What Does the Intention to be a Volunteer for a Student with Autism Predict? The Role of Cognitive Brain Types and Emotion and Behavior Characteristics

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A B S T R A C T

The study was designed to verify which cognitive brain types and behaviors in classroom predicted the intention to volunteer to become a peer buddy for a student with Autism Spectrum Disorder (ASD). Five hundred and sixteen adolescents attending the first grade of public high schools were enrolled. Gender–related differences were discussed according to the empathizing-systemizing theory. As expected, empathy and prosocial behavior predicted volunteering in ASD intervention. We conclude that the selection of peers as intervention agents should require more informative sources. Clinical and research implications are discussed.

¿Qué predice la intención de ser voluntario con un alumno con autismo? El papel de los tipos de cerebro cognitivo y las características emocionales y comportamentales

R E S U M E N

Este estudio se diseñó para verificar qué tipos de cerebro cognitivo y comportamientos en el aula predecían la intención de ofrecerse voluntario a acompañar a un alumno con trastorno del espectro autista (TEA). Se apuntaron 516 adolescentes de primer curso de enseñanza secundaria. Se abordaron las diferencias relativas al género de acuerdo a la teoría empatía-sistematización. Según lo esperado, la empatía y el comportamiento prosocial predecían la voluntariedad para intervenir en el TEA. Se concluye que la elección de compañeros como agentes de intervención necesitaría de más fuentes de información. Se comentan las implicaciones clínicas y de investigación.

In recent years, peer-mediated intervention (PMI) has demonstrated to be one of the best evidence-based practices in enhancing social responses and communication abilities in children and adolescents with Autism Spectrum Disorder (ASD) (Melogno et al. 2012; Zhang & Wheeler 2011). PMI involves typically developing peers as intervention agents to model, reinforce, and promote appropriate social interactions and social skills among children and adolescents with ASD in inclusive settings (McConnel, 2002). The involvement of peers in intervention programs allows to overcome major criticisms linked to adult-mediated approaches, such as the difficulties shown by students with ASD to generalize social skills learned through work with adults when they interacted with classmates (Garrison-Harrell, Kamps, & Kravits, 1997; Laushey & Heflin 2000; Watkins et al. 2015).

Considered a specific feature of PMI, the peer buddy is interested in providing support, understands the requirements of the classroom, and helps a student with disabilities, trying to bring him/her into his or her circle of friends. Thus, peer buddy approach constitutes an efficacious classroom arrangement in building friendships and relationships for students with disabilities, allowing them to develop a more positive outlook on their life (Hughes & Carter 2008).

Thanks to the social benefits that the peer buddy approach offers, a growing attention is directed to identify which characteristics have to hold a peer to become a buddy. Several studies have focused on different components of social cognition and its related behaviors, highlighting how the theory of mind (Laghi, Federico et al. 2016; Laghi, Lonigro et al., 2016), prosocial conduct (Locke, Rotheram-Fuller, & Kasari, 2012),

social preference, and social popularity (Jackson & Campbell 2009) are crucial variables that allow to efficaciously select peer buddies.

However, empathy – a specific component of social cognition that refers to the ability to correctly identify and appropriately respond to someone else's mental state (Eisenberg, Fabes, & Spinrad, 2006) – has not been broadly investigated in the PMI research. Nevertheless, it is broadly documented that empathy, in particular the affective component, is strongly related to social behavior. It promotes prosocial conduct, usually defined as a voluntary behavior intended to benefit others, and inhibits aggressive act (Eisenberg, Eggum, & Di Giunta, 2010). The purpose of this study was to verify the role that empathy played in the intention to volunteer to become a peer buddy for a student with ASD. To do this, the empathizing-systemizing theory, proposed by Baron-Cohen (2009), was adopted. This theory is born to explain the social and communication difficulties in individuals with ASD and overcome the limits of the mind-blindness theory. The empathizing-systemizing theory argues two factors linked to social and non-social drives respectively that guide human behavior (Baron-Cohen 2009). Empathizing is defined as the drive to predict and identify another person's emotion and thoughts and to respond to these with an appropriate emotion (Baron-Cohen 2003). It may be influenced by a broad range of situational factors, individual differences, and neurobiological conditions. By contrast, systemizing refers to the drive to predict and respond to the behavior of non-agentive deterministic systems by analyzing input-operation-output relations and inferring the rules that govern such systems (Baron-Cohen, Knickmeyer, & Belmonte, 2005; Baron-Cohen & Wheelwright, 2004). Empathizing and systemizing are independent of each other, albeit neurobiological links may be hypothesized. According to Baron-Cohen (2009), at the cognitive and psychometric level, five brain types are defined: Type E (individuals whose empathy is stronger than their systemizing), Type S (individuals whose systemizing is stronger that their empathy), Type Balanced (individuals with the same performance at systemizing and empathy), Extreme Type E (individuals whose empathy is above average, but who are challenged when it comes to systemizing), and Extreme Type S (individuals whose systemizing is above average, but who are challenged when it comes to empathy). In the population, clear gender-related patterns have been observed. In particular, females are more likely able to empathize whilst males show the opposite profile (Pace, 2014; Wheelwright et al., 2006). In the light of what empathizing-systemizing theory asserts and extends it to our study, we hypothesized that Type E and Extreme Type E would predict the intention to volunteer to become a peer buddy more than other brain types.

Another aim of the present study was to verify which emotional and behavioral variables predicted volunteering in ASD intervention. To do this, prosocial conduct and behavioral problems (e.g., hyperactivity, difficulties with peers, emotional problems) shown by each student were assessed. In line with what has already been found by past research (for meta-analytic review, see Jackson & Campbell, 2009), we hypothesized that prosociality would positively predict the intention to volunteer to become a peer buddy. With respect to emotional and behavioral problems, no specific results were expected. Perhaps, students with internalizing problems (e.g., emotional difficulties and peer problems) would accept less frequently to have a social role in the classroom as it is required to a peer buddy.

Method

Participants and Procedure

The sample consisted of 516 adolescents (321 boys and 195 girls, *M* age = 14.69, *SD* = 1.09), attending the first grade of public high schools in the center of Italy (Lazio).

Recruitment began by contacting the schools at the beginning of the first semester with letters that described the purpose of the study. The schools were selected on the basis of their willingness to participate in the study as part of a project for peer-mediated intervention in supporting adolescents with ASD in regular education settings. To participate in the study, the schools were required to have classrooms with students with ASD, assessed and certified by experienced clinicians, following the ICD-10 criteria (World Health Organization [WHO], 1994). The voluntary nature of participation was ensured.

The application consisted of the students completing the questionnaire quietly in a classroom at school, after informed consent was acquired from both students and their parents. The questionnaires were administered in the classroom by a team of interviewers who were trained as advanced PhD students in Psychology.

The whole research project was coordinated by the first author. This survey was reviewed and approved by the Ethics Commission of the Department of Developmental and Social Psychology of Sapienza, University of Rome.

Measures

The Empathy and Systemizing Quotient. The Italian adaptation of the Empathy and Systemizing Quotient was provided by courtesy of the Autism Research Centre (ARC, Autism Research Center Cambridge, United Kingdom). The Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004) is a 40-item questionnaire measuring thought and behavioral characteristics in both the affective and cognitive aspects of empathy. The Systemizing Quotient revised version (SQ; Wheelwright et al., 2006) is a 75-item questionnaire measuring the cognitive and behavioral features of "systemizing", the drive to analyze, understand, predict, control, and construct rule-based systems. For both the Adolescent EQ and SQ, adolescents are asked to indicate how strongly they agree with each statement by ticking one of four options: *definitely agree, slightly agree, slightly disagree*, or *definitely disagree*. Each of the items scores 1 point if the respondent records the behavior mildly or 2 points if the respondent records the behavior strongly. To avoid a response bias, approximately half the items were worded to produce a "disagree" response and half to produce an "agree" response. Cronbach's alpha coefficients were calculated using the scoring methods reported by Auyeung, Allison, Wheelright, and Baron-Cohen (2012), and showed high coefficients for both the EQ (Cronbach's α = .76) and SQ (Cronbach's α = .73).

Intention to volunteer. This measure consisted of 1 item, and asked participants to provide their contact information if they were interested in "learning what they thought about the possibility to help a peer with ASD in their classroom". Those who provided contact information were scored as having positive 'intention to volunteer'. According to Gardiner and Iarocci (2013), this measure provides an accurate indication of behavioral intent.

Strength and Difficulties Questionnaire (SDQ). The Italian version of SDQ 11-17 (Goodman, Meltzer, & Bailey, 1998) consists of 25 items, divided into five subscales of five items covering emotional problems, conduct problems, hyperactivity problems, peer problems, and prosocial behavior. Each item uses a three-point ordinal Likert format (0 = *not true*, 1 = *somewhat true* or 2 = *certainly true*). Responses can be rated 0-2 for negatively worded items and rated inversely 2-0 for positively worded items. Subscores are generated for each subscale (range: 0-10). All subscores, except for the prosocial score, are added up to a total difficulties score (range: 0-40). The prosocial subscale measures the adolescent's ability to act prosocially, independent of the difficulties measured by the other subscales. These scores have exhibited good levels of internal consistency (Cronbach's α = .74 for emotional problems, Cronbach's α = .72 for conduct problems, Cronbach's α = .78 for hyperactivity

problems, Cronbach's α = .72 for peer problems, Cronbach's α = .82 for prosocial behavior).

Statistical Analyses

Preliminary analyses were carried out for univariate outliers. The chi-square test was used to verify gender differences among the cognitive brain type groups. Because previous investigations have found gender-related differences on socio-cognitive dimensions (Laghi, Federico et al., 2016; Lonigro, Laghi, Baiocco, & Baumgartner, 2014), a factorial MANOVA was carried out assuming cognitive brain type groups (E, B, and S), intention to act as a peer buddy, and gender as independent variables, and the scores in the subscales of SDQ were used as dependent variables. Partial eta-squared values were calculated as a measure of effect size, and results were interpreted using Cohen's (1988) guidelines for determining small (.01), medium (.06), and large (.14) effects.

Logistic regression was carried out, using empathy and systemizing quotient, and emotional and behavior characteristics as predictors, and the intention to act as a peer buddy as dependent variable. All statistical analyses were performed with SPSS 23 for Windows.

Results

Cognitive Brain Types and Intention to Act as Peer Buddy

Using the method suggested by Auyeung et al. (2012) for adolescent EQ and SQ data, cognitive brain types were numerically assigned according to the percentiles of the typically developing group on the 'D' scale (D = difference between the normalized SQ and EQ scores/2). As can be seen in Table 1, the lowest scoring 2.5% were classified as Extreme Empathizing (Extreme Type E). Participants who scored between the 2.5th and 35th percentiles were classified as better at Empathizing (Type E). Those scoring between the 35th and 65th percentile were classified as 'Balanced' (Type B). Those scoring between the 65th and 97.5th percentile were classified as better at Systemizing (Type S) and the top 2.5% were classified as Extreme Type Systemizing (Extreme Type S). Additionally, because of the small number of participants classified as Extreme Type E and S,

we tested gender differences between Type E (Extreme Empathizing and Empathizing), type B, and type S (Extreme Type Systemizing and Systemizing) groups. Chi-square analysis pointed out gender differences, $\chi^2(2)$ = 46.13, p < .001, among the cognitive brain type groups. Females were more likely to be classified as Type E than males and males were more likely to be classified as Type S than females.

Two hundred and eighty-two students (54.7% of the sample, 119 females and 163 males) reported the intention to become a peer model for adolescents with ASD. Significant differences were found for gender, $\chi^2(1)$ = 5.14, p < .001, where females were more likely to be a volunteer than males (61% of females vs. 50.8 % of males). A chi-square analysis of intention to volunteer and cognitive brain type groups revealed significant differences, $\chi^2(2)$ = 26.02, p < .001. Adolescents classified as Type E were more likely to be a volunteer (74.8%) than adolescents classified as B (53.6%) and S (43.7%) type.

Table 1. Cognitive Profiles: Gender Differences

	Females n (%)	Males n (%)	Total n (%)
1. Extreme Type E	8 (4.1%)	3 (0.9%)	11 (2.1%)
2. Type E	56 (28.7%)	40 (12.5%)	96 (18.6%)
3. Type B	96 (49.2%)	139 (43.3%)	235 (45.5%)
4. Type S	35 (17.9%)	135 (42.1%)	170 (32.9%)
5. Extreme Type S	-	4 (1.2%)	4 (0.4%)
Total	195 (100%)	321 (100%)	516 (1%)
Type E (1 + 2)	64 (32.8%)	43 (13.4%)	107 (20.7%)
Type B	96 (49.2%)	139 (43.3%)	235 (45.5%)
Type S (4 + 5)	35 (17.9%)	139 (43.3%)	174 (33.7%)

Intention to Act as Peer Buddy and Cognitive Brain Types: Emotional and Behavior Characteristics

MANOVA revealed gender differences in the dependent variables, an effect of intention to act as peer buddy, and an effect of cognitive brain types. There was no effect of interaction between variables. Results from the univariate tests (ANOVA) revealed that: a) females obtained higher scores than males on Emotional Problems and

Table 2. Descriptive Statistics and Significant Effects for Gender and Intention to Act as Peer Buddy

Dimensions	Females n = 195		Males n = 321					Negative Intention n = 234		Positive Intention n = 282				
	M	SD	M	SD	F	p	η_p^2	M	SD	M	SD	F	p	η_p^2
Emotional problems-SDQ	4.20	2.52	2.65	1.94	47.56	.00	.09	3.24	2.43	3.23	2.20	0.08	.77	.00
Conduct problems-SDQ	1.94	1.59	2.24	1.90	0.17	.68	.00	2.35	1.85	1.94	1.74	1.24	.27	.00
Hyperactivity problems-SDQ	3.86	2.13	4.08	2.06	0.10	.75	.00	4.21	2.03	3.82	2.12	0.53	.47	.00
Peer problems-SDQ	2.16	1.92	2.16	1.84	0.13	.72	.00	2.29	1.89	2.06	1.85	0.42	.52	.00
Prosocial behaviour-SDQ	7.83	1.93	6.91	2.20	7.15	.01	.01	6.40	2.28	7.97	1.73	32.35	.00	.06

Effects	λ	F	p	η_p^2
Gender	.88	3.61	.01	.12
Intention to act as peer buddy	.94	6.47	.01	.06
Cognitive brain types	.94	3.16	.01	.03

Table 3. Descriptive Statistics and Significant Effects for Cognitive Brain Types

Dimensions	1. E type n = 107		2. B type n = 235		3. S type n = 174		F	p	η_p^2	Tukey's test
	M	SD	M	SD	M	SD				
Emotional problems-SDQ	3.38	2.34	3.33	2.38	3.02	2.15	.97	.38	.00	
Conduct problems-SDQ	1.50	1.57	2.08	1.77	2.57	1.85	6.94	.00	.03	3 > 2 >1
Hyperactivity problems-SDQ	3.79	2.12	3.77	2.08	4.42	2.01	4.15	.02	.02	3 > (1 = 2)
Peer problems-SDQ	1.62	1.58	2.23	1.91	2.40	1.92	5.50	.00	.02	1 < (2 = 3)
Prosocial behaviour-SDQ	8.18	1.63	7.14	2.24	6.86	2.14	5.90	.00	.02	1 > (2 = 3)

Prosocial subscales, and b) adolescents who were more likely to volunteer differed only on the Prosocial subscale, obtaining higher scores than adolescents who did not express the willingness to become peer buddy, as depicted in Table 2.

ANOVA and post-hoc (Tukey's test, *p* < .05) revealed that the cognitive brain type groups differed on the Hyperactivity subscale, where E and B type groups, that did not differ from each other, obtained lower scores than the S type group; for Conduct problems, the S group obtained higher scores than B, and this group obtained higher scores than the E group; for Peer Problems, adolescents classified as S group obtained higher scores than E and B type groups, that did not differ; for the Prosocial subscale, the E group obtained higher scores than B and S groups that did not differ, as reported in Table 3.

Empathy and Systemizing Quotient, Emotional and Behavior Characteristics as Predictors of Intent to Volunteer

This analysis was conducted to examine what predicted the intention to act as peer buddy for all students. The model was statistically significant, indicating that predictors distinguished between positive and negative intent, and accounted for 20% of the variance, $\chi^2(8)$ = 83.04, *p* < .001, Nagelkerke's R^2 = .20. Overall prediction success was 65.9%, with 73.4% for positive intent and 56.8% for negative intent. The Wald Criterion indicated that the Empathy Quotient and the Prosocial Behavior made significant contributions to the model, as reported in Table 4.

Table 4. Predictors of Intent to Volunteer

Predictors	*B*	*SE*	Wald	*p*	Odds Ratio
Gender (0 = females, 1 = males)	0.00	0.23	0.00	.99	1.00
Empathy quotient	2.23	0.73	9.34	.00	9.27
Systemizing quotient	-0.41	0.91	0.20	.66	0.67
Emotional problems	-0.02	0.05	0.18	.67	0.98
Conduct problems	0.00	0.08	0.00	.99	1.00
Hyperactivity problems	0.03	0.05	0.23	.64	1.03
Peer problems	0.01	0.06	0.02	.89	1.01
Prosocial behavior	0.34	0.06	36.18	.00	1.40

Discussion

The results of this study mirror the empathizing-systemizing (E-S) theory of psychological gender differences, revealing that female students were stronger empathizers than their male counterparts, who were stronger systemizers. As argued by Baron-Cohen (2003), at the population level, females show better ability than males to infer other people's inner states and to respond to these with appropriate emotions. Such drive enables females to predict others' conducts and engage in behaviors that are appropriate to the emotional context. By contrast, males are better than females at analyzing non-agentive systems in terms of relations between input, operation, and output, in order to predict the rules that govern those systems (Baron-Cohen & Wheelwright, 2004).

It is easy to understand that the systemizing trend cannot be applied to other people's emotional states and behaviors. The complexity of individuals' emotional life and different contexts in which people act cannot be parameterized formally in an input-output function as in a deterministic system (Baron-Cohen et al. 2005). For this reason, it is not surprisingly that, as predicted, students with a greater trend to systemizing – classified as Type S or Extreme Type S – engaged in fewer prosocial acts, reported major level of hyperactivity and scored higher on conduct problems than all other brain cognitive types. By contrast, students who are stronger empathizers – classified as Type

E or Extreme Type E – engaged in more prosocial behavior and in fewer conduct and peer problems than systemizing and balanced types. Furthermore, empathizers expressed a greater intention to volunteer than students stronger at systemizing.

The main aim of the present study was to identify which socio-cognitive, behavioral, and emotional variables predicted volunteering in ASD intervention. As hypothesized, the trend at recognizing others' emotions feelings and appropriately responding, was a significant and positive predictor of the willingness to become a peer buddy. Likewise, to empathy, the engagement in prosocial conduct also predicted the intention to be a volunteer to help a classmate with ASD. Such findings coherently insert into research on social cognition, which has found prosocial behavior – a superordinate category that includes acts as helping, sharing, cooperating, and comforting – and empathy are strongly related to each other (Carlo, Hausman, Christiansen, & Randall, 2003; Eisenberg et al., 2010; Laghi, Baiocco, Liga, Guarino, & Baumgartner, 2013; Laghi, Vitoroulis et al., 2013). Students who have expressed their intention to volunteer are those who scored higher on the prosocial scale and held good empathy skills, thus constituting a good model for classmates with ASD. Social impairment is a debilitating core deficit that affects children, adolescents, and adults with ASD. It is not uncommon that difficulty in correctly inferring social cues as well as engaging in interpersonal communication may preclude students with ASD from successfully interacting with their classmates (Bauminger, Solomon, & Rogers, 2010). It is well documented that the simple exposure to peer interactions is not sufficient to promote social kills in adolescents with ASD, but highly structured training programs with systematic procedures are required (Owen-DeSchryver, Carr, Cale, & Baddeley-Smith, 2008; Wilson, 2013). Evidence in the literature has shown that the peer buddy approach is a valid intervention program (Watkins et al., 2015).

Emotional and behavioral problems did not affect the intention to volunteer. Students who have decided to become peer buddies did not differ from students who have expressed a negative intention, namely non-volunteers, in mean scores on hyperactivity, conduct, emotional, and peer problem subscales. The only difference was in the prosocial scale, with volunteers scoring higher than non-volunteers. This issue induces us to ask how students with emotional and behavioral problems, although they engage in prosocial behavior more frequently, may constitute an efficient social model to improve social and communicative skills in classmates with ASD. Likewise, when teachers have to select peer buddies, they prefer students who have a regular attendance, appropriate social skills, and are high in social status to get involved in PMI (Chang & Locke, 2016). Perhaps, it would be interesting to understand the reasons underpinning the intention to volunteer to become a peer buddy, thus not limiting the attention to a single question about willingness (Yes/No). Future research will have to carefully consider this suggestion.

Furthermore, although in our study female students outperformed male students in prosocial behavior and empathy scales, no gender-related differences were found in the prediction of volunteers. This means that both boys and girls want to be involved in PMI as volunteers. However, when peer buddies are selected by teachers, males are more frequently judged as inappropriate than females (Jackson & Campbell, 2009; Laghi, Lonigro et al., 2016). This incoherence between self-nomination and via teacher nominations suggests that more information should be combined when peer buddies are selected. Past studies have already highlighted how teachers do not enjoy a complete access to students' complex social relationships or the larger peer ecology (Rodkin & Hodges, 2003). Moreover, students and teachers have different access to the social situations and may draw different conclusions based on the same observance of behavior (Ladd & Profilet, 1996).

This study presents some limits that need to be mentioned. First, we used a single item to investigate the intent to volunteer.

As argued above, it is extremely important to investigate which reasons are behind the intention to volunteer to become a peer buddy. Second, we are not able to claim whether the specific profiles of volunteers translate into a better implementation of PMI or, most importantly, if they are related to the outcomes for students with ASD. The limit of the present study may constitute the challenge for future research.

Conflict of Interest

The authors of this article declare no conflict of interest.

Acknowledgements

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