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Parfenov, R.-M, & Bedwell, S. A. (2020) The influence of individuals diagnosed with Autism on their siblings’ level of empathy and pro-social behaviour. *PsyPAG Quarterly*. (In Press)

Research in Brief

**The influence of individuals diagnosed with Autism on their siblings’ level of empathy and pro-social behaviour**

*Sibling relationships are a primary source of intrapersonal and interpersonal development (Knott, Lewis, & Wiliams, 1995). Based on social learning theory (Bandura, 1971), McHale, Updegraff and Feinberg (2016) stated that individuals with autistic siblings develop strong empathetic feelings and pro-social behaviours towards them. The current study is the first one to analyse the influence of neurotypical individuals and individuals diagnosed with Autism on their siblings’ levels of empathy and pro-social behaviour towards others. One hundred and twenty-three adult participants, with either neurotypical (N = 71) or autistic siblings (N = 52), completed two questionnaires, the Empathy Quotient (Baron-Cohen & Wheelwright, 2004) and the Helping Attitude Scale (Nickell, 1998). As hypothesized, the participants with siblings diagnosed with autism presented higher levels of both empathy and pro-social behaviour towards others.*

**Introduction**

**Sibling relationships**

The sibling relationship is a primary source of intrapersonal and interpersonal development and understanding formed by sustained daily contact (Knott, Lewis & Williams, 1995). The relationship between siblings offers the chance to shape individual personal and social skills (McHale, Updegraff, & Feinberg, 2016). Sibling relationships are an opportunity for social understanding training, leading to the development of interacting styles (e.g. driver or amiable), which later will be transferred to external relationships (Gass, Jenkins, & Dunn, 2007; McHale, Updegraff, & Whiteman, 2012). Siblings usually spend a considerable amount of time interacting daily, often having a great impact on one another’s development (Weisner, 1989). This influence occurs through simply observing and imitating. For example, Azmitia and Hesser (1993) found that older siblings help their younger siblings to develop cognitively, by teaching them how to use toys or play games. Older siblings may also support more rapid motor development. For instance, Berger and Nuzzo (2008) found that younger siblings started to walk earlier than their older siblings because they had the opportunity to imitate the older child.

Often, children who nurture and take care of their siblings develop a better understanding of other’s feelings, which helps them form stronger interpersonal relationships, thus making them more socially skilled (Hetherington, 1989). However, the influence of siblings can also be negative. In many families with multiple children, each child may perceive that they are receiving differential treatment from their parents. In these cases, the influence of the sibling comes from shared presence in a family environment (McHale, Updegraff, Jackson-Newsom, Tucker & Crouter, 2000). One’s beliefs that the love, attention, and warmth received from parents is less than that received by their siblings has been shown to have a negative impact on behaviour, self-esteem and emotional development (Brody, 2004).

Additionally, Linares (2006) revealed that children who display aggression towards their siblings are predisposed to become aggressive in adulthood, particularly within social relationships, including those with friends or intimate partners. The presence of conflict makes a younger sibling highly predisposed towards adjustment problems, anti-social behaviours towards their peers and parents, as well illegal substance usage (Bank, Burraston, & Snyder, 2004; Bullock & Dishion, 2002; East & Khoo, 2005).

**Siblings of individuals diagnosed with ASD**

Challenges faced by siblings of individuals with ASD include increased anxiety, resulting from their exposure to abnormal or violent behaviours (Rodrigue, Geffken, & Morgan, 1993). Findings from Gold (1993) highlight the negative impact of having a sibling diagnosed with ASD. She found a clear difference between the siblings of boys diagnosed with ASD and those of neurotypical individuals (individuals without any cognitive or developmental disorder) in terms of depression and social adjustment. Lovell and Wetherell (2016) revealed that individuals who live with autistic siblings often take on additional responsibilities, including household chores and caretaking roles, minimising the opportunities for social interactions or diversified activities outside their home and school.

Tomeny, Barry and Bader (2014) revealed that birth order is important, stating that in families where the child diagnosed with ASD was older than the neurotypical one, the influence of the diagnosed child was stronger. Their results showed that an autistic older brother’s externalizing behaviours were very likely to be imitated by neurotypical younger siblings. From another perspective, Macks and Reeve (2007) revealed that being an older neurotypical sibling to a younger individual diagnosed with Autism is harder than being the younger neurotypical sibling. These difficulties are mainly due to the need to adapt to a new and complex situation following the arrival of an autistic individual into a family. Furthermore, Macks and Reeve also found a difference between coping levels of the neurotypical sibling, with neurotypical females being better at managing their autistic sibling as compared to neurotypical males. Such differences might arise from gender bias in the allocation of household responsibilities. For instance, females typically undertake more caretaking or nurturing role compared to their male counterparts, which may help them to better understand other’s feelings and difficulties (Hetherington, 1989).

Green (2013) stated that individuals who have siblings diagnosed with ASD presented more positive and warm views towards their relationship and the disability in comparison to those with neurotypical siblings. Importantly, such attitudes led to less sibling conflict, compared with situations where both siblings were typically developed (Rivers & Stoneman, 2003). Researchers have also identified a greater level of maturity and appreciation of life within those with siblings diagnosed with ASD (Kovshoff, Cebula, Tsai, & Hastings, 2017; Pilowsky, Yirmiya, Doppelt, Gross-Tsur, & Shalev, 2004). Kaminsky and Dewey (2002) compared siblings of individuals who were neurotypical, diagnosed with ASD or diagnosed with Downs Syndrome. Findings show that individuals with an autistic sibling were better mentally adjusted and the least likely to report feelings of loneliness.

**Empathy and pro-social behaviour**

Eyuboglu, Baykara and Eyuboglu (2018) compared neurotypical individuals with neurotypical siblings and neurotypical individuals with autistic siblings. They found that the latter group was worse at emotion recognition and Theory of Mind tasks. Shaked, Gamliel, and Yirmya (2006) also compared the difference between the performance of 48 siblings of individuals who were neurotypical or diagnosed with Autism on two Theory of Mind tasks. Critically, this study revealed a non-significant difference between the two groups on both of the tasks, showing inconsistency and the need for further investigation. Benderix and Sivberg (2007) found that individuals who experienced empathetic feelings towards their autistic siblings often developed caring and helping behaviours towards them. Moreover, Lobato, Miller, Barbour, Hall, and Pezzullo (1991) stated that siblings of children with autism presented more pro-social behaviours and kind feeling towards their affected siblings, rather than those with only typically developing siblings. However, comparisons between families of children with Autism and those with Downs Syndrome showed sibling relationships in families including an autistic child were characterised by less pro-social, caring, and compassionate behaviours (Kaminsky & Dewey, 2001).

It is clear that having a sibling with ASD has a significant impact on cognitive and social development in neurotypical individuals, however, the role this plays in specific social processes remains relatively unclear. Consequently, the current study aimed to address this gap. Here we aimed to identify whether the presence of individuals with and without ASD have an influence on their siblings’ external levels of empathy and pro-social behaviours. It was hypothesised that individuals with autistic siblings would present higher levels of empathy and pro-social behaviours towards others.

**Methodology**

**Participants**

123 participants over 18 years old (71 participants in the neurotypical siblings condition and 52 participants in the autistic siblings condition; 96 females and 24 males; 56.1% of participants’ age range between 18 and 24) from a community sample in the West Midlands, UK and from a registered charity for autism in West Midlands, UK were recruited through an opportunistic sampling method. Participants were required to have at least one sibling, of any gender and age. Ethical approval was obtained from Birmingham-City-University’s Ethics Committee (application reference: PSY\_BSc\_Dec18\_167).

**Materials**

Participants completed the Empathy Quotient (Baron-Cohen & Wheelwright, 2004), a 60-item (α = .92) questionnaire developed to measure the level of empathy in adults and, the Helping Attitude Scale (Nickell, 1998), a 20-item (α = .87) questionnaire designed to measure participants’ feelings and behaviours towards interaction with others.

**Design**

A between-subjects design was implemented to determine whether the participants’ levels of empathy and pro-social behaviour are influenced by the presence of siblings diagnosed with autism compared to those growing up with neurotypical siblings. This study involved two conditions whereby 71 participants had neurotypical siblings and 52 had siblings diagnosed with autism.

**Procedure**

The study was presented to participants online via the Qualtrics platform.

Participants first stated whether they have at least one typically developing sibling or at least one diagnosed autistic sibling. This information was subsequently used to assign participants to the experimental or control condition. Participants were then required to complete the Empathy Quotient and, the Helping Attitude Scale. The study took approximately 16 minutes to complete.

**Results**

Siblings’ influence on individuals’ development was evaluated by analysing the levels of empathy and pro-social behaviour scored by the participants with neurotypical and autistic siblings. As shown in Table 1, participants who have siblings diagnosed with Autism presented higher levels of empathy and pro-social behaviour.

Table 1

*Mean (and Standard Deviation) for the two types of siblings on each condition*

|  |  |  |
| --- | --- | --- |
|  Type of participants’ N  siblings  |  Interpersonal skill |  Mean (SD) |
|  Neurotypical 71 |  Empathy |  45.10 (12.65) |
|  Diagnosed with Autism 52  |  Pro-social behaviour Empathy Pro-social behaviour |  79.80 (10.80) 57.21 (15.34) 84.63 (11.14) |

A one-way between-subjects MANOVA was used to examine the effect of having a sibling with Autism on empathy and pro-social behaviour scores. Multivariate test’ results showed a significant effect of autistic sibling condition, Pillai’s *V* = 0.16, *F*(2,120) = 11.38 *p* <.001, = .16. This shows the influence of autistic individuals on their siblings’ level of empathy and pro-social behaviour.

The univariate test revealed a significant difference between individuals with neurotypical siblings and those with siblings diagnosed with Autism for the level of empathy *F*(1,121)= 22.95 *p* <.001, = .16. Therefore, as seen in Figure 1, self-reported empathy is significantly higher for those who have a sibling diagnosed with autism.

*Figure 1.* Mean scores of self-reported empathy levels of participants with neurotypical siblings (N = 71) and participants with siblings diagnosed with Autism (N = 52). The level of empathy scored on the Empathy Quotient questionnaire was higher for the participants with autistic siblings. Error bars show standard error.

The univariate test also revealed a significant difference between individuals with neurotypical siblings and those with siblings diagnosed with autism for the levels of pro-social behaviour *F*(1,121) = 5.84 *p* =.017, = .05. Accordingly, as displayed in Figure 2, these results suggest that self-reported engagement in pro-social behaviours is significantly higher for participants with autistic siblings.

*Figure 2.* Mean scores of self-reported engagement in pro-social behaviour levels of participants with neurotypical siblings (N = 71) and participants with siblings diagnosed with Autism (N = 52). The level of pro-social behaviour scored on the Helping Attitude Scale was higher for the participants with autistic siblings. Error bars show standard error.

**Discussion**

The present study investigated the influence of sibling type (ASD or neurotypical) on the development of external empathy and pro-social behaviour. To identify a difference between neurotypical and autistic siblings’ influence on the participants’ personal development, the difference of empathy and pro-social levels scored by each sibling group were compared. Our results show a significant difference between the levels of both empathy and pro-social behaviour between the two sibling groups. The participants with siblings diagnosed with ASD showed significantly higher levels of empathy and higher levels of pro-social behaviour. The findings support our hypothesis, suggesting that individuals with autistic siblings have higher levels of empathy and pro-social behaviour towards others.

Until recently, research into the siblings of individuals with ASD has mostly focused on the negative factors involved (Shivers & Dykens, 2017). The results of the present study emphasise the positive impact having a sibling with ASD can have on development. The findings presented here contribute to a growing body of research assessing the positive outcomes associated with autism (e.g. greater maturity and patience; Kovshoff, Cebula, Tsai, & Hastings, 2017; Lovell & Wetherell, 2016; Benderix & Sivberg, 2007). Whereas previous investigations have measured the role of ASD on empathy from neurotypical siblings towards the child with ASD, here we reveal how such empathetic and pro-social behaviour is affected in wider relationships. These findings form an important basis on which to build further research and inform caregivers.

Although we have established a clear link between having a sibling with ASD and levels of empathy and pro-social behaviour, there are several aspects of the sibling relationship that may affect the outcome which remains unknown. It cannot be established from the results presented what the quality of the relationship between the siblings was and whether this had an impact. It is possible that individuals who demonstrate higher levels of empathy have stronger sibling bonds. This should be controlled for in future investigations to further inform us of the effect. Additionally, future research could include a no-siblings group, in order to determine if the simple presence of a sibling has an influence on the participant’s level of empathy and pro-social behaviour.

Eyuboglu, Baykara and Eyuboglu (2018) revealed that neurotypical individuals with autistic siblings performed worse at emotion recognition and Theory of Mind tasks, suggesting that emotion recognition is necessary for developing empathy. The present study contradicts these findings. However, we cannot assume that the participants in the autistic sibling's condition scored higher levels of empathy because they had Theory of Mind. Future research should take into consideration measuring participant performance on Theory of Mind tasks. Poor Theory of Mind may be a potential outcome of having an autistic sibling, and may even represent an explanation in the cases where individuals with autistic siblings show lower levels of empathy.

The vast majority of the studies that explore the influence of siblings, both neurotypical and autistic, on individuals involved children and adolescent participants (7-18 years old). However, Green (2013) has stated participants under 18 years old can generate data confounds. This might happen because younger children do not usually have a proper understanding of the disorder or its difficulties. Adolescents start wanting to spend more time with their friends rather than their siblings, thus might also be the period they start feeling ashamed by the disability. Moreover, Guite, Lobato, Kao, and Plante (2004) suggest that in general self-report data is more reliable when assessing sibling influence. However, in the studies where the participants were children, the results are often based on parent reports. Therefore, an advantage of the methodology used in the current study is the fact that all the participants were adults and the results were based on the participants’ self-reports. However, it must be acknowledged that adults desire social approval, especially regarding positive social skills. Thus, the self-reported answers provided by the participants might also be influenced by a social desirability bias (Kämpfe, Penzhorn, Schikora, Dünzl, & Schneidenbach, 2009).

Tomeny, Barry and Bader (2014) found that birth order is an important factor when assessing the strength of impact an autistic sibling has on their neurotypical counterparts. Similarly, Macks and Reeve (2007) found that being an older neurotypical sibling to a younger individual diagnosed with Autism is more difficult. Kamisky and Dewey (2002) also showed that the addition of more neurotypical children in a family helps improve psychosocial balance and adjustment for the first neurotypical sibling after or before the sibling diagnosed with Autism. Notably, the current study did not take into account participant-sibling birth order, the total number of siblings within a family, or even the age-gap between them. Accordingly, due to the demonstrated importance of birth-order and family size, future studies could include these factors in order to further investigate the impact of an autistic sibling on empathy and pro-social behaviour.

Tomeny, Barry and Bader (2014) revealed that birth order is important, stating that in families where the child diagnosed with ASD was older than the neurotypical one, the influence of the diagnosed child was stronger. Their results showed that an autistic older brother’s externalizing behaviours were very likely to be imitated by neurotypical younger siblings. From another perspective, Macks and Reeve (2007) revealed that being an older neurotypical sibling to a younger individual diagnosed with Autism is harder than being the younger neurotypical sibling. These difficulties are mainly due to the need to adapt to a new and complex situation following the arrival of an autistic individual into a family. Furthermore, Macks and Reeve also found a difference between coping levels of the neurotypical sibling, with neurotypical females being better at managing their autistic sibling as compared to neurotypical males. Such differences might arise from gender bias in the allocation of household responsibilities. For instance, females typically undertake more caretaking or nurturing role compared to their male counterparts, which may help them to better understand other’s feelings and difficulties (Hetherington, 1989).

In the current study, the majority of participants were female (78.05%). Macks and Reeve (2007) stated that females were better at managing their autistic siblings compared to males. Therefore, findings from the current study may have arisen due to a gender bias in our sample. Macks and Reeve’s (2007) research suggest the differences they detected be due to the gendered division of household responsibilities. Females may be given more caretaking and nurturing tasks compared to males, which are likely to help them better understand other’s feelings and difficulties (Hetherington, 1989). Accordingly, gender should be further considered in future research. Where possible, a balanced gender sample should be obtained, allowing us to statistically examine gender differences.

To the author’s knowledge, the present study was the first one to compare the external levels of empathy and pro-social behaviour of individuals with autistic siblings, while also using adult participants. The presented results support the idea that an individual diagnosed with ASD has a positive influence on their sibling’s levels of external empathy and pro-social behaviour. These findings provide an important basis for the development of future investigations to further establish the complex role of autism in sibling relationships and social development.

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