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# Research in Autism Spectrum Disorders

journal homepage: [www.elsevier.com/locate/rasd](http://www.elsevier.com/locate/rasd)

## Friendship understanding in males and females on the autism spectrum and their typically developing peers

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### ARTICLE INFO

#### Keywords:

Autism spectrum  
 Friendship understanding  
 Gender differences  
 Adolescents  
 Adults

### ABSTRACT

**Background:** An altered understanding of relationships, including friendship, is one of the hallmark features of autism. However, research concerning friendship understanding among autistic people is scarce. The existing literature is limited mostly to children and often disregards gender differences. Thus, the current study aimed to examine friendship understanding in adolescents and adults whilst taking into account both autism diagnosis and gender.

**Method:** The current study was a secondary analysis of data obtained in the Polish Autism Survey. Participants were 76 autistic individuals (44 males, ages 14–37 years) and 76 matched controls. Qualitative responses to an open-ended question concerning friendship understanding were coded into six non-exclusive categories, including motivational (intimacy, support, and companionship) and cognitive-developmental (reciprocity, unconditional responsiveness, and complexity) aspects of friendship. Chi-squared tests and Mann-Whitney U were used to examine group (autistic vs. typically developing) and gender differences in friendship understanding.

**Results:** Autistic people referred to intimacy and unconditional responsiveness less often and also provided less complex definitions of a 'friend' than their typically developing peers. Autistic and typically developing males endorsed unconditional responsiveness and complexity less often than females. Additionally, participants who included cognitive-developmental aspects in their definition of a 'friend' more often reported having casual friends and a best friend.

**Conclusions:** The findings shed light on rarely explored aspects of friendship understanding in autistic and typically developing adolescents and adults. The study identifies distinct profiles of friendship understanding in autistic males and females. Taken together, the results can foster the development of fine-grained assessment and support of friendship understanding for people on the autism spectrum.

## 1. Introduction

Difficulties in developing, maintaining, and understanding social relationships, including friendship, are one of the hallmark features of autism spectrum disorder ([American Psychiatric Association, 2013](https://www.psychiatry.org/american-association-of-psychiatrists)). Indeed, empirical studies indicate that autistic people<sup>1</sup> have few friends ([Mazurek & Kanne, 2010](https://doi.org/10.1016/j.jrasd.2020.101716); [Orsmond, Krauss, & Seltzer, 2004](https://doi.org/10.1016/j.jrasd.2020.101716); [Solish, Perry, & Minnes, 2010](https://doi.org/10.1016/j.jrasd.2020.101716)), which is related to a

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<sup>1</sup> In this paper, we use terms "autistic" and "on the autism spectrum" to describe autistic individuals, as these terms are preferred by the majority of the autism community ([Kenny et al., 2016](https://doi.org/10.1016/j.jrasd.2020.101716)).

<https://doi.org/10.1016/j.jrasd.2020.101716>

Received 29 April 2020; Received in revised form 13 November 2020; Accepted 14 December 2020

Available online 29 December 2020

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higher level of loneliness, lower life satisfaction, and lower self-worth in this group (Mazurek, 2014). However, the understanding of friendship among autistic people has received scant attention, especially in the context of adolescent and adult functioning. This is surprising given that friendship understanding is routinely assessed during the clinical evaluation of autism spectrum disorder (Lord et al., 2012). Thus, the current study aims to investigate the concept of friendship in adolescents and adults on the autism spectrum in comparison to their typically developing peers.

## 2. Friendship understanding in typical development

As theorized by Sullivan (1953) and confirmed by empirical studies, friendship satisfies various human needs, including intimacy, support, and companionship (Bukowski, Newcomb, & Hoza, 1987; Hall, 2012; McDougall & Hymel, 2007). These interpersonal needs emerge in a specific developmental order, with companionship appearing as early as in the second year of life (Howes, 2009), while intimacy and emotional support become a central motivation for friendship during preadolescence and early adolescence (Buhrmester & Furman, 1987; Sullivan, 1953). From adolescence throughout adulthood, friends continue to serve as a vital source of companionship, intimacy, and support (Wrzus, Zimmermann, Mund, & Neyer, 2017).

The development of friendship understanding parallels the emergence of these various functions of friendship. Children understand a 'friend' as a reliable play partner, one that is evaluated globally as likable and nice (Bigelow & La Gaipa, 1975; McDougall & Hymel, 2007). References to intimacy, as well as loyalty and commitment, become more prevalent from around 11–14 years of age (McDougall & Hymel, 2007). From that period onwards, the concept of friendship remains relatively stable throughout life, with intimacy, support, and companionship as its key components (Fehr, 2004; Fox, Gibbs, & Auerbach, 1985).

In addition to developmental changes, there are consistent differences in the functions friendship serves for males and females. Adolescent boys focus more on companionship and competition, while girls stress the role of intimacy in their conceptions of friendship (Clark & Ayers, 1993; Hall, 2011; McDougall & Hymel, 2007). Similarly, adult males more often focus on enjoyable joint activities with friends, whereas females concentrate on sharing their feelings and ideas (Caldwell & Peplau, 1982; Singleton & Vacca, 2007).

A needs-based, or motivational, approach to friendship is complemented by cognitive-developmental theory. According to Selman (1980, 1981); Selman, 1980, this is the growing ability of social perspective-taking that guides children's and adolescents' understanding of friendship. In this process, children progress from an egocentric perspective (friends fulfill one's needs) to a recognition that friendship functions must be reciprocated. As validated in cross-cultural research (Gummerum & Keller, 2008), children attain this understanding between 9 and 12 years of age. However, it is not until adolescence that they acquire a sense of continuity of shared experiences with a friend that transcends situational demands and conflicts (Gummerum & Keller, 2008; Hindy, 1980). Concepts such as loyalty and trust become central to adolescents' understanding of friendship – a belief that a friend should be unconditionally responsive to one's needs (Azmitia, Ittel, & Radmacher, 2005). In summary, all these changes build the increasing complexity of friendship understanding, including various functions and characteristics of this kind of relationship.

Although most studies conducted in Selman's paradigm yielded no gender differences (Keller & Wood, 1989; Pellegrini, 1986; Selman, 1980), more recent data suggest that early adolescent girls may have a more developed concept of friendship than boys (Gummerum & Keller, 2008). Adolescent and adult females more often refer to commitment and loyalty than males (Hall, 2011; McDougall & Hymel, 2007). Lastly, both adolescents' and adults' concept of friendship is less complex in males than in females, as measured by the number of coded segments in their definitions of a 'friend' (McDougall & Hymel, 2007; Monsour, 1992). This body of research suggests that females, on average, can develop a more complex concept of friendship as a mutual relationship based on unconditional responsiveness.

## 3. Friendship understanding in autism

Although difficulties in understanding social relationships, including friendship, are a part of extant diagnostic criteria (American Psychiatric Association, 2013) and well-established protocols for diagnosing autism spectrum disorder (Lord et al., 2012), there has been little research conducted in that area. Studies that involved children on the autism spectrum yielded either no differences in friendship understanding in comparison with typically developing children (Petrina, Carter, Stephenson, & Sweller, 2017), or indicated fewer references of children on the autism spectrum to affection and companionship, but not to intimacy (Bauminger & Kasari, 2000). This result is unsurprising given that a central role of intimacy in friendship emerges later in adolescence. However, we are not aware of any studies that would quantitatively investigate the definitions of 'friend' given by autistic adolescents and adults.

Theoretically, the differences between autistic and typically developing people in friendship understanding can stem from motivational or cognitive mechanisms, which should differently manifest in their concepts of friendship. The existing literature on friendship motivation suggests that adolescents and adults on the autism spectrum are oriented more toward joint activities around their interests than sharing feelings and emotional support (Baron-Cohen & Wheelwright, 2003; Head, McGillivray, & Stokes, 2014; Sedgewick, Leppanen, & Tchanturia, 2019). This finding resonates with many qualitative studies suggesting that friendships maintained by autistic adolescents are often centred around shared interests and structured activities, such as playing computer games or riding bikes (Carrington, Templeton, & Papinczak, 2003; Daniel & Billingsley, 2010; O'Hagan & Hebron, 2017). On the other hand, these studies involved predominantly male participants, whereas recent studies suggest that autistic girls focus on talking and emotional sharing, similarly to typically developing girls (Foggo & Webster, 2017; Sedgewick, Hill, Yates, Pickering, & Pellicano, 2016).

There is growing evidence that gender differences in friendship follow a similar pattern among autistic people, as described in a

typically developing population (Head et al., 2014; Sedgewick, Leppanen et al., 2019). Recently, Sedgewick, Hill, and Pellicano (2019) discovered gender differences directly in friendship understanding. In a set of qualitatively analysed interviews, both autistic and typically developing adolescent girls focused more on intimate sharing and emotional support, whereas boys in both groups were more activity-focused and stressed the role of practical support. These results encourage quantitative research in which autism and gender should be investigated jointly as fundamental factors of friendship understanding.

Alternatively to motivational mechanisms, differences in friendship understanding may arise from altered social cognition in autistic people. As cognitive-developmental theory explains (Selman, 1981), difficulties in perspective-taking or empathizing with other people exhibited by autistic individuals (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Mathersul, McDonald, & Rushby, 2013) can impact their understanding of friendship. However, such aspects of friendship understanding as reciprocity or unconditional responsiveness have not yet been investigated among people on the autism spectrum. Existing research concerns only children, indicating they may have a less complex understanding of friendship than their typically developing peers (Bauminger & Kasari, 2000). Moreover, in one study, children on the autism spectrum (15 boys, 1 girl) described a picture of two friends with fewer references to their emotions than typically developing children (Bauminger, Shulman, & Agam, 2004). Overall, understanding the cognitive-developmental aspects of friendship by autistic people seems to be a promising, yet insufficiently investigated research path.

Besides gender differences and cognitive-developmental aspects of friendship, there are a number of other gaps in the current literature on friendship understanding among autistic people. First, previous studies focused exclusively on either adolescents or adults. Therefore, it is not known whether friendship understanding changes significantly in this group between adolescence and adulthood, or if it remains relatively stable, as in a typical population (Fehr, 2004; Fox et al., 1985). Some studies report that autistic adolescents have an immature conception of friendship and prefer to make friends with younger people (Church, Alisanski, & Amanullah, 2000; Marks, Schrader, Longaker, & Levine, 2000). Thus, it may be the case that the maturation of friendship understanding, that typically takes place in early adolescence (McDougall & Hymel, 2007), is postponed to late adolescence or early adulthood among autistic individuals. Second, links between friendship understanding and friendship experiences have not been explored in an autistic population. Other studies suggest that socially withdrawn children describe some aspects of friendship with less sophistication than non-withdrawn children (Fredstrom et al., 2012; Schneider & Tessier, 2007). Establishing such a link among autistic people could be diagnostically and therapeutically helpful. Thus, age and friendship experiences will be examined exploratively in the present study as correlates of friendship understanding.

The current study aims to investigate and compare friendship understanding in adolescent and adult males and females on the autism spectrum and their typically developing peers. We focus on both motivational and cognitive-developmental aspects of friendship understanding. First, based on existing literature, we suppose that autistic people will refer less often to two motivational (intimacy and support) and three cognitive-developmental (reciprocity, unconditional responsiveness, and complexity) aspects of friendship than typically developing individuals. Second, we predict that males will refer less often to these characteristics of friendship than females, both in the typically developing (TYP) and autism spectrum (AS) groups. References to companionship will be studied exploratively. In the same manner, we will explore associations of friendship understanding with age and friendship experiences.

## 4. Methods

### 4.1. Participants

The present study constitutes a secondary analysis of data obtained in the Polish Autism Survey (Platos et al., 2016) – a nationwide survey covering various aspects of functioning in young people on the autism spectrum in Poland. To qualify for the analyses, participants had to (a) be at least 14 years old; (b) have a clinical diagnosis of childhood autism, atypical autism, Asperger syndrome, or other pervasive developmental disorder (World Health Organization, 1992; AS group only), and (c) consent to participate in the study (in the case of participants under 18 years old parental consent was also required).

Participants were 76 adolescents and young adults on the autism spectrum (44 males, 32 females) and 76 typically developing individuals (41 males, 35 females) that were matched for age, gender, area of residence, and participants' and parents' level of education (all  $p$  levels  $< .05$ ). The mean age of participants was 22.3 years (range 14–37 years) in the AS group and 21.6 years (range 14–34) in the TYP group. Moreover, female and male subgroups in both AS and TYP samples were balanced in terms of age, participants' and parents' level of education, area of residence, autism spectrum diagnostic category (in the AS group), and comorbid mental health diagnoses (all  $p$  levels  $< .05$ ). The only exception was age in the AS group, in which females were older than males (means 25.1 and 20.4, respectively,  $U = 962$ ;  $p = .007$ ).

Autistic participants declared having one of the diagnoses included in the category of pervasive developmental disorder, according to the International Classification of Diseases, 10th Revision (World Health Organization, 1992). Due to the indirect nature of the survey, diagnostic status was based on participants' reports. Those declaring no formal diagnosis or no knowledge of one were excluded from the study. The majority of participants had Asperger syndrome (52.3 %) and some comorbid mental health problems (56.6 %). In particular, about a quarter of participants reported anxiety disorders (26.3 %) and depressive disorders (23.7 %). This is consistent with previous findings that comorbid mental health problems are typical in the population of autistic people (Buck et al., 2014; Mattila et al., 2010). Detailed information about both samples' characteristics is provided in Table 1.

Autistic people that took part in the study were recruited via therapeutic and diagnostic service providers, including non-governmental organizations, mental health clinics, educational counseling centers, outpatient hospitals, and occupational therapy workshops, as well as schools with special or integration classrooms. Moreover, recognizing that many autistic people in Poland do not

use any therapeutic services (Platos & Pisula, 2019), an information campaign about the study was carried out across social media and the press. Typically developing people in the TYP group were recruited via the internet and schools.

#### 4.2. Materials and design

Four questions concerning friendship were used from the Polish Autism Survey (for details about the study, see Platos et al., 2016). The main item was an open-ended question: “A friend is someone who...” with a blank field for the participants to fill in. It should be noted that the Polish word ‘przyjacieli’ used in the question could be translated to English as a ‘close friend’ rather than a ‘casual friend’, which is denoted by a different word (‘kolega’). The three other questions concerned participants’ experiences with casual, close, and best friends. The questions were as follows: (1) ‘Do you have [casual] friends?’ (answers: 5-point Likert scale from 1 – *definitely not* to 5 – *definitely yes*); (2) ‘Do you have a best friend?’ (answers as above); (3) ‘How many [close] friends do you have?’ (answers: ‘one friend’; ‘2–3 friends’; ‘4–6 friends’; ‘more than 6 friends’; ‘I don’t have a friend’). Finally, all the necessary demographic information was obtained (see Table 1).

##### 4.2.1. Procedures

Autistic participants could complete the survey either in paper-and-pencil form or a computer-based version. The majority (92.1 %) used the computer-based version. Typically developing participants were provided only with a computer-based version. All the participants and legal guardians of underage participants gave informed consent to take part in the study. The research protocol was approved by the Research Ethics Committee at the Faculty of Psychology, University of Warsaw.

##### 4.2.2. Analysis

Based on the theoretical accounts of friendship (Selman, 1980; Sullivan, 1953), a coding scheme was developed to capture different functions and features of friendship (see Table 2). First, participants’ definitions of a ‘friend’ were coded into seven dichotomous categories. In the next step, two summary categories (intimacy and complexity) were computed. Intimacy involved three components (self-disclosure, empathetic understanding, and affection) that were summarized into a single variable (range 0–3). The final category, complexity, included the total of all the basic categories (range 0–7). Full descriptions and instructions for coding of the categories can be found in the Appendix in the Supplemental Materials.

Consequently, 40 % of the data was double coded by a second coder, a psychologist who was blind to the group assignments and the study hypotheses. Cohen’s Kappa inter-rater reliability for the analyses was between 0.7 and 0.96, depending on the category, indicating good reliability of the coding scheme.

A chi-squared test was used to assess group (AS vs. TYP) and gender differences in all the dichotomous variables, while a Mann-Whitney *U* test was employed for the continuous variables, with  $p < .05$  being used as a significance threshold. Cramer’s *V* and Cohen’s *r* were used as measures of associations (effect size) for the chi-squared test and Mann-Whitney *U* test, respectively (Cohen, 1988). Both measures were interpreted as follows: 0.1 – 0.29 as small; 0.30 – 0.49 as medium;  $\geq 0.50$  as large effect. For multiple analyses with no previous hypotheses (i.e. correlations of friendship understanding with age and having friends), the Bonferroni correction was applied. Given the exploratory nature of the study, the significance of the tests was reported in reference to both corrected and uncorrected  $\alpha$  levels. IBM SPSS 25 was used to perform all the statistical analyses.

**Table 1**  
Demographic characteristics of the samples.

Variable	Males AS	Females AS	Females TYP	Males TYP
Age (in years)				
M (SD)	20.4 (6.3)	25.1 (7.8)	21.0 (4.6)	22.3 (4.8)
Range	14–37	14–37	14–30	15–34
Education (n, %)				
Current students				
Primary and middle school	14 (31.8 %)	4 (12.5 %)	5 (12.2 %)	1 (2.9 %)
High school	11 (25.0 %)	7 (21.9 %)	11 (26.8 %)	10 (28.6 %)
University	6 (13.6 %)	9 (28.1 %)	15 (36.6 %)	15 (42.9 %)
Completed education	13 (29.5 %)	12 (37.5 %)	10 (24.4 %)	9 (74.3 %)
Diagnosis (n, %)				
Childhood autism	6 (13.6 %)	0	0	0
Asperger syndrome	23 (52.3 %)	21 (65.6 %)	0	0
Other PDD categories	4 (9.1 %)	3 (9.4 %)	0	0
Not specified <sup>1</sup>	11 (25.0 %)	8 (25.0 %)	0	0
Comorbid psychiatric disorders (n, %)				
Yes	21 (47.7 %)	22 (68.8 %)	2 (4.9 %)	5 (14.3 %)
No	13 (29.5 %)	3 (9.4 %)	25 (61.0 %)	25 (71.4 %)
No answer	10 (22.7 %)	7 (21.9 %)	14 (34.1 %)	5 (14.3 %)

Note. AS = autism spectrum; TYP = typically developing; M = mean; SD = standard deviation; PDD = pervasive developmental disorders.

<sup>1</sup> Participants who reported having autism spectrum disorder but did not specify a category. The default answer for participants < 15 years old.

**Table 2**

The coding scheme for the definitions of a 'friend'.

Category definition	Range
<b>Intimacy</b> – self-disclosure (0–1), empathetic understanding (0–1), and affection with a friend (0–1) [summary category]	0–3
<b>Support</b> – general, emotional, or instrumental help	0–1
<b>Companionship</b> – doing and enjoying things together, having common interests	0–1
<b>Reciprocity</b> – a sense of mutuality in all the functions of friendship	0–1
<b>Unconditional responsiveness</b> – trust in the continuity of friendship, regardless of the situational demands; loyalty	0–1
<b>Complexity</b> – number of friendship features recognized by an individual [summary category]	0–7

## 5. Results

### 5.1. Preliminary analyses

The data were screened for missing or incorrect values in the open-ended question concerning friendship, resulting in 32 cases (21.1 %) being excluded from further analyses. Specifically, 25 participants (9 in AS group and 16 in TYP group) left the field asking for a definition of a 'friend' blank, while 7 participants (5 in AS group and 2 in TYP group) gave an answer other than that expected (e.g., 'I don't have a need for social contacts', 'I don't need a friend') that did not facilitate an assessment of their friendship understanding. Participants with missing values did not differ from the rest of the sample demographically or in their friendship experiences ( $p > .05$ ). Moreover, excluding these cases did not affect the matching of the AS and TYP groups or gender-based subgroups on the demographic variables, as described in the Methods section.

### 5.2. Differences in friendship understanding

Adolescents and adults on the autism spectrum referred to components of intimacy less often than their typically developing counterparts ( $U = 2200.5$ ;  $p = .021$ ; *Cohen's*  $r = 0.21$ ; see Table 3). However, differences between males and females did not reach significance ( $U = 2089.0$ ;  $p = .78$ ; *Cohen's*  $r = 0.16$ ).

Autistic participants also included unconditional responsiveness as a feature of friendship less often than their typically developing peers ( $\chi^2(1) = 4.864$ ;  $p = .027$ ;  $V = 0.20$ ). Moreover, males included unconditional responsiveness less often than females ( $\chi^2(1) = 5.017$ ;  $p = .025$ ;  $V = 0.20$ ). However, gender differences lost statistical significance when analysed in the AS and TYP subgroups separately (see Table S1 in the Supplemental Materials).

A similar pattern occurred for the complexity of friendship understanding. Autistic participants mentioned fewer characteristics of friendship than those who were typically developing ( $U = 2269.0$ ;  $p = .018$ ; *Cohen's*  $r = 0.21$ ), and males mentioned fewer characteristics than females ( $U = 2289.0$ ;  $p = .01$ ; *Cohen's*  $r = 0.23$ ), but again the latter difference was statistically significant only on the whole group level. Effect sizes for all the reported results were small.

For the remaining friendship features (support, companionship, and reciprocity), there were no statistically significant differences between the AS and TYP groups or between males and females. The full results of statistical tests can be found in Table S1 in the Supplemental Materials.

### 5.3. Friendship understanding and age

Exploratory testing for the association between friendship understanding and age yielded no statistically significant results. The only exception was companionship in the AS group – those who endorsed companionship in their definitions (coded as '1') were younger ( $Mdn = 17$  years) than those who did not ( $Mdn = 21$  years;  $U = 161.0$ ;  $p = .029$ ; *Cohen's*  $r = 0.28$ ). However, this result was no longer significant after applying the Bonferroni correction ( $\alpha = .05/18 = .003$ ).

**Table 3**

References to features of friendship in males (M) and females (F) on the autism spectrum (AS) and their typically developing peers (TYP).

Category	AS Group			TYP Group		
	M	F	Sum	M	F	Sum
Intimacy (Mean, SD)	0.59 (0.61)	0.86 (0.59)	0.71 (0.61)	0.97 (0.82)	1.15 (0.83)	1.05 (0.83)
Support	26.5 %	25.0 %	25.8 %	25.0 %	46.2 %	34.5 %
Companionship	20.6 %	14.3 %	17.7 %	9.4 %	11.5 %	10.3 %
Reciprocity	11.8 %	7.1 %	9.7 %	21.9 %	15.4 %	19.0 %
Unconditional responsiveness	32.4 %	53.6 %	41.9 %	53.1 %	73.1 %	62.1 %
Complexity (Mean, SD)	1.46 (1.24)	1.96 (0.96)	1.68 (1.15)	2.06 (1.48)	2.62 (1.27)	2.31 (1.40)

Note. Percentage values refer to the proportion of participants whose responses were coded '1'. Intimacy and complexity values refer to the number of codes ascribed to a response (ranges 0–3 and 0–7, respectively). SD = standard deviation.



#### 5.4. Friendship understanding and having friends

The three indices of having friends – namely, having casual friends, having a best friend, and the number of close friends – were associated with the cognitive-developmental aspects of friendship (reciprocity, unconditional responsiveness, and complexity) but not with the motivational ones (intimacy, companionship, and support). Participants who referred to unconditional responsiveness in their definitions of a ‘friend’ reported both having casual friends ( $U = 2260.5$ ;  $p = .010$ ; *Cohen’s*  $r = 0.14$ ) and a best friend ( $U = 2379.0$ ;  $p = .001$ ; *Cohen’s*  $r = 0.17$ ) more often, in addition to having more close friends ( $Mdn = ‘2-3\text{ friends}’$ ;  $U = 2260.5$ ;  $p = .010$ ; *Cohen’s*  $r = 0.27$ ) than those who did not mention unconditional responsiveness ( $Mdn = ‘one\text{ friend}’$ ). Moreover, participants who included reciprocity in their definition of a ‘friend’ reported having more close friends ( $Mdn = ‘2-3\text{ friends}’$ ;  $U = 1220.0$ ;  $p = .005$ ; *Cohen’s*  $r = 0.26$ ) than those who did not ( $Mdn = ‘one\text{ friend}’$ ), but associations with the two remaining indices were not statistically significant. Lastly, a more complex understanding of friendship was positively correlated with having friends ( $\tau_b = .181$ ;  $p = .017$ ), a best friend ( $\tau_b = .189$ ;  $p = .012$ ), and a greater number of friends ( $\tau_b = .151$ ;  $p = .046$ ), although the correlations were weak. After applying the Bonferroni correction ( $\alpha = .05/18 = .003$ ), only a relationship between unconditional responsiveness and having a best friend remained statistically significant.

#### 5.5. Discussion and implications

The current study aimed to investigate friendship understanding in adolescents and adults on the autism spectrum and their typically developing peers. Based on previous literature, we predicted the existence of differences between autistic and typically developing individuals in two motivational and three cognitive-developmental aspects of friendship understanding. Moreover, we expected to find gender differences in both the autistic and typically developing groups. The results confirmed these predictions in relation to intimacy, unconditional responsiveness, and complexity, but not the rest of the examined aspects of friendship understanding.

Intimacy was the only motivational aspect of friendship understanding that differed between autistic and typically developing people. In light of previous studies (Bauminger and Kasari, 2000), differences in intimacy may be less salient in childhood, but during adolescence and adulthood become a distinctive feature of friendship understanding in the autistic population. As expected, participants on the autism spectrum less often referred to self-disclosure, empathetic understanding, and affection as defining characteristics of friendship. Surprisingly, gender differences, consistently found in previous studies for both autistic and typically developing people (McDougall & Hymel, 2007; Sedgewick, Hill et al., 2019), did not reach statistical significance, although they did have the expected direction.

Additionally, two of three cognitive-developmental aspects of friendship understanding (unconditional responsiveness and complexity) were less prevalent among autistic people, and all three were related to participants’ experiences in friendship. Autistic adolescents and adults defined a ‘friend’ as somebody who was unconditionally responsive to one’s needs less often than their typically developing peers, and males less often than females. According to Selman (1980), acquiring a sense of continuity in friendship marks the transition from a ‘fair-weather cooperation’ to an ‘intimate and mutually shared relationship’ that takes place around preadolescence. The present results suggest that autistic people, especially males, understand friendship in a more exchange-based (‘tit-for-tat’) or situation-dependent way than typically developing individuals. However, over half of autistic females endorsed unconditional responsiveness (similar to typically developing males), supporting a notion of different relational orientation of males and females on the autism spectrum (Head et al., 2014; Sedgewick, Hill et al., 2019). Moreover, the observed differences were of a small size ( $V = 0.20$ ), and thus did not mean that this exchange-based friendship understanding dominates either in the autistic or male populations.

Autistic participants’ definitions of a ‘friend’ were also less complex than in a typically developing group, as evidenced by the smaller number of coded categories of friendship understanding. This finding corroborates results obtained with school-aged children (Bauminger & Kasari, 2000). Moreover, similarly to previous studies in the general population (McDougall & Hymel, 2007; Monsour, 1992), males gave less complex friendship definitions than females. Although gender differences in terms of complexity and unconditional responsiveness lost statistical significance in the group-based analyses, similar effect sizes in the whole sample and the AS and TYP groups (see Table S1) suggest that those gender differences are also intact among autistic people. In fact, the results from autistic females were more similar to the results of typically developing males than males on the autism spectrum (comparable to what Head et al. (2014) determined for friendship motivation), which again points to a distinct profile of friendship understanding in autistic females.

To date, the cognitive-developmental account of friendship (Selman, 1980,) has gained little attention in studies concerning autistic people. Current results encourage further exploration of the language used by people on the autism spectrum to describe relationships. Possible topics of such research include the means to express the unconditional character of the relationship (e.g., *always*, *never*, *no matter what*) and usage of plural pronouns to express reciprocity, as well as semantic complexity of utterances. Not only did autistic participants use some of these constructions less often, but their usage was correlated with having actual friends. However, these findings require replication using more extensive narratives and perhaps more fine-grained categories that would differentiate between the various linguistic means used by participants.

Adolescents and adults who defined friendship as a reciprocal, unconditional, and complex relationship declared having casual friends, a best friend, and close friends more often. For example, the median number of close friends was two-three for those who mentioned the unconditional character of friendship in their definition, but only one for those who did not. These findings can be interpreted in several different ways. A more advanced understanding of friendship may help adolescents and adults make and keep

friends. Conversely, more interactions with friends can foster friendship understanding. Lastly, a third factor, such as social cognition, can influence both the understanding and development of relationships with friends. Remarkably, Bauminger and Kasari (2000) found a similar association between loneliness understanding and quality of friendship in autistic and typically developing children, aged 9–14 years, although they did not find a correlation between friendship understanding and quality of friendship. Further research is needed to explore the link between social understanding and social interaction in typical and atypical development.

Lastly, no statistically significant relationships between the studied variables and age suggest there exists a stability of friendship understanding in adolescence and adulthood in either autistic or typically developing populations (Fehr, 2004; Fox et al., 1985).

The study has practical implications, as friendship understanding is often assessed as a part of diagnosing autism spectrum or tailoring support to autistic people. The dimension of intimacy appears to be a crucial motivational aspect that differs between autistic and typically developing adolescents and adults. Perhaps the focus of many autistic individuals on joint activities and interests in friendship, reported in many qualitative studies (Howard, Cohn, & Orsmond, 2006; O'Hagan & Hebron, 2017; Sedgewick, Hill et al., 2019), stems from a lower need for intimacy and not necessarily a higher need for companionship. However, differences based on autism status must be analysed jointly with gender differences, as much research shows that autistic females endorse intimacy in friendship quite like typically developing females (Foggo & Webster, 2017; Sedgewick, Hill et al., 2019).

The growing evidence for gender differences among autistic people in friendship points to the importance of using carefully gender-balanced samples in future research. It is also a call for more gender-specific norms for assessing friendship understanding, which is in line with broader recommendations for diagnosing individuals on the autism spectrum (Gould, 2017). Existing research shows that autistic females do endorse many friendship qualities, similarly to their typically developing peers. However, other studies suggest that they may not share in the stereotypically female peer culture such as gossiping, and this makes it difficult for them to find friends (Cook, Ogden, & Winstone, 2018; Foggo & Webster, 2017). Thus, these issues should be probed when interviewing autistic females about friendship.

Finally, professionals should pay more attention to cognitive-developmental aspects of friendship understanding in people on the autism spectrum, which are reflected not only in *what* individuals say but also *how* they say it (for example, to what extent they stress the continuous and unconditional character of a relationship). Learning about these aspects of friendship should also be prioritized in social skills training programs that aim at friendship development.

### 5.6. Limitations and future directions

The results of the current study are preliminary and, therefore, should be treated with caution. First, the severity of autism symptoms, intellectual abilities, and language level were not assessed in the examined samples. There is the possibility that at least some of the results (e.g., complexity of given definitions) were influenced by the expressive language level of the participants. Given that the majority of participants had Asperger syndrome and the survey required high literacy levels, the interpretation of the results and their clinical utility must be limited to individuals with normal cognitive and language abilities.

Second, a substantial proportion of participants (21.1 %) did not give an expected answer to an open-ended question, although they did answer the rest of the questions concerning friendship that were close-ended. The reason for this omission could be that those participants simply did not know how to answer, which could alter our findings. However, participants with a missing answer did not differ from the rest of the sample demographically and in terms of friendship experiences, which makes the aforementioned interpretation less likely.

Third, although the main hypotheses were confirmed in relation to three out of five aspects of friendship understanding, the obtained effect sizes were small. Furthermore, gender differences were not significant in within-group (AS and TYP) analyses. However, an inspection of the effects sizes of within-group differences suggests that those analyses might have been underpowered due to reduced sample sizes. Moreover, the written responses of the participants were typically short, which could be a reason for the low frequency of some of the coded categories in the studied material (namely, reciprocity, companionship, and support). Thus, encouraging participants to give longer responses would increase the probability of finding statistically significant differences in these categories.

Fourth, the coding system was based on dichotomous categories that did not take into account the number of references to a given aspect of friendship understanding. A more quantitative analytic approach, perhaps performed on longer study materials, could allow the use of parametric statistical methods and increase the variability of the results.

Fifth, the measures of participants' friendship experiences were based on a self-report mechanism, so it is not known if they were reciprocated. Sixth, the lack of age differences should be interpreted with caution, as the study was cross-sectional, so other factors, such as a cohort effect, could have influenced the results.

Lastly, analyses of gender differences were based on dichotomous distinctions between males and females, without the inclusion of transgender and nonbinary identities. There is a growing understanding that these identities may be more common among autistic people (Thrower, Bretherton, Pang, Zajac, & Cheung, 2020; Warriier et al., 2020), and that transgender and nonbinary people on the autism spectrum may have a different motivation for friendship than cisgender individuals (Sedgewick, Leppanen et al., 2019). Thus, future research on friendship understanding should include measures of transgender and nonbinary identities.

Nevertheless, the study contributes substantial knowledge to friendship understanding in males and females on the autism spectrum, being one of the first quantitative analyses of friendship conceptions among autistic adolescents and adults. The study also laid the foundation for further research that would explore, in particular, cognitive-developmental aspects of friendship understanding. More focus should be placed on the formal features of language used to describe what friendship means for people on the autism spectrum. Finally, the current study encourages more research into how autistic females understand friendship differently from males

and how that could be translated into better diagnostic and support services for them.

### Funding source

The study received no external funding. The research was conducted as part of the first author's doctoral dissertation, under the supervision of the second.

### CRediT authorship contribution statement

**Mateusz Platos:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft. **Ewa Pisula:** Conceptualization, Writing - review & editing, Supervision.

### Declaration of Competing Interest

None.

### Acknowledgments

The authors wish to thank Karolina Gocłowska, Sylwia Szyszko, Kinga Wojaczek, Paulina Woźniak-Rekucka, and Adam Zawisny whose efforts in data collection made this study possible. We would like to thank all the autistic people and their families for their willingness to participate in the study.

### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.rasd.2020.101716>.

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