



Non-autistic college students' responses to the social behavior of autistic peers

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ABSTRACT

Autistic college students commonly experience strained social relationships with non-autistic peers. This is often attributed to autistic social differences. Yet, how non-autistic peers receive and respond to autistic individuals is also predictive of social interaction outcomes. This study investigated how non-autistic college students' ($n = 469$, $M_{age} = 18.62$; 79.3 % female) previous experiences with autistic people and perceptions of autistic behavior related to their willingness to socially engage with a hypothetical autistic peer. We hypothesized that the relations between predictor variables: non-autistic peers' quality of previous contact, perceptions of autistic individuals' controllability and responsibility over their behavior, and criterion variables: attitudes about autism and willingness to engage with autistic individuals, would be mediated by the peers' affective responses to a hypothetical autistic individual. Positive affect mediated the relations between quality of previous contact and positive attitudes and willingness to engage, whereas there were no associations between perceived controllability or perceived responsibility and positive affect, positive attitudes, or willingness to engage. These findings highlight potential intervention points (e.g., fostering positive interactions with autistic people) that may reduce social interaction difficulties and associated negative mental health outcomes for autistic people.

Many autistic young adults experience social interaction challenges with non-autistic peers (i.e., cross-neurotype interactions; e.g., Crompton et al., 2020). These challenges are often attributed to autistic individuals having difficulties understanding and utilizing expected social communication behaviors (e.g., The Diagnostic and Statistical Manual of Mental Disorders, 5th ed.; DSM-5 TR; American Psychiatric Association, 2022). However, cross-neurotype interaction quality is also influenced by non-autistic individuals' perceptions and responses to autistic individuals and both social partners' abilities and willingness to understand each other's communication efforts (Crompton et al., 2021). Cross-neurotype interaction difficulties are hypothesized to contribute to reports of poorer friendship quality and quantity and reduced social engagement for autistic individuals compared to non-autistic peers (e.g., Forster & Pearson, 2020; Stacey et al., 2019). Notably, social relationship difficulties are associated with elevated depression, social anxiety, and increased loneliness for autistic individuals across the lifespan, including among autistic young adults (Gelbar et al., 2014; Grace et al., 2022; Kuusikko et al., 2008; Locke et al., 2010; Mazurek, 2014).

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Autistic social behaviors

The Double Empathy Problem theory attributes some cross-neurotype interaction difficulties to different social communication approaches and social perspectives between autistic and non-autistic people (Crompton et al., 2021; Heasman & Gillespie, 2018; Milton, 2012). For example, autistic individuals may misunderstand non-autistic social cues or exhibit behaviors that violate non-autistic social norms, such as standing closer to their social partner relative to non-autistic individuals (APA, 2022; Asada et al., 2016).

To address cross-neurotype social difficulties, existing interventions target social cognition and social skill acquisition by teaching autistic individuals social interaction behaviors that non-autistic individuals expect (e.g., Cotugno, 2009). *Social camouflaging* is the process of replacing autistic individuals' natural social behaviors with socially expected behaviors (e.g., Hull et al., 2017). Autistic individuals describe camouflaging as effortful (Leven, 2020), exhausting, sometimes ineffective (Botha et al., 2022), and inauthentic (Hull et al., 2017). Additionally, autistic adults often engaging in camouflaging reported higher rates of anxiety and depression than those camouflaging less often (Cage & Troxell-Whitman, 2019).

To improve cross-neurotype interactions and redistribute the burden of social success, some researchers (Ai et al., 2022) and autistic individuals report a desire for non-autistic peers to improve their understanding of autism characteristics (Botha et al., 2022). Researchers have thus explored how non-autistic peers perceive and choose to participate socially with autistic peers (e.g., Faso et al., 2015; Sasson et al., 2017).

Non-autistic peers perceptions of autistic individuals

In previous research, non-autistic peers briefly observing autistic individuals rated them as less attractive, likable, dominant, empathetic, competent, and more awkward and deceptive than their non-autistic counterparts (Alkhaldi et al., 2021; Lim et al., 2022; Sasson et al., 2017). Non-autistic peers also reported a low likelihood of wanting to hang out or start a conversation with or sit next to individuals demonstrating characteristics of autism, indicating reduced intentions to pursue social interactions with the observed autistic individuals (Sasson et al., 2017; Underhill et al., 2019). Thus, non-autistic peers seem to (a) perceive social behaviors produced by autistic individuals as atypical, (b) quickly form negative first impressions of these peers and (c) their negative impressions hinder their willingness to engage. Altogether, this suggests that addressing non-autistic peers' receptivity to autistic individuals is as important as autistic individuals' attempts to adopt expected social behaviors.

Determinants of social receptivity in non-autistic peers

As outlined below, the known mechanisms of non-autistic peer receptivity, or lack thereof, include factors such as previous contact with autistic individuals and affective, cognitive, and behavioral responses toward autistic individuals, influencing the peers' likelihood to engage positively.

Previous contact

Autism stigma researchers have found associations between non-autistic reports of previous contact with autistic individuals, their attitudes, and behavioral intentions toward autistic peers. More positive quality and higher levels of intimacy (e.g., having an autistic friend) of previous contact with autistic individuals have been associated with more positive feelings toward (Dickter & Burk, 2021), openness and willingness to volunteer with (Gardiner & Iarocci, 2014), and attributions of trustworthiness, dominance, and intelligence for autistic peers; as well as lower ratings of awkwardness and less preferred social distance from autistic peers (Morrison et al., 2019). One hypothesis explaining these connections is that previous interactions with autistic individuals provide practice opportunities, which promote comfortability and confidence, and reduce apprehension about participating in similar experiences in the future (Griffin et al., 2012; Makas, 1993).

Cognitive attributions

Non-autistic individuals' attitudes and behavioral intentions toward autistic individuals may also be driven by their misperceptions of autism, as non-autistic college students commonly hold misinformation about autism and confuse the diagnosis with other disorders (Birnschein et al., 2024; Gillespie-Lynch et al., 2015). Attribution Theory posits that social partners make determinations about the degree to which social behaviors are caused by the individual or by external sources (i.e., perceived responsibility) and the level of personal versus external control (i.e., perceived controllability) individuals have over their behavior (Weiner, 1985). These perceptions are linked to emotional and behavioral responses toward peers (Dolphin & Hennessey, 2014; Juvonen, 1991). For example, perceiving an autistic peer to have more control over their behavior correlates with reports of less sympathy and helping behaviors and more anger and punitive behaviors (Ling et al., 2010; Payne & Wood, 2016).

Affective response

Generally, when people observe and interpret others' behavior, they experience affective responses that subsequently influence their beliefs and decisions in interpersonal settings (Forgas, 2009). Researchers have identified affective responses like sympathy and

anger as significant mediators of attitudes and behavioral intentions toward autistic individuals (e.g., Ling et al., 2010). However, researchers have not explored whether positive affect specifically promotes willingness to approach, or engage with, autistic individuals. Researchers have hypothesized that experiencing positive affect promotes perceptions of social safety, suggesting that such positive relations may exist between positive affect and willingness to engage (Schwarz, 1990). Further, to our knowledge, no study has examined how non-autistic adults' immediate affective responses to the presentation of an autistic individual may be associated with their previous experiences with autistic individuals and their interpretations of the social behavior they observe. Researchers have suggested that positive affect invokes top-down processing, indicating that previous experiences may be more directly recalled and used to make decisions when experiencing positive affect (Bless, 2000; Fiedler, 2000). Further investigation into these relations is warranted given connections between affect, cognitions, and behavioral decision-making (van der Pligt et al., 1997).

Taken together, assessing levels of previous contact with autistic individuals, perceived controllability and responsibility of displayed behaviors, affective responses, attitudes, and behavioral intentions toward autistic individuals may improve understanding of non-autistic peers' perceptions and responses to autistic individuals. Although these factors have been examined separately in previous studies, the relations between these mechanisms have not been combined into a cohesive conceptual model. Therefore, we aimed to quantify the relations between these mechanisms through multiple mediation pathways. Further, because we were interested in identifying predictors of inclusion and acceptance of autistic people (rather than stigma and exclusion), in this study, we chose to include positive affect, positive attitudes, and high willingness to engage within the hypothesized mediation models.

The present study

We hypothesized that: 1. More positive previous contact would be positively correlated with positive affective responses, positive attitudes, and high willingness to engage; 2. High perceived controllability would be negatively associated with positive affective responses, positive attitudes, and high willingness to engage; 3. High causal responsibility would be negatively associated with positive affective responses, positive attitudes, and high willingness to engage; and 4. Positive affective responses would be positively correlated with positive attitudes and with high willingness to engage.

Mediation analyses

We also hypothesized a potential indirect mechanism by which our predictor variables related to attitudes and behavioral intentions, as opposed to how the nature of these relations might change (as with moderation). Using path analysis, we investigated the following six simple mediation models: Quality of previous contact (X_1), perceived controllability (X_2), and perceived causal responsibility (X_3) would serve as predictors of positive attitudes toward autistic individuals (Y_1) and willingness to engage (Y_2), and peers' positive affective responses (M) would mediate these relations (see Fig. 1). We hypothesized there would be direct effects (i.e., pathways c'_1 , c'_2 , c'_3 , c'_4 , c'_5 , and c'_6) of each predictor (quality of previous contact (X_1), perceived controllability (X_2), and perceived causal responsibility (X_3)) on positive attitudes (Y_1) and willingness to engage (Y_2), controlling for positive affective responses (M). Additionally, there would be indirect effects of each predictor on positive attitudes and willingness to engage through positive affective responses.

Method

Participants

519 undergraduate students (ages 18 to 24) enrolled in introductory psychology courses at a university in the southeastern region of the United States completed this study via an online survey. Participants' data were excluded from analyses if they self-disclosed an autism diagnosis ($n = 5$), were missing greater than 50 % of total data ($n = 13$), failed more than one attention or comprehension

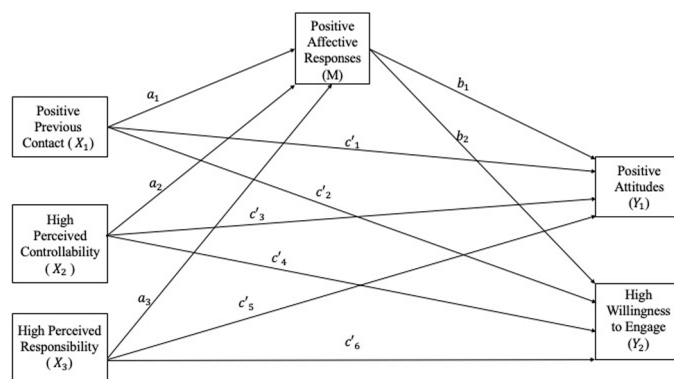


Fig. 1. Conceptual Framework of Six Mediation Models.

check ($n = 19$), or spent an excessive time (i.e., $> 2 SD$) completing the survey ($n = 13$). Due to the low number ($n = 6$) of participants not identifying their gender as male or female, data from these participants were excluded from analyses that included gender as a covariate. This resulted in a final sample of 469 college students ($M_{age} = 18.62$, $SD_{age} = .94$; 79.3 % female; Table 1).

Procedure

Informed consent was obtained before participation in the study, and participants received course credit for their participation. Participants completed study questionnaires through Qualtrics. Participants were told the study was assessing college students' perceptions of their peers. Participants read an adapted version of Underhill et al.'s (2019) vignette about a hypothetical character demonstrating behaviors characteristic of autism. Reflecting on the vignette scenario, participants first answered three comprehension questions about the vignette content and then responded to questions assessing their current affective state, perceptions of responsibility and controllability of the character's portrayed behavior, cognitive attitudes toward the character, willingness to engage with the character across settings, and whether they ascribed gender to the character. Participants also reported on the level of and quality of previous contact they had with autistic individuals and provided demographic information. Participants responded to three attention checks that were distributed throughout the survey.

To mitigate social desirability effects, participants completed a social desirability measure, were prompted with a message

Table 1
Sample Demographic Characteristics.

Characteristic		<i>n</i>	Valid %
Gender	Male	91	19.4
	Female	372	79.3
	Other	6	1.3
Age	18	275	58.6
	19	128	27.3
	20	47	10.0
	21	13	2.8
	22	2	.4
	23	1	.2
	24	3	.6
Academic Year	First Year	350	74.6
	Sophomore	82	17.5
	Junior	28	6.0
	Senior	9	1.9
Race	White	401	85.5
	Black	57	12.2
	American Indian/Alaska Native	4	.9
	Asian	9	1.9
	Native Hawaiian/Pacific Islander	4	.9
	Other	9	1.9
	Multiracial	15	3.2
	Spanish	1	.2
Ethnicity	Hispanic	15	3.2
	Latinx/e	6	1.3
	Non-Latinx/e	452	96.4
Caregiver's Income	Less than \$10,000	16	3.4
	\$10,000 to \$19,999	11	2.4
	\$20,000 to \$29,999	16	3.4
	\$30,000 to \$39,999	23	4.9
	\$40,000 to \$49,999	10	2.1
	\$50,000 to \$59,999	21	4.5
	\$60,000 to \$69,999	33	7.1
	\$70,000 to \$79,999	22	4.7
	\$80,000 to \$89,999	32	6.9
	\$90,000 to \$99,999	25	5.4
	\$100,000 to \$149,999	110	23.6
	\$150,000 or more	148	31.7
Highest Level of Previous Contact	No observation	19	4.1
	Observed autistic person in passing	24	5.1
	Watched autistic person on TV/movie	66	14.1
	Watched documentary about autism	30	6.4
	Observed autistic person(s) on frequent basis	42	9.0
	Worked with autistic person(s) through employment	21	4.5
	Provided services to autistic people as their job	8	1.7
	Provided treatment to autistic people as their job	18	3.8
	Had an autistic friend/family member	113	24.1
	Had a close autistic relative (child, sibling, parent)	109	23.2
	Lived with autistic person	19	4.1

explaining that their responses would remain anonymous and that there were no right or wrong answers to the questions and were directed to report their honest opinions and perspectives. Data were collected as part of a larger study containing additional measures of participants' willingness to engage, personality characteristics held that are similar to those with an autism diagnosis, and open-ended prompts about what they believed to be the cause of the vignette character's behavior. Data from these additional measures are not reported in this article.

Measures

Social desirability

Participants completed 13 true-false items on the Marlowe-Crowne Social Desirability Scale-Short Form C (M-C Form C) to assess impression management ($\alpha = .714$; Crowne & Marlowe, 1960; short form validated by Reynolds, 1982). The M-C demonstrated acceptable internal consistency with previous ($\alpha = .76$; Reynolds, 1982) and current samples ($\alpha = .714$). Stronger agreement with socially desirable items indicates a stronger desire to produce culturally appropriate responses. Scores were totaled.

Vignette

Participants read a vignette (adapted from Underhill et al., 2019) about a fictional college student, "Alex," who demonstrated behaviors characteristic of autism (e.g., a restricted interest, trouble understanding social cues, emotion dysregulation, and repetitive behaviors). We adapted the vignette by renaming the character Alex and changing the character's male pronouns to "their" to reduce the likelihood that the character's gender would influence participants' perceptions of the character. Participants were instructed to imagine that Alex was in the same class as them and that Alex asked them to be partners on a class project. To reflect a more ecologically valid social environment, participants were not informed whether Alex had an autism diagnosis.

Affective responses

Participants completed the Positive and Negative Affect Schedule—Expanded Form (PANAS-X; Watson & Clark, 1994). Using a Likert scale from 1 ("Very Slightly or Not at All") to 5 ("Extremely"), participants were asked to consider how much they would feel the 60 emotions assessed if the passage were real and the vignette character had asked to partner on a class project. The PANAS-X produces two composite subscores that range from 10 to 50 (higher scores indicate more extreme affective responses): the Negative Affect and Positive Affect scores. The Positive Affect score served as a measure of positive affective response to the vignette character. The internal reliability for in-the-moment positive affect was high in previous (.89; Watson & Clark, 1994) and present samples ($\alpha = .88$).

Behavioral attributions: perceived controllability and responsibility

Participants completed an adapted Revised Causal Dimension Scale (CDSII). Whereas the original CDSII captured personal causal perceptions, the 12 items on the Revised CDSII reflected a third-person point of view, assessing observer causal attributions, with little impact on the psychometric properties of the scale (Boisvert & Faust, 1999; Jones and Hastings, 2003). The CDSII is composed of four subscales (i.e., perceptions of behavioral stability, locus of causality, personal control, and external control). The two subscales included within this study were: Locus of Causality (i.e., the extent to which participants believed the vignette character was responsible for their behavior) and Personal Control (i.e., the extent to which participants perceived that the vignette character could control their behavior). Participants responded via a bipolar Likert scale, indicating the degree to which they agreed with causal attribution statements (e.g., 1 ("The cause is something Alex cannot regulate") to 9 ("The cause is something Alex can regulate")). Internal consistencies for the two subscales were adequate to good in previous research: Locus of Causality, .67; Personal Control, .79 (McAuley et al., 1992). The current sample yielded questionable internal consistency scores, .50 and .70, respectively. Inter-item correlations among the three items making up the Locus of Causality (i.e., perceived responsibility) score ranged from .133 to .561. Inter-item correlations among the three items composing the Personal Control score ranged from .392 to .496.

Attitudes

Attitudes toward the vignette character were assessed using the Cognition subscale of the Multidimensional Attitudes Scale Toward Persons with Disabilities (MAS; Findler et al., 2007). Participants rated the extent to which they agreed with 10 cognitions (e.g., "Alex seems to be an interesting person") on a 5-point Likert scale (1, "Not at all," to 5, "Very much"). Higher scores on the Cognition subscale indicated more positive attitudes. The MAS has previously assessed non-autistic attitudes toward autistic peers with strong reliability in previous (Cronbach's $\alpha = .80$; Matthews et al., 2015) and the current ($\alpha = .88$) college student samples.

Willingness to engage

The Shared Activities Questionnaire-Form B (SAQ-B) is a 24-item measure. Participants indicated their behavioral intentions to engage with "Alex" in academic, recreational, and social settings (8 items per setting; e.g., "Study with Alex at school") by responding to a 3-point Likert-type scale: 1 ("No"), 2 ("Maybe"), and 3 ("Yes"; Campbell, 2008). A total score and subscale scores were calculated, with higher summed scores indicating stronger willingness to engage. The SAQ was originally developed for child populations, but an adapted college-age student version demonstrated high internal consistency in previous (Cronbach's alphas = .94 for the total score, .83 academic domain, .86 recreational domain, and .86 social domain; Meeks, 2014) and current samples (total score = .92, academic = .86, recreational = .92, social = .84).

Quality of previous contact (QoPC)

Participants responded “Yes” or “No” to the question, “Have you ever had direct interaction with someone with ASD?” If the participants endorsed, “Yes,” they were prompted to complete a 7-item measure of the quality of previous contact with autistic individuals, created by the first author of the current study. If participants denied previous contact, they did not complete this measure. Participants responded on a scale from 1 (a negative adjective, e.g., “unpleasant”) to 5 (a positive adjective, e.g., “pleasant”). The other six adjective pairs included “negative/positive,” “uncomfortable/comfortable,” “challenging/easy,” “natural/awkward,” “un enjoyable/enjoyable,” and “unimportant/valuable.” Scores were averaged, and higher scores indicated more positive previous experiences with autistic individuals, producing high internal consistency ($\alpha = .87$).

Level of previous contact (LoPC)

We adapted the Level-of-contact Report (Holmes et al., 1999) to measure how close participants have been in contact with an individual(s) with autism. Participants selected as many of the 12 statements that applied to them (e.g., I live with a person who has ASD; Table 1). The highest ranked selected item served as each participant’s score (e.g., if a participant endorsed the 11th item “I live with a person who has ASD” and the 5th item “I have observed people with ASD on a frequent basis,” the participant received a score of 11). Higher scores indicated closer levels of previous contact with people with autism. Internal consistency with undergraduate students has been acceptable ($\alpha = .62-.83$; Corrigan et al., 2003; Mahoney, 2007).

Data analysis

To process the data, we examined the data for outliers and assumption violations. Next, we conducted bivariate Pearson correlation analyses to examine the associations between all primary variables of interest and potential confounding variables (i.e., social desirability and demographic factors). We conducted a repeated measures ANOVA to test whether participant responses in their willingness to engage varied by setting. To examine the factor structure of the newly designed quality of previous contact measure, we conducted an exploratory factor analysis.

The main study analyses included a path model encompassing multiple simple mediation pathways (Fig. 1) which we conducted via the lavaan package in R (Rosseel, 2012). Quality of Perceived Contact, Perceived Controllability, and Perceived Responsibility were specified as exogenous variables (i.e., independent variables), while Positive Affect was specified as a mediator variable and Willingness to Engage and Attitudes were specified as endogenous variables (i.e., dependent variables). Potential confounding variables (i.e., social desirability and demographic factors) were included in the path model, predicting the mediating variable and endogenous variables. Maximum likelihood was used as the estimation method for the path model.

Results

Preliminary analyses

Variables of interest (Table 2) were examined and assumptions were tested, revealing normal distributions and no significant outliers. A repeated measures ANOVA revealed a significant difference between the setting domains of the SAQ-B, (i.e., Social ($M = 10.53$, $SD = 3.713$), Academic ($M = 10.40$, $SD = 4.224$), and Recreational ($M = 8.12$, $SD = 4.868$), sphericity violated, Greenhouse-Geisser correction: $F(1.397) = 101.893$, $p < .001$. Paired samples t -tests revealed significant differences between social and recreational settings, $t(468) = 17.365$, $p < .001$, and academic and recreational settings, $t(468) = 9.382$, $p < .001$, suggesting that non-autistic participants were more willing to engage in social and academic as compared to recreational settings. Although the three setting subscores were initially examined separately given these differences, the indirect and direct effects with each path model produced similar patterns across settings. Thus, we chose to parsimoniously report the results of analyses at the Total score level, collapsing across settings.

Table 2
Descriptives of Variables of Interest.

	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Skewness</i>	<i>Kurtosis</i>
QoPC	3.91	0.703	1.29	5	−.483	.022
Perceived Controllability	15.21	5.471	3	27	−.017	−.356
Perceived Responsibility	10.14	4.218	3	24	.283	.003
Positive Affect	25.25	8.278	10	50	.253	−.496
Attitudes	3.80	0.704	1.6	5	−.400	−.435
SAQ Academic	10.40	4.224	0	16	−.617	−.574
SAQ Recreational	8.12	4.868	0	16	−.017	−1.052
SAQ Social	10.53	3.713	0	16	−.594	−.342
SAQ Total	29.06	10.740	0	48	−.412	−.337

Note. QoPC = Quality of Previous Contact; SAQ = Shared Activities Questionnaire. Only 390 participants endorsed having previous interactions with autistic individuals and provided data on QoPC. Therefore, analyses including the QoPC variable featured 390 participants, as opposed to 469.

Exploratory factor analyses (EFA)

A principal component exploratory factor analysis was conducted on all seven Quality of Previous Contact (QoPC) items. The purpose of the EFA was to report the data-driven factor structure of this newly created questionnaire. Participants provided the full range of responses across each item included in the QoPC measure [i.e., each item had at least one participant who responded 1 (lowest quality) and 5 (highest quality)]. Mean and standard deviation values of participant responses are presented in Table 2. Results of an internal consistency analysis revealed high full-scale internal consistency (Cronbach's $\alpha = .87$). The Kaiser-Meyer-Olkin value of .871 indicated that the sample size was adequate to complete subsequent factor analyses. Additionally, Bartlett's Test of Sphericity revealed a significant chi-square result, $\chi^2(21) = 1261.894, p < .001$, indicating that the data were significantly distributed and not redundant. Eigenvalues of the 7-item measure indicated the presence of one psychometrically valid factor, explaining 57.27 % of the variance in the 7-item solution. Further, the scree plot revealed one factor. Factor loading values were examined to determine the strength of the relationship between items and extracted factors. All items demonstrated loading values above .50 (Table 3).

Correlation Analyses

As predicted, QoPC was positively correlated with positive affect ($r = .225, p < .001$), positive attitudes ($r = .320, p < .001$), and behavioral intentions ($r = .239, p < .001$; Table 3). Contrary to hypotheses, perceived control over and responsibility for one's behavior were not correlated with any variables of interest ($ps > .05$). Consistent with hypotheses, positive affect was positively correlated with both outcome variables (i.e., positive attitudes and greater willingness to engage) and both outcome variables were positively correlated with one another (Table 4).

Intercorrelations of possible covariates with outcome variables revealed several variables to control for in subsequent analyses (Table 5). Variables significantly correlating with positive affect included LoPC ($r = .095, p = .040$), social desirability ($r = .132, p = .004$), race ($r = .097, p = .035$), and income ($r = -.124, p = .007$); as positive affect served as the only tested mediator, those variables served as covariates in the path analysis. Analyses including the criterion variable of positive attitudes included LoPC ($r = .145, p = .002$), social desirability ($r = .098, p = .033$), and gender ($r = .116, p = .013$) as covariates. Analyses including the criterion variable of behavioral intentions included social desirability ($r = .123, p = .008$), ascribed gender ($r = -.095, p = .041$), and income ($r = -.133, p = .004$) as covariates.

Mediation analysis testing

A path analysis examined each hypothesized direct and indirect effect (CFI = .939, RMSEA = .082, SRMR = .033). There were no assumptions violations for each mediation model. One outlier was identified within a mediation model but was retained in all analyses as its exclusion did not significantly change findings.

Quality of previous contact

Positive QoPC significantly predicted positive affect, $B = .016, p < .001$. While controlling for covariates and the mediator, Positive QoPC significantly predicted positive attitudes, $B = .194, p < .001$. Positive affect was a significant predictor of positive attitudes, $B = .322, p < .001$, and the indirect effect of Positive QoPC through positive affect on positive attitudes was significant, $B = .005, p < .001$. Overall, approximately 19 % of the variance in attitudes was accounted for by the predictors ($R^2 = .186$).

Positive QoPC was a significant predictor of willingness to engage, again while controlling for covariates and the mediator, $B = .013, p < .001$. Positive affect was a significant predictor of willingness to engage, $B = .396, p < .001$, and the indirect effect of Positive QoPC through positive affect on positive attitudes was significant, $B = .006, p < .001$. Approximately 18 % of the variance in willingness to engage was accounted for by the predictors ($R^2 = .179$).

Perceived controllability & perceived responsibility

No significant direct or indirect effects of perceived controllability were observed in predicting positive affect, positive attitudes, or willingness to engage. Likewise, no significant direct or indirect effects of perceived responsibility were observed in predicting positive

Table 3
Factors and Loading Values for Exploratory Factor Analysis for QoPC Items.

Items	1.
1. Pleasant vs. Unpleasant	.842
2. Positive vs. Negative	.778
3. Comfortable vs. Uncomfortable	.815
4. Easy vs. Challenging	.686
5. Natural vs. Awkward	.747
6. Enjoyable vs. Unenjoyable	.797
7. Valuable vs. Unimportant	.604

Table 4
Intercorrelations of Variables of Interest.

	2.	3.	4.	5.	6.	7.	8.	9.
1. QoPC	-.028	.004	.225**	.320**	.253* *	.134**	.217**	.239**
2. Perceived Controllability	—	.011	.008	.049	-.009	-.077	-.041	-.053
3. Perceived Responsibility		—	.043	-.065	-.065	-.043	-.070	-.069
4. Positive Affect			—	.374**	.363**	.366**	.399**	.447**
5. Attitudes				—	.430**	.383**	.532**	.527**
6. SAQ Academic					—	.339**	.561**	—
7. SAQ Recreational						—	.787**	—
8. SAQ Social							—	—
9. SAQ Total								—

Note. QoPC = Quality of Previous Contact; SAQ = Shared Activities Questionnaire

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

Table 5
Intercorrelations of Possible Covariates with Outcome Variables.

	Positive Affect	Attitudes	SAQ Total
Level of Contact	.095*	.145**	.051
Social Desirability	.132**	.098*	.123**
Age	.052	.030	.014
Academic Year	-.017	-.014	-.041
Gender	.014	.116*	.031
Race	.097*	-.059	.059
Ethnicity	.067	.075	.047
Income	-.124**	-.029	-.133**
Gender Ascription	-.069	.001	-.095*

Note. Gender and Gender Ascription variables coded as Male = 2, Female = 1

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

affect, positive attitude, or willingness to engage. Table 6.

Discussion

This study examined correlations between non-autistic college students' perceptions of a hypothetical autistic peer and their attitudes and behavioral intentions toward the hypothetical autistic peer. Consistent with hypotheses, positive affective responses (e.g., excitement, interest, enthusiasm) were associated with greater positive attitudes and willingness to engage. Quality of previous contact (QoPC) was also a predictor of positive attitudes and greater willingness to engage while controlling for positive affect. Additionally, there were significant indirect effects of QoPC on positive attitudes and willingness to engage through positive affective responses. Thus, having more positive previous experiences with autistic individuals was related to more positive in-the-moment affective responses toward an autistic individual, which was further associated with more positive attitudes toward and willingness to engage with the autistic peer. Although this may be the first study to test positive affective responses toward an autistic peer as a mediating variable, the significant bivariate associations found between QoPC and positive affect, positive attitudes, and greater willingness to engage are consistent with previous findings (Gardiner & Iarocci, 2014; Mahoney, 2007; Payne & Wood, 2016). These results also mirror the relations between positive previous contact and positive attitudes demonstrated by non-autistic young adults toward individuals with intellectual disabilities (McManus et al., 2010).

Table 6
Results of path analysis model.

Path From	Positive Affect	Attitudes	Willingness to Engage
Direct Effects			
Previous Contact	.016***	.194***	.013***
Perceived Controllability	.006	.070	.005
Perceived Responsibility	.024	-.046	-.003
Positive Affect	—	.322***	.396***
Indirect Effects¹			
Previous Contact		.005***	.006***
Perceived Controllability		.002	.002
Perceived Responsibility		-.001	-.002
R ²	.08	.186	.179

Note. Standardized Betas are reported. ¹ Indirect effect of variable through Positive Affect.

* ** $p < .001$.

Having positive previous interactions with autistic people appears to be predictive of both non-autistic attitudes and behavioral intentions, perhaps because of increased optimism regarding future interactions. In this study, however, we did not test how peers developed such positive perceptions of their interactions with autistic peers. Given recent widespread efforts to reduce stigma and increase acceptance of neurodiverse people, non-autistic peers' attitudes may be generally more positive in this cohort than previous college student cohorts (Hotez et al., 2023; Kim & Gillespie-Lynch, 2023; Turnock et al., 2022). Future studies may assess these potential confounding factors in conjunction with comparison groups.

Contrary to hypotheses, there were no significant correlations between perceived controllability or responsibility and positive affect, attitudes, or willingness to engage. Further, analyses yielded nonsignificant indirect effects for all models involving perceived controllability and responsibility as predictor variables. Examining inter-item correlations between the three items comprising each scale revealed low associations, suggesting that the items may not accurately represent the constructs. Likewise, previous studies examining perceived controllability of autistic peers' behavior with two items ($\alpha = .31$; Mahoney, 2007) or five items ($\alpha = .69$; Ling et al., 2010; $\alpha = .75$; Mogavero & Hsu, 2018), yielded low internal consistency scores. Unlike the current results, those studies demonstrated that perceived controllability or responsibility were significant predictors of non-autistic peers' attitudes (Mahoney, 2007) and behavioral intentions (Ling et al., 2010; Mahoney, 2007; Mogavero & Hsu, 2018). Notably, in Mogavero and Hsu's study (2018), participants perceived the vignette character as having less control of their behavior and were less favorable of punishing the character when they were informed the character was autistic as compared to participants who did not receive this diagnostic information. These results suggest that diagnostic disclosure may impact peer perceptions and behavioral intentions toward individuals presenting with autistic behavior. However, many researchers have manipulated disclosure of an autism diagnosis to participants (Thompson-Hodgetts et al., 2020), with significant variability in effects on others' perceptions across studies (Brosnan & Mills, 2016; Gardiner & Iarocci, 2014; Gillespie-Lynch et al., 2015; Matthews et al., 2015). Further, many autistic people have voiced concerns about the potential increase in stigma or negative reactions from others should they choose to disclose their autism diagnosis (Thompson-Hodgetts et al., 2020).

Discrepancies between current study results and those of other studies may be the result of participant, measurement, situational, or any combination of several study differences. It is possible that examining more granular aspects of perceptions of autistic behavior presentations may explain this variability. For example, Ling and colleagues (2010) observed indirect effects of anger and sympathy as mediating variables between perceived controllability and intentions to help or punish autistic individuals. The vignette utilized in the Ling et al. (2010) study portrayed a physically aggressive character, while the present vignette character did not display any aggression. Thus, the behavior portrayed by the vignette character in the present study may not have been salient enough to elicit such strong responses. Additionally, given autism's significant heterogeneity (APA, 2022; Masi et al., 2017) and researchers' attempts to capture this variety in vignette-based studies, peer perceptions may differ significantly based on the types of non-autistic social norm violations depicted.

More granular affective responses may also better predict non-autistic peers' perceptions and responses to autistic peers. Weiner (1985) posited that behaviors are motivated by emotions such as anger, gratitude, guilt, hopelessness, pity, pride, and shame, thus warranting an examination of associations between such emotional responses and non-autistic peers' willingness to engage with an autistic peer. Given previously demonstrated associations between anger and sympathy, perceived controllability, and behavioral intentions (Ling et al., 2010), certain specific affective responses may be stronger predictors of attitudinal and behavioral responses as compared to general positive affect as measured in the current study.

Limitations and future directions

Although we controlled for social desirability, participants' responses may not match their actual behaviors within more ecologically valid environments. Self-reported measures of willingness to engage are hypothetical in nature and serve as a proxy for actual behavior. Vignettes are commonly used by researchers conducting similar work (e.g., Matthews et al., 2015; Nevill & White, 2011; Underhill et al., 2019), but participant responses may differ when contact with an autistic person is via video or in-person. Indeed, non-autistic peers have exhibited less favorable responses to autistic peers when the autistic individual was presented through an audio-visual modality as compared to transcript or audio modalities (Sasson et al., 2017). Future studies should thus examine how non-autistic peers' reported behavioral intentions relate to actual behavior and consider the modality through which interactions occur. Furthermore, the questionnaire used to measure QoPC was created for this study and lacks established psychometrics beyond what is reported here. Future research on this measure's psychometric properties would help to increase confidence in the reliability and validity of its scores.

The present sample is fairly demographically homogenous, limiting the generalizability of the results. Correlations between demographic and criterion variables revealed that participants who came from more wealthy households demonstrated more negative affect toward and less willingness to engage with autistic peers. Future studies may investigate potential explanatory mechanisms.

Finally, this study presents mediation models with variables placed within the models according to their hypothesized connections. Because we did not collect longitudinal data and therefore did not introduce the necessary temporal element to control directionality between variables, we cannot definitively conclude that predictor variables *caused* a change in outcome variables. Moreover, our use of terms like "predictor" and "criterion" variables (and their derivatives and synonyms) was driven by convention with regression-based analyses (e.g., Hayes, 2018; Hayes et al., 2017) and not to imply causation or temporality. Instead, our findings provide evidence of correlations between variables of interest. Future work may benefit from intentionally assessing the temporal order of the variables included within these models.

Clinical implications and conclusions

Overall, results demonstrated that non-autistic peers who had positive emotional reactions to a hypothetical autistic peer were also more likely to express positive attitudes and behavioral intentions toward that peer. This suggests that positive affective responses may be a beneficial point of intervention for existing social skills intervention programs (e.g., Locke et al., 2012; Matthews et al., 2018) or anti-autism-stigma training programs (e.g., Gillespie-Lynch et al., 2015). This behavioral target may help to avoid the potential harms associated with interventions primarily encouraging camouflaging as autistic individuals have cautioned that camouflaging reinforces the idea that demonstrating autistic behaviors is problematic and that autistic individuals must change themselves to be valued (Schneid & Raz, 2020).

Further, this study's results demonstrate that having positive prior experiences with autistic individuals is associated with having more positive affect, more positive attitudes, and greater willingness to engage with autistic peers. If non-autistic peer intervention programs can effectively promote opportunities for positive interactions to develop, there may be resulting attitudinal and/or behavioral changes in non-autistic peers. Future work should measure whether this increases non-autistic peer social reciprocity and bolsters the positive effects of social skills interventions already targeting autistic individuals without placing the burden solely on autistic individuals.

Ethical Approval

All procedures were performed in line with the principles of the Declaration of Helsinki. Approval for this study was granted by the local ethics committee (IRB # 20–07-3710).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Statements and Declarations

Not applicable.

Consent to Participate

Each participant provided informed consent via online survey prior to participating in this research study.

Data availability

The authors do not have permission to share data.

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