *Psycho-oncology*, *19*(8), 789–805.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th edition). 2013 Arlington, VA.
- Barr, J. J., & Higgins-D'Alessandro, A. (2007). Adolescent empathy and prosocial behavior in the multidimensional context of school culture. *The Journal of Genetic Psychology*, *168*(3), 231–250.
- Batanova, M. D., & Loukas, A. (2011). Social anxiety and aggression in early adolescents: Examining the moderating roles of empathic concern and perspective taking. *Journal of Youth and Adolescence*, *40*(11), 1534–1543.

- Begun, A. L. (1989). Sibling relationships involving developmentally disabled people. *American Journal on Mental Retardation*, 93, 566–574.
- Bzdok, D., Schilbach, L., Vogeley, K., Schneider, K., Laird, A. R., Langner, R., et al. (2012). Parsing the neural correlates of moral cognition: ALE meta-analysis on morality, theory of mind, and empathy. *Brain Structure & Function*, 217(4), 783–796.
- Centers for Disease Control and Prevention (2018). *Autism Spectrum Disorder (ASD): Data & statistics*. Retrieved from <http://www.cdc.gov/ncbddd/autism/data.html>.
- Centers for Disease Control and Prevention (2016). *Autism spectrum disorder (ASD): Identified prevalence of autism spectrum disorder*. Retrieved from <http://www.cdc.gov/ncbddd/autism/data.html>.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, 6(4), 284–290.
- Cicirelli, V. G. (1995). *Sibling relationships across the life span*. New York: Plenum Press.
- Davis, M. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- De Caroli, M. E., & Sagone, E. (2013). Siblings and disability: A study on social attitudes toward disabled brothers and sisters. *Procedia-Social and Behavioral Sciences*, 1, 1217–1223.
- Dykens, E., Schwenk, K., Maxwell, M., & Myatt, B. (2007). The sentence completion and three wishes tasks: Windows into the inner lives of people with intellectual disabilities. *Journal of Intellectual Disability Research*, 51(8), 588–597.
- Eisenberg, N., Zhou, Q., & Koller, S. (2001). Brazilian adolescents' prosocial moral judgment and behavior: Relations to sympathy, perspective taking, gender-role orientation, and demographic characteristics. *Child Development*, 72(2), 518–534.
- Flaton, R. A. (2006). "Who would I be without Danny?" Phenomenological case study of an adult sibling. *Mental Retardation*, 44(2), 135–144.
- Gau, S., Chou, M., Lee, J., et al. (2010). Behavioral problems and parenting style among Taiwanese children with autism and their siblings. *Psychiatry and Clinical Neurosciences*, 64, 70–78.
- Gerdtz, J. A., Bernier, R., Dawson, G., & Estes, A. (2013). The broader autism phenotype in simplex and multiplex families. *Journal of Autism and Developmental Disorders*, 43(7), 1597–1605.
- Gini, G., Albiero, P., Benelli, B., & Altoe, G. (2008). Determinants of adolescents' active defending and passive bystanding behavior in bullying. *Journal of Adolescence*, 31(1), 93–105.
- Grossman, F. K. (1972). *Brothers and sisters of retarded children: An exploratory study*. Oxford: Syracuse U. Press.
- Hayes, S. A., & 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.
- Janus, M., & Goldberg, S. (1995). Sibling empathy and behavioural adjustment of children with chronic illness. *Child: Care, Health and Development*, 21(5), 321–331.
- Labay, L. E., & Walco, G. A. (2004). Brief report: Empathy and psychological adjustment in siblings of children with cancer. *Journal of Pediatric Psychology*, 29(4), 309–314.
- Laible, D. J., Carlo, G., & Roesch, S. C. (2004). Pathways to self-esteem in late adolescence: The role of parent and peer attachment, empathy, and social behaviours. *Journal of Adolescence*, 27(6), 703–716.
- Lam, C. B., Solmeyer, A. R., & McHale, S. M. (2012). Sibling relationships and empathy across the transition to adolescence. *Journal of Youth and Adolescence*, 41(12), 1657–1670.
- LeBlanc, L. A., Coates, A. M., Daneshvar, S., Charlop-Christy, M. H., Morris, C., & Lancaster, B. M. (2003). Using video modeling and reinforcement to teach perspective-taking skills to children with autism. *Journal of Applied Behavior Analysis*, 36(2), 253–257.
- Li, X., Bian, C., Chen, Y., Huang, J., Ma, Y., Tang, L., et al. (2015). Indirect aggression and parental attachment in early adolescence: Examining the role of perspective taking and empathetic concern. *Personality and Individual Differences*, 86, 499–503.
- McAlister, A., & Peterson, C. (2007). A longitudinal study of child siblings and theory of mind development. *Cognitive Development*, 22(2), 258–270.
- Meyer, D., & Holl, E. (2014). *The sibling survival guide: Indispensable information for brothers and sisters of adults with disabilities*. Bethesda, MD: Woodbine House.
- Nereo, N. E., & Hinton, V. J. (2003). Three wishes and psychological functioning in boys with Duchenne muscular dystrophy. *Journal of developmental and behavioral pediatrics: JDBP*, 24(2), 96.
- O'Neill, L. P., & Murray, L. E. (2016). Anxiety and depression symptomatology in adult siblings of individuals with different developmental disability diagnoses. *Research in Developmental Disabilities*, 51, 116–125.
- Perner, J., Ruffman, T., & Leekam, S. R. (1994). Theory of mind is contagious: You catch it from your sibs. *Child Development*, 65(4), 1228–1238.
- Peterson, J. L., & Zill, N. (1986). Marital disruption, parent-child relationships, and behavior problems in children. *Journal of Marriage and the Family*, 48, 295–307.
- Piven, J., Palmer, P., Jacobi, D., Childress, D., & Arndt, S. (1997). Broader autism phenotype: Evidence from a family history study of multiple-incidence autism families. *The American Journal of Psychiatry*, 154(2), 185–190.
- Rodgers, J. D., Warhol, A., Fox, J. D., et al. (2016). Minimal risk of internalizing problems in typically-developing siblings of children with high-functioning autism spectrum disorder. *Journal of Child and Family Studies*, 25, 2554–2561.
- Shaked, M., Gamlie, I., & Yirmiya, N. (2006). Theory of mind abilities in young siblings of children with autism. *Autism*, 10(2), 173–187.
- Shivers, C. M., Jackson, J. B., & McGregor, C. M. (2018). Functioning among typically developing siblings of individuals with autism spectrum disorder: A meta-analysis. *Clinical Child and Family Psychology Review*, 1–25.
- Tucker, C. J., Updegraff, K. A., McHale, S. M., & Crouter, A. C. (1999). Older siblings as socializers of younger siblings' empathy. *The Journal of Early Adolescence*, 19(2), 176–198.
- Van der Graaff, J., Branje, S., De Wied, M., Hawk, S., Van Lier, P., & Meeus, W. (2014). Perspective taking and empathic concern in adolescence: Gender differences in developmental changes. *Developmental Psychology*, 50(3), 881.
- Verté, S., Roeyers, H., & Buysse, A. (2003). Behavioural problems, social competence and self-concept in siblings of children with autism. *Child: Care, Health and Development*, 29, 193–205.
- Wilson, C. J., McGillivray, J. A., & Zetlin, A. G. (1992). The relationship between attitude to disabled sibling and rating of behavioural competency. *Journal of Intellectual Disability Research*, 36, 325–336.
- Yirmiya, N., Erel, O., Shaked, M., & Solomonica-Levi, D. (1998). Meta-analyses comparing theory of mind abilities of individuals with autism, individuals with mental retardation, and normally developing individuals. *Psychological Bulletin*, 124(3), 283.
- Zuckerman, M., & Lubin, B. (1965). *Multiple affect adjective checklist, manual*. San Diego: Educational Industrial Testing Services.