



# The relationship between contact and attitudes: Reducing prejudice toward individuals with intellectual and developmental disabilities



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## ABSTRACT

Increases in intellectual and developmental disability (IDD) diagnoses coupled with higher rates of inclusion in school and community settings, has created more opportunities for exposure and integration between those with IDD and the mainstream population. Previous research has found that increased contact can lead to more positive attitudes toward those with IDD. The current study further investigated this impact of contact on attitudes by examining the influence of the quality and quantity of contact on both explicit and implicit levels of prejudice, while also considering potential mediation via intergroup anxiety and implicit attitudes. Based on past research and theory, we predicted that contact (especially quality contact) would have a strong relationship with explicit and implicit positive attitudes toward individuals with IDD. In the present study, 550 people completed a survey and short task that measured their level of contact with individuals with IDD across their lifetime, their current attitudes toward these individuals, and other constructs that are thought to influence this relationship. Multiple regression analyses suggested consistent links between higher quality of contact and lower levels of prejudice toward individuals with IDD at both the explicit and implicit levels. After controlling for quality of contact, higher quantity of contact was either not significantly associated with our measures of prejudice or was, importantly, associated with higher levels of prejudice. Additional analyses support intergroup anxiety and implicit positive attitudes as significant mediators in the associations between quality of contact and the various dimensions of explicit prejudice. Thus, it would seem that it is the quality of interpersonal interactions that is most strongly related to positive attitudes toward individuals with IDD, making it crucial to take care when developing inclusion opportunities in community settings.

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## 1. Introduction

The prevalence of individuals with intellectual and developmental disabilities (IDD) in the United States is estimated to range from 4.6 to 7.7 million (Larson et al., 2000; Morstad, 2012). Changes in inclusive education, workplace integration, and individualized support programs have created a community that allows for more exposure and interaction between the mainstream population and those with IDD (Metzel & Walker, 2001). Because integration is present across a variety of

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settings, it is essential to understand the positive and negative outcomes of increased interaction. While increases in inclusion have had many positive effects (Odom, Buysse, & Soukakou, 2011), these effects may be attenuated by residual prejudice and discrimination toward those with IDD. Past studies have found compelling evidence that suggests that prejudice negatively impacts those with IDD, leading to a devaluation of themselves, mistrust in systems that show social stigma, difficulty feeling like a part of a broader community, and distancing from other individuals with IDD (Jahoda & Markova, 2004; Metzel & Walker, 2001). Similarly, in a paper on mental illness, Corrigan and Watson (2002) emphasized how stereotypes and prejudice can take away opportunities including good jobs, safe housing, adequate health care, and the ability to interact with a diverse group of people. In addition, Corrigan et al. (2003) found that stigmatized individuals suffered from low self-esteem and demoralization as a result of internalizing this stigma. Continued research is needed to increase understanding of prejudice toward individuals with IDD in an effort to reduce these negative attitudes and the deleterious effects that can result from prejudice and discrimination.

A classic theory on prejudice, the intergroup contact hypothesis, addresses the way in which exposure to a dissimilar group of individuals, termed the out-group, can lead to a reduction in negative attitudes toward that group (Allport, 1954/1979). This theory proposes that interacting with members of another group can lead to an increase in positive feelings if certain conditions are met, such as shared goals, equal status, cooperation, and institutional support. Following Hewstone and Brown's publication of *Contact and Conflict in Intergroup Encounters*, several studies have furthered the contact hypothesis by analyzing key components of inclusive opportunities that lead to varying levels of decreased prejudice in a diverse range of populations. This theory has been used as a framework in research on prejudice for the past several decades. For example, the principles of this theory were present in studies investigating racial prejudice between Muslims and Hindus (Islam & Hewstone, 1993), cross-group friendship between White and South Asian elementary school children (Turner, Voci, & Hewstone, 2007), prejudice toward other nationalities (Pettigrew, 1997), and attitudes toward gay men (Vonofakou, Hewstone, & Voci, 2007).

The intergroup contact hypothesis has also been used as a guiding framework in research on prejudice toward individuals with IDD. Manetti, Schneider, and Siperstein (2001) investigated the acceptance of students with intellectual disabilities by their peers, by comparing children's attitudes in elementary schools that did or did not have programs to foster interaction between groups. They found that children who had regular contact with peers with intellectual disabilities had more positive attitudes toward IDD than children who did not have regular contact. The former group reported more positive attitudes toward hypothetical peers with IDD and also reported that they enjoyed their interactions with their classmates with IDD, but in psychometric analyses showed unfavorable views toward the less socially skilled students with a disability. The school that fostered inclusion also found that their students placed less weight on the disability-status of a classmate when forming impressions than the students in the comparison school. Piercy, Wilton, and Townsend (2002) emphasize the importance of cooperative-learning procedures through the results of a 10-week inclusion program that produced social acceptance of typically developing children toward classmates with moderate to severe intellectual disabilities. The authors found that feelings of peer acceptance and popularity indices increased more after children worked together on a cooperative learning task than in conditions in which there was mere exposure or no contact at all. This finding is important as it shows that meaningful, non-superficial contact can occur between typically developing children and those with moderate to severe IDD.

The studies above suggest that both the quality and the quantity of contact may be central to changing attitudes toward IDD. When the type of contact was specifically analyzed, quality and quantity of contact were often found to have significant and different effects on perceptions of and attitudes toward out-group members. Islam and Hewstone (1993) used an integrative model to show how varying dimensions of contact between Muslim and Hindu participants affected prejudice toward their respective out-groups. The authors developed a comprehensive scale that assessed quantitative and qualitative aspects of contact, finding that quantity of contact decreased the perceived homogeneity of the group, while quality of contact was the main factor affecting attitudes toward the minority group. Looking at variations in contact with individuals with IDD, McManus, Feyes, and Saucier (2010), found that quantity of contact was not associated with attitudes, whereas quality of contact was related to more positive attitudes. Based on past research, the specific influence that the quality of contact has on prejudice toward individuals with IDD above and beyond the quantity of that contact (and vice versa) is unclear and needs further study.

Examining possible mediators in the relationship between contact and prejudice increases our understanding of the mechanisms by which contact may influence attitudes. This is important as it may help to maximize the benefits of inclusion when developing integration opportunities. Past research examining indirect effects in the association between contact and prejudice identified intergroup anxiety as an important mediator (Pettigrew & Tropp, 2008; Voci & Hewstone, 2003). Stephan and Stephan (1985) described intergroup anxiety as the uncomfortable feeling individuals may have while interacting with an out-group member. They posited that this anxiety may be a result of poor past experiences with a person from an out-group, which produce negative expectancies of future interactions. These difficult feelings can lead to a dislike or avoidance of the interaction or even of the out-group members themselves (Plant & Devine, 2003). Voci and Hewstone (2003) discussed the influence of contact on attitudes toward immigrants and found that intergroup anxiety may mediate this relationship with less anxiety leading to decreased prejudice. Similarly, Crowson and Brandes (2010) reported that quality of contact indirectly predicted attitudes toward inclusion of students with disabilities through intergroup anxiety. While some research has investigated the role of intergroup anxiety in a model between contact and prejudice, further research is needed to better understand this construct as it relates to prejudice toward individuals with IDD, as it may serve as a crucial point of intervention in this relationship.

Previous research has approached the measurement of prejudice in various ways. Based on a dual-process model, the literature emphasizes two forms of intergroup attitudes: a more direct, explicit form and a subtle, implicit form of prejudice (Fazio & Olson, 2003). In a study examining both direct and subtle forms of prejudice, Akrami, Ekehammar, Claesson, and Sonnander (2006) concluded that these forms of attitudes were correlated but still discrete even when both were examined through self-report. Participants' self reports of explicit prejudice may be vulnerable to social desirability and motivational biases. While self report is susceptible to bias in desirable responding, implicit tasks work to eliminate this confound by utilizing fast response rates to target an individual's subtle, covert attitudes. In addition, explicit and implicit prejudice may be differentially influenced by dimensions of intergroup contact. In a study by Turner et al. (2007), the authors found that increases in the quantitative and qualitative aspects of contact between White and South Asian elementary school students led to decreases in implicit and explicit aspects of prejudice in similar but still distinct ways. Their results suggest that increased opportunity for cross-group contact directly affects implicit prejudice, whereas self-disclosure in high-quality contact may mediate the relationship between interactions and explicit prejudice. Hence, both explicit and implicit measurement can serve an important role in analyzing prejudice toward those with IDD. The extant research on the specific ways in which dimensions of contact may affect prejudice is unclear. Differing findings in previous studies may be due to differences in measurement of contact and prejudice, as well as differences in the nature of prejudice itself for the particular populations studied. Because of the elusive nature of this relationship within the IDD literature, further investigation is needed (Wilson & Scior, 2014).

The extant literature investigating contact and prejudice has largely focused on populations other than individuals with IDD and is mixed in regard to the relative importance of quality vs. quantity of contact. Hence, the current study aimed to further investigate the impact of contact on prejudice toward those with IDD by better understanding the distinct relationship quantity and quality of contact have with attitudes measured both explicitly and implicitly. It was expected that greater quality and quantity of contact would both be related to prejudice, but may show a different pattern of relationship with explicit vs. implicit prejudice. Additionally, to better understand this complex relationship, intergroup anxiety and implicit attitudes were examined as potential mediators in the association between contact and prejudice.

Based on previous research and theory, the current study sought to examine four hypotheses.

**Hypothesis 1.** We hypothesized that higher levels of contact would predict individuals reporting more positive explicit (self-reported) attitudes toward individuals with IDD. Specifically, we thought that higher quality (Hypothesis 1A) and higher quantity (Hypothesis 1B) of contact would predict higher levels of positive explicit attitudes.

**Hypothesis 2.** We also hypothesized that higher quality (Hypothesis 2A) and quantity (Hypothesis 2B) of contact would predict stronger positive implicit attitudes toward disabilities.

**Hypothesis 3.** We further hypothesized that higher quality (Hypothesis 3A) and quantity (Hypothesis 3B) of contact would predict lower levels of intergroup anxiety.

**Hypothesis 4.** Finally, we hypothesized that intergroup anxiety (Hypothesis 4A) and implicit attitudes (Hypothesis 4B) might both act as potential mediators, helping to explain how quality and quantity of contact could shape explicit attitudes toward individuals with IDD. Based on the extant literature in IDD and other populations, for all of the relationships above, quality of contact was hypothesized to show stronger associations with the other constructs than quantity of contact.

The current study aimed to expand the literature on attitudes toward IDD by including participants from a wide age range with a variety of personal and professional backgrounds, by asking for a recollection of levels of contact throughout life, and by integrating a variety of measures to assess intergroup attitudes in a comprehensive manner. Importantly, the range of people sampled in this study includes individuals who have experienced a variety of points on the integration-segregation spectrum and who likely represent the adults who are working and interacting with individuals with IDD on a daily basis.

## 2. Methods

### 2.1. Procedure

All procedures and materials for this study were approved by the university's Institutional Review Board. Respondents had to be at least 18 years of age and living in the United States to participate and were recruited via the university's student body (66%) and Amazon.com's Mechanical Turk (34%). The traditional use of college samples was augmented with Mechanical Turk recruitment in the current study in an effort to capture a wider range of experiences with individuals with IDD. The hyper-links used in the recruitment materials took subjects to a webpage presenting a study information letter with a link at the bottom of the page allowing interested individuals to begin the online survey. The survey took approximately 15 to 20 min to complete. Participants recruited via the undergraduate research pool ( $n = 365$ ) were given extra credit toward their psychology courses as the primary recruitment incentive. Participants recruited via Mechanical Turk ( $n = 185$ ) were given 15–25 cents of Amazon.com store credit as their primary recruitment incentive. While this payment is minimal, past research has found that these incentives are able to recruit participants who produce attentive and compliant data (Maniaci & Rogge, 2014).

## 2.2. Participants

A total of 616 respondents completed the online survey. This yielded a final sample of 550 participants after screening out respondents giving excessively inconsistent or inattentive responses (see Section 2.4). The final 550 participants were 61% female and 75% Caucasian, with 13% Asian, 7.1% African American, and 6.4% Latino. Participants were 24.5 years old on average ( $SD = 9.6$  yrs; range: 18–74) and 26% reported having completed high school or less, 55% reported having completed some college, and 19% reported having a bachelor's degree or higher.

## 2.3. Measures

All measures were collected online in an effort to encourage the most honesty in answering questions on this sensitive topic. A variety of tasks were used to assess the relationship between contact and prejudice. Self-report measures assessing quantity and quality of contact and intergroup anxiety served as independent variables for this study. To assess the outcome variable, prejudice, an implicit word-sorting task and an explicit self-report measure were included. Additionally, several demographic variables were also included to assess age, gender, socioeconomic status, race and ethnicity, education, and employment.

### 2.3.1. Quantity and quality of contact with individuals with IDD

To assess the different dimensions of contact, a 14-item contact scale was adapted from Islam and Hewstone (1993) (by substituting individuals with IDD as the target group) and included quantitative and qualitative aspects of contact. Quantity of Contact was measured using 7 items, which formed a reliable subscale with good internal consistency in the current study ( $\alpha = .75$ ). Questions assessing quantity of contact included, "Rate the amount of contact you have had with an individual with mental retardation<sup>1</sup> or developmental disability in the following contexts... elementary school, middle school, high school, in college, as neighbors, as close friends, and in a job setting." Available response options for these questions were assessed on a 5-point scale ranging from None at All (1) to A Great Deal (5). Quality of Contact was measured using 7 items, which also formed a reliable subscale with good internal consistency in the current sample ( $\alpha = .79$ ). Examples of questions assessing quality of contact inquired about the frequency of subjects' informal talks with individuals with IDD and visits to homes of individuals with IDD (both assessed on a 5-point scale from Never (1) to Very Often (5)), as well as a series of questions assessing the general tone of interactions with individuals with IDD (e.g., was the conversation perceived as cooperative or competitive, intimate or superficial, voluntary or involuntary; assessed on a 5-point scale from Definitely Not (1) to Definitely Yes (5)). Items within each subscale were averaged to create two distinct variables, each representing a different dimension of contact.

### 2.3.2. Intergroup anxiety

Intergroup anxiety, or feeling anxious in the presence of a member of an out-group (in this case an individual with IDD), was measured using the Intergroup Anxiety Scale (adapted from Stephan & Stephan, 1985 by substituting individuals with IDD as the target group). This 11-item scale remained internally consistent ( $\alpha = .83$ ) in the present sample. Examples of questions assessing intergroup anxiety included, "Imagine you alone are interacting with a group of people with mental retardation or developmental disability (e.g., talking with them, working on a project with them). How would you feel in this situation compared with occasions when you are interacting with people who did not have these disabilities?... awkward, self-conscious, confident, etc." Each item was rated on a 7-point scale (Not at all to Very) and an overall intergroup anxiety score was calculated by averaging across individual items.

### 2.3.3. Explicit prejudice toward individuals with IDD

To assess participants' outward expressions of prejudice toward individuals with IDD, we used the Community Living Attitudes Scale—Mental Retardation Form (CLAS-MR; Henry, Keys, Jopp, & Balcazar, 1996). This included the 10-item Exclusion subscale (e.g., "I would not want to live next door to people with mental retardation"; "Homes and services for people with mental retardation should be kept out of residential neighborhoods"), the 10-item Sheltering subscale (e.g., "People with mental retardation need someone to plan their activities for them"; "Sheltered workshops for people with mental retardation are essential"), and the 10-item Empowerment subscale (e.g., "People with mental retardation should be encouraged to lobby legislatures on their own"; "The opinion of a person with mental retardation should carry more weight than those of family members and professionals in decisions affecting that person"). Although the 10-item Similarities subscale was also included in the study, totals on that subscale were extremely collinear with the exclusion subscale ( $r = -.81$ ). We chose to retain only the exclusion subscale in our analyses because we felt its content captured more clearly prejudicial attitudes. All items were answered on a response scale of (1) Strongly Disagree to (6) Strongly Agree. Responses were totaled so that higher scores indicated higher levels of exclusion, sheltering, or empowerment attitudes, and the subscales demonstrated good internal consistency in the current sample ( $\alpha_{\text{Exclusion}} = .87$ ,  $\alpha_{\text{Sheltering}} = .79$ ,  $\alpha_{\text{Empowerment}} = .80$ ).

<sup>1</sup> The term "Mental Retardation" was retained in this study for ease of recognition with the wide range of individuals who participated in the current study.

### 2.3.4. Implicit attitudes toward individuals with IDD

A Go/No-go Association Task (GNAT) was used to capture subtle, subconscious forms of prejudice toward individuals with IDD (Nosek & Banaji, 2001). The GNAT is a word-sorting task in which stimuli are presented one at a time in random order. After completing demographic measures, subjects were taken to a web page that presented the GNAT via a Macromedia Flash program written for this project. To help participants focus on the task, the background of the page was set to black and instructions and stimuli were presented in light colors and in large fonts (20–40 point). For each block of trials, specific types of stimuli (e.g., good words) were assigned as targets; the remaining stimuli served as distractors. Participants were instructed to press the space bar when a target appeared and to refrain from pressing the space bar when a distractor appeared. Stimuli were presented for 650 ms each, with an intertrial interval of 400 ms. After each trial, a green O (for a correct response) or a red X (for an incorrect response) flashed on the screen for 100 ms. Consistent with current best practices in the implicit literature, we used a set of 25 common words with strongly positive connotations that are routinely used in such tasks (see Greenwald, McGhee, & Schwartz, 1998): caress, freedom, love, peace, cheer, friend, heaven, loyal, pleasure, diamond, gentle, honest, lucky, rainbow, gift, honor, miracle, sunrise, family, happy, laughter, paradise, vacation, good, and triumph. Similarly, we used a set of 25 commonly used negative words: abuse, filth, murder, death, grief, poison, stink, assault, disaster, hatred, pollute, tragedy, bomb, divorce, jail, poverty, bad, cancer, evil, kill, rotten, vomit, agony, prison, and terrible. Not only have these words been extensively validated as effective triggers for the constructs of “good” and “bad” within association tasks, but using them in the current study allowed for direct comparisons between our results and the larger implicit literature. Finally, we used a set of nine words to represent the target category of disability: disability, autism, retardation, retarded, handicapped, downs, wheelchair, disorder, and disabled.

The GNAT had four blocks made up of 172 trials. The task began with two practice blocks of 16 trials each in which participants were asked to simply sort good stimuli from bad stimuli (one identifying good words as targets and the other block identifying bad words as targets). These practice blocks gave participants a chance to familiarize themselves with the mechanics of the task. These trials were followed by two 70-trial critical blocks, in which participants had to discriminate among all three sets of stimuli: good words, bad words, and disability words. In one block, both good stimuli and disability stimuli were identified as co-targets; in the other, bad stimuli and disability stimuli were co-targets. The order of the blocks was fully counterbalanced across respondents. Very accurate performance on the block in which good words were paired with disability words as co-targets (the disability-good block) would suggest a strong association between the concepts of disability and positivity, thereby indicating a strong positive implicit attitude toward disability. In comparison, very accurate performance on the disability-bad block would suggest a strong association between disability and bad, thereby indicating a strong negative implicit attitude toward disability. Given the nature of the GNAT, it is possible to obtain a high hit-rate (correctly pressing the spacebar for target stimuli) by indiscriminately pressing the spacebar across all targets. Fortunately, such a response pattern would be characterized by a high false-positive rate (incorrectly pressing the spacebar for distracter targets). Thus, to control for inflated GNAT hit-rates that could result from indiscriminant responding, the developers of the GNAT validated the use of a  $d'$  statistic and suggest its ongoing use (Nosek & Banaji, 2001). This statistic is obtained by subtracting the false alarm rate from the hit rate after they were standardized with a probit function, thereby lowering the observed hit rates in direct proportion to the number of false positive responses observed. Extreme cell values (0 or 1) were corrected following recommendations by Greenwald and Banaji (1995).

### 2.3.5. Social desirability

The Balanced Inventory of Desirable Responding, abbreviated version (BIDR; Leite & Beretvas, 2005) was used to measure the tendency to portray oneself in a socially acceptable manner given the controversial nature of self-reporting prejudicial attitudes. This 20-item scale is composed of two subscales: Self Deception Enhancement and Impression Management. The 10-items that measure Self-Deception Enhancement assessed the extent to which participants claimed to have unrealistic and socially valued cognitive characteristics (e.g., “I am a completely rational person”; “I am fully in control of my own fate”). The 10-items that measured Impression Management assessed the degree to which participants affirm very unlikely socially desirable behaviors (e.g., “I never swear”; “I never take things that don’t belong to me”). Item responses can range from 1 (Not True) to 7 (Very True). Half of the items are negatively keyed and after reverse scoring, only the extreme responses for all items (scoring a 6 or a 7) are considered indicative of social desirability bias. Scales are totaled with the extreme scores given a 1 and others (1–5) given a 0 and the subscales demonstrated acceptable internal consistency in the current sample ( $\alpha_{\text{Self Deception}} = .67$ ,  $\alpha_{\text{Impression Management}} = .71$ ). Social desirability was controlled for in all analyses of explicit attitudes.

### 2.3.6. Validity scales

Two subscales of the Attentive Responding Scale (ARS; Maniaci & Rogge, 2014) were used to screen for excessively inattentive responding on the online survey. The Inconsistent Response subscale is made up of six pairs of nearly identical items given at different points in the survey (e.g., “I am an active person”; “I have an active lifestyle”); each is rated on a 5-point response scale (Not At All True to Very True). Absolute differences in paired responses were summed so that higher scores indicated higher levels of inconsistent responding. The Infrequent Response subscale is made up of four items with extremely skewed distributions (e.g., “I enjoy receiving telemarketer calls”; “I’d rather be hated than loved”). Responses were made on a 5-point response scale. Responses to the items were then recoded so that increasing scores indicated

increasingly unlikely responding for each item. These responses were then summed to create a scale score. In the current study, if a respondent had a score of 11 or more on the Infrequent Response Scale or a 6 or more on the Inconsistent Response Scale they were considered an invalid responder (because of lack of attention or effort) and were omitted from subsequent analyses.

#### 2.4. Data cleaning

Based on recent findings suggesting that it is possible to improve power by screening out excessively inattentive responding on surveys (Maniaci & Rogge, 2014), we used the ARS to identify the respondents that failed to exert sufficient attention and effort on the survey. Of the 616 initial rows of data, this screen identified 66 (10.7%) as having problematic levels of inattention and so they were excluded from further analyses. Among the remaining 550 subjects, 125 people failed to complete the GNAT. Although this represents a sizable portion of the sample, it primarily represents a platform issue as the flash program offering the task requires a dedicated spacebar and an operating system with flash-compatibility. Thus, respondents completing the survey on smart phones or tablets would simply not be able to see or complete the GNAT despite being compliant respondents in all other aspects of the survey. Thankfully, current guidelines and best practices for missing data management and imputation suggest that techniques like multiple imputation with expectation maximization (via programs like Amelia II) are highly effective at handling missing data (i.e., allowing retention of the entire sample to reduce selection biases without introducing spurious results) provided at least half the sample provided data (e.g., Schlomer, Bauman, & Card, 2010; Young & Johnson, 2013). In addition to the missing GNAT data, 6 individuals did not complete the Contact Scale, 25 did not complete items on the CLAS-MR scale, 4 did not complete items on the Intergroup Anxiety Scale, and 14 did not enter responses to all of the demographic variables. Analysis of Variance and  $\chi^2$  analyses suggested that participants with small amounts of missing data did not differ significantly from those with complete data on measures of age, race (white vs. non-white), education level, gender, self-reported exclusion, sheltering or empowerment attitudes, or on their implicit attitudes toward disabilities. Thus, even though there was missing data, it did not appear to bias in any meaningful way. Following current best practices (e.g., Schlomer et al., 2010), we used the process of multiple imputation to handle the missing data as: (1) multiple imputation has been shown to have consistent advantages over other methods such as listwise deletion or mean substitution (see Schlomer et al., 2010 for a discussion), and (2) it allowed us to retain all 550 participants in the final analyses (after only imputing less than 4% of the total observations). More specifically, multiple imputation using the expectation maximization method fills in missing values multiple times across multiple datasets introducing levels of random noise into those estimates. This ensures that when the results of analyses are pooled across the resulting datasets, any potentially spurious effects that might have been generated by the specific imputed values in a single dataset will be balanced out via the other datasets. At a statistical level, this method of imputing missing values ensures that the standard errors of specific effects are neither inflated (reducing power) nor reduced (artificially increasing power) by this process (e.g., Young & Johnson, 2013). To implement this approach in the current study we created 10 different imputed data sets using Amelia II (Honaker, King, & Blackwell, 2009), and then ran analyses in all datasets, presenting the pooled results in the Tables and Figures.

#### 2.5. Analysis strategy

Hierarchical multiple regression analysis was used to understand the relationship between contact and prejudice.

**Outcome Variables.** The three CLAS-MR subscales (exclusion, sheltering, and empowerment) demonstrated only moderate levels of correlation with one another (Table 1), suggesting that they were measuring largely distinct attitudes. Thus, we ran separate models testing Hypothesis 1, by allowing contact to predict each of these attitudinal dimensions (see Table 2). To test Hypotheses 2 and 3, we ran similar models allowing contact to predict positive implicit attitudes and intergroup anxiety toward individuals with IDD (Table 2). We focused on positive implicit attitudes as we were interested in the automatic or subconscious tendency of participants to associate positive, valuable attributes to individuals with IDD. As is typical with implicit measures (e.g., Lee, Rogge, & Reis, 2010; Nosek & Banaji, 2001), we found a significant *positive* correlation between performance on the disability-good blocks and the disability-bad blocks ( $r = .499, p < .01$ ) despite measuring opposing implicit attitudes. This is likely due to shared method variance between the two blocks of trials (i.e., ability, attention, and comfort with computers). To account for this shared method variance, we created a residual, removing the variance in disability-good performance that was shared with disability-bad performance as such strategies have been shown to be effective at controlling for shared method variance (Boldero, Rawlings, & Haslam, 2007).

**Predictor Variables.** To build the models presented in Table 2, we first entered a set of demographic variables along with the Self-Deception Enhancement and Impression Management subscales of the BIDR as controls. We then entered both the quantity of contact (i.e., the amount of contact each participant had with individuals with IDD) and quality of contact (i.e., how cooperative, voluntary and intimate their interactions with individuals with IDD were) as simultaneous predictors. By doing so, each of those variables became a control for the other, helping to highlight their unique predictive contributions to attitudes (i.e., how much sheer quantity of contact predicts attitudes after controlling for the quality of that contact and vice versa).

**Exploring Mediation.** To test Hypothesis 4, which examined how intergroup anxiety and implicit attitudes toward disability could have potentially served as mediators of the links between contact and explicit attitudes, we built a second set of regression models (presented in Table 3) in which intergroup anxiety and implicit attitudes were added as predictors.

**Testing Indirect Paths.** Following

current best practices, we used MacKinnon's asymmetric confidence interval method to test the significance of indirect paths (MacKinnon, 2008). Specifically, we used the RMediation web interface (Tofghi & MacKinnon, 2011) to explore mediational paths suggested by the regression analyses presented in Tables 2 and 3. Statistically significant indirect paths are presented in Fig. 1.

### 3. Results

#### 3.1. Participants' level of contact with individuals with IDD

An aim of the current study was to enroll participants with a wide range of experience with individuals with IDD. Our final sample included participants with a variety of both quantity and quality of contact. Participants rated their level of quantity of contact on a 5-point scale ranging from (1) None at All to (5) A Great Deal. Averaged across 7 settings, the mean quantity of contact rating was 2.3 and the percentage of participants at each rating is as follows: 1: 4%, 2: 41.3%, 3: 38.3%, 4: 12.2%, and 5: 4.2%. Participants rated their quality of contact on two 5-point scales ranging from (1) Never to (5) Very Often and (1) Definitely Not to (5) Definitely Yes. The mean quality of contact rating was 3.5 and the percentage of participants at each quality of contact rating is as follows: 1: 1.3%, 2: 3.8%, 3: 26.4%, 4: 46.9%, and 5: 21.6%.

#### 3.2. Bivariate associations among variables

Table 1 presents the means, standard deviations, and correlations among the variables examined. The variables assessing attitudes toward individuals with IDD demonstrated moderate correlations with one another in the expected directions. The magnitude of these correlations suggested that although they are assessing different aspects of a common phenomenon (sharing roughly 25% of their variance with one another), they each contain sufficient unique variance to be considered separately in our analyses. Consistent with previous work, the correlations further suggested that quality and quantity of contact with individuals with IDD were modestly correlated. The remaining correlations were modest to weak in magnitude.

**Table 1**  
Means, standard deviations, and correlations among the variables.

Variables	M	SD	Correlations among the scales														
			1	2	3	4	5	6	7	8	9	10	11	12			
1. Age	24.47	9.58	–														
2. Years of education	13.42	1.61	<b>.39</b>	–													
3. White (0 = other, 1 = white)	.75	–	<b>.12</b>	.05	–												
4. Impression management	3.71	2.44	.05	.03	.05	–											
5. Self deception	2.51	2.11	<b>.10</b>	.03	–.01	<b>.32</b>	–										
6. Quantity of contact w/People w/IDD	2.30	.84	<b>.12</b>	–.04	.04	–.05	–.03	–									
7. Quality of contact w/People w/IDD	3.46	.81	.06	<b>–.09</b>	.05	<b>.26</b>	<b>.17</b>	<b>.43</b>	–								
8. Intergroup anxiety	3.02	.98	<b>–.11</b>	.07	–.06	<b>–.32</b>	<b>–.32</b>	<b>–.23</b>	<b>–.58</b>	–							
9. Exclusion	2.06	.91	–.08	.05	<b>–.12</b>	<b>–.28</b>	<b>–.17</b>	<b>–.11</b>	<b>–.50</b>	<b>.49</b>	–						
10. Sheltering	3.16	.87	<b>.10</b>	<b>.11</b>	–.07	<b>–.09</b>	–.08	.02	<b>–.17</b>	<b>.24</b>	<b>.48</b>	–					
11. Empowerment	3.82	.78	–.01	.00	.06	<b>.21</b>	.08	<b>.17</b>	<b>.48</b>	<b>–.35</b>	<b>–.56</b>	<b>–.49</b>	–				
12. Implicit positive attitude	.00	.64	–.07	–.09	.06	<b>.11</b>	–.02	.02	<b>.12</b>	<b>–.13</b>	<b>–.21</b>	<b>–.14</b>	<b>.14</b>	–			

Note. IDD = Intellectual and developmental disability. Correlations significant at  $p < .05$  have been bolded for ease of interpretation. Accuracy of performance on blocks of trials on the GNAT-disability task was converted into  $d$ -prime scores to control for increased hit rates that could have been obtained by indiscriminant pushing of the spacebar. The implicit positive attitude variable presented in the table is a residual of the performance on the disability-good trials, controlling for performance on the disability-bad trials.

#### 3.3. Predicting prejudice

As seen in Table 2, the demographic and social desirability controls predicted 18% of the variance in self-reported intergroup anxiety and 11% of the variance in exclusion attitudes, suggesting that these two dimensions might show differences across demographic groups and might be more influenced by social stigma. In contrast, these controls only predicted 4.6% of variance in empowerment attitudes, 3.7% of variance in sheltering attitudes, and 1.7% of variance in implicit positive attitudes toward IDD. Adding the quality and quantity of contact variables resulted in improved prediction across all four models, accounting for an additional 1.4%–22.6% of variance in attitudes, demonstrating unique predictive variance for those contact variables.

**Table 2**  
Predicting attitudes and intergroup anxiety using quantity and quality of contact.

Predictor variables	Distinct outcome constructs																			
	Intergroup anxiety				Implicit positive attitude				Exclusion				Sheltering				Empowerment			
	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$
Step 1—Controls																				
Constant	<b>2.91</b>	<b>.330</b>	<b>.00</b>	.183	.38	.312	.00	.017	<b>2.13</b>	<b>.322</b>	<b>.00</b>	.106	2.64	.320	.00	.037	3.54	.284	.00	.046
Age	<b>-.01</b>	<b>.004</b>	<b>-.13</b>		.00	.004	-.06		-.01	.004	-.09		.01	.004	.09		.00	.004	-.02	
Education level	<b>.09</b>	<b>.026</b>	<b>.14</b>		-.03	.023	-.07		<b>.05</b>	<b>.025</b>	<b>.10</b>		.05	.025	.08		.00	.022	.00	
Race (white vs. all others)	-.09	.090	-.04		.11	.072	.07		<b>-.22</b>	<b>.088</b>	<b>-.11</b>		-.17	.088	-.08		.09	.079	.05	
Impression management	<b>-.10</b>	<b>.017</b>	<b>-.25</b>		-	-	-		<b>-.09</b>	<b>.016</b>	<b>-.24</b>		-.03	.016	-.07		.06	.014	.20	
Self deception	<b>-.11</b>	<b>.019</b>	<b>-.24</b>		-	-	-		<b>-.04</b>	<b>.019</b>	<b>-.09</b>		-.03	.019	-.07		.01	.017	.02	
Step 2—Adding predictors																				
Constant	<b>3.12</b>	<b>.282</b>	<b>.00</b>	.226	.32	.310	.00	.014	<b>2.28</b>	<b>.286</b>	<b>.00</b>	.192	2.67	.316	.00	.028	3.39	.253	.00	.201
Age	<b>-.01</b>	<b>.004</b>	<b>-.08</b>		.00	.004	-.06		-.01	.004	-.06		<b>.01</b>	<b>.004</b>	<b>.09</b>		-.01	.003	-.06	
Education level	.04	.022	.07		-.02	.023	-.05		.02	.022	.04		.04	.025	.07		.03	.020	.07	
Race (white vs. all others)	-.05	.077	-.02		.10	.072	.07		<b>-.19</b>	<b>.079</b>	<b>-.09</b>		-.16	.087	-.08		.06	.071	.03	
Impression management	<b>-.05</b>	<b>.015</b>	<b>-.13</b>		-	-	-		<b>-.04</b>	<b>.015</b>	<b>-.12</b>		-.01	.016	-.02		<b>.03</b>	<b>.013</b>	<b>.09</b>	
Self deception	<b>-.09</b>	<b>.017</b>	<b>-.19</b>		-	-	-		-.02	.017	-.04		-.02	.019	-.05		-.01	.015	-.03	
Quantity of contact	-.02	.045	-.02		-.02	.045	-.03		<b>.12</b>	<b>.045</b>	<b>.11</b>		<b>.10</b>	<b>.050</b>	<b>.10</b>		-.03	.040	-.03	
Quality of contact	<b>-.59</b>	<b>.048</b>	<b>-.49</b>		<b>.10</b>	<b>.047</b>	<b>.12</b>		<b>-.56</b>	<b>.048</b>	<b>-.50</b>		<b>-.21</b>	<b>.054</b>	<b>-.20</b>		<b>.47</b>	<b>.043</b>	<b>.48</b>	

Note. These models focused on predicting attitudes using quantity and quality of contact as the primary predictor variables. Step 1 includes demographic and social-desirability bias controls to ensure that any significant effects for contact could not be better explained by one of these third variables. Coefficients significant at  $p < .05$  have been bolded.

### 3.3.1. Quality of contact predicting attitudes and anxiety

Even after controlling for the demographic variables, quality of contact emerged as a fairly robust predictor of attitudes toward individuals with IDD, offering support for Hypothesis 1A. As seen in the bottom half of Table 2, quality of contact significantly predicted all three subscales of the CLAS-MR as well as positive implicit attitudes toward individuals with IDD. Thus, higher levels of quality contact predicted lower exclusion ( $\beta = -.50, p < .001$ ) and sheltering ( $\beta = -.20, p < .001$ ). This suggests that having rewarding and intimate interactions with individuals with IDD might have encouraged participants to feel that such individuals should be included in (rather than excluded from) society and should be encouraged to lead more autonomous lives. Quality of contact also predicted stronger empowerment attitudes ( $\beta = .48, p < .001$ ), suggesting that enriching interactions with individuals with IDD might have also encouraged respondents to view individuals with IDD as a population to be empowered and given agency in their own lives. As seen in Table 2, higher quality of contact also predicted lower intergroup anxiety ( $\beta = -.49, p < .001$ ). This offered support for Hypothesis 3A, suggesting that rewarding and enjoyable interactions with individuals with IDD might have helped reduce the anxiety felt in the presence of these individuals. Finally, higher levels of quality of contact also predicted stronger positive implicit attitudes toward IDD ( $\beta = .12, p < .05$ ). This offered support for Hypothesis 2A, suggesting that fulfilling and positive interactions with individuals with IDD might have engendered more positive automatic or sub-conscious attitudes toward IDD in general.

### 3.3.2. Quantity of contact predicting prejudice

After controlling for demographics and the quality of contact, quantity of contact emerged as a predictor of negative attitudes toward individuals with IDD. As seen in the bottom of Table 2, higher amounts of contact predicted stronger endorsement of exclusion ( $\beta = .11, p < .01$ ) and sheltering ( $\beta = .10, p < .05$ ). These results failed to support Hypothesis 1B, and instead suggested that higher levels of mere exposure (without ensuring that the exposure is rewarding, intimate, and fulfilling) could actually engender more negative attitudes toward individuals with IDD. After controlling for demographics and quality of contact, quantity of contact failed to significantly predict empowerment, intergroup anxiety, or implicit attitudes, failing to offer support for Hypotheses 2B or 3B.

### 3.3.3. Intergroup anxiety and implicit attitudes as possible mechanisms

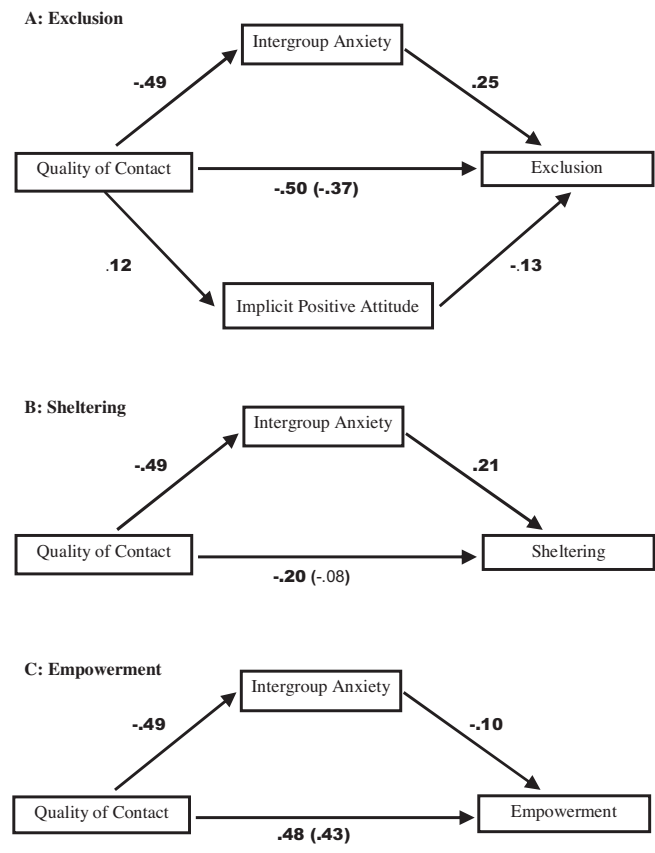
To explore intergroup anxiety and implicit attitudes as possible mediators of the links between quality of contact and explicit prejudice, we built a second set of models including these variables as predictors alongside the contact variables. As seen in Table 3, consistent with Hypothesis 4A, higher levels of intergroup anxiety predicted higher levels of exclusion attitudes ( $\beta = .25, p < .001$ ), higher levels of sheltering attitudes ( $\beta = .21, p < .001$ ), and lower levels of empowerment attitudes ( $\beta = -.10, p < .05$ ), even after controlling for quantity and quality of contact. Similarly, stronger positive implicit



**Table 3**  
Adding intergroup anxiety and implicit positive attitude as possible mediators.

Predictor variables	Exclusion				Sheltering				Empowerment			
	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$
Step 1—Controls				.106				.037				.046
Constant	<b>2.13</b>	<b>.322</b>	<b>.00</b>		<b>2.64</b>	<b>.320</b>	<b>.00</b>		<b>3.54</b>	<b>.284</b>	<b>.00</b>	
Age	-.01	.004	-.09		.01	.004	.09		.00	.004	-.02	
Education level	<b>.05</b>	<b>.025</b>	<b>.10</b>		.05	.025	.08		.00	.022	.00	
Race (white vs. all others)	<b>-.22</b>	<b>.088</b>	<b>-.11</b>		-.17	.088	-.08		.09	.079	.05	
Impression management	<b>-.09</b>	<b>.016</b>	<b>-.24</b>		-.03	.016	-.07		<b>.06</b>	<b>.014</b>	<b>.20</b>	
Self deception	<b>-.04</b>	<b>.019</b>	<b>-.09</b>		-.03	.019	-.07		.01	.017	.02	
Step 2—Adding predictors				.249				.066				.213
Constant	<b>1.61</b>	<b>.310</b>	<b>.00</b>		<b>2.13</b>	<b>.347</b>	<b>.00</b>		<b>3.62</b>	<b>.280</b>	<b>.00</b>	
Age	-.01	.004	-.05		<b>.01</b>	<b>.004</b>	<b>.10</b>		-.01	.003	-.07	
Education level	.01	.022	.01		.03	.025	.05		.04	.020	.08	
Race (white vs. all others)	<b>-.16</b>	<b>.076</b>	<b>-.08</b>		-.14	.086	-.07		.05	.071	.03	
Impression management	-.03	.015	-.07		.01	.016	.02		.02	.013	.07	
Self deception	.00	.017	.00		-.01	.019	-.01		-.02	.015	-.04	
Implicit positive attitude	<b>-.18</b>	<b>.062</b>	<b>-.13</b>		-.13	.069	-.09		.09	.055	.07	
Intergroup anxiety	<b>.23</b>	<b>.042</b>	<b>.25</b>		<b>.19</b>	<b>.047</b>	<b>.21</b>		<b>-.08</b>	<b>.039</b>	<b>-.10</b>	
Quantity of contact	<b>.12</b>	<b>.044</b>	<b>.11</b>		<b>.11</b>	<b>.049</b>	<b>.10</b>		-.03	.040	-.03	
Quality of contact	<b>-.41</b>	<b>.053</b>	<b>-.37</b>		-.09	.060	-.08		<b>.41</b>	<b>.049</b>	<b>.43</b>	

Note. These models build on those presented in Table 2 by adding intergroup anxiety and implicit positive attitude toward disability as predictors, thereby testing them as possible mediators of the links between contact and attitudes. Coefficients significant at  $p < .05$  have been bolded.



**Fig. 1.** Mediation models for quality of contact and explicit prejudice.  
Note: The above figures depict the mediation models for quality of contact and the three explicit measures of prejudice, incorporating intergroup anxiety and implicit positive attitude as mechanisms. In the paths from quality of contact to each of the explicit subscales, the first coefficient represents the direct path, while the coefficient in parentheses represents the relationship once the indirect path(s) is/are added to the model. Coefficients significant at  $p < .05$  have been bolded.

attitudes toward IDD predicted lower exclusion attitudes ( $\beta = -.13, p < .01$ ). Taken with the results from Table 2 described above, this suggested a number of possible indirect paths, and asymmetric confidence interval tests (MacKinnon, 2008) suggested that those paths were statistically significant.

As seen in Fig. 1A, the results suggested that higher quality of contact helped to predict lower exclusion attitudes in part due to its associations with both intergroup anxiety and implicit positive attitudes (accounting for roughly 26% of the variance in that direct path). Thus, higher quality of contact predicted lower intergroup anxiety, which, in turn, predicted lower levels of exclusion. Similarly, quality of contact predicted stronger positive implicit attitudes toward IDD, which, in turn, predicted lower levels of exclusion attitudes. Although these analyses are cross-sectional, rendering the direction of causality unclear, these results are consistent with Hypotheses 4A and 4B, suggesting that highly rewarding and enriching contact with individuals with IDD could potentially help to reduce explicit (conscious) prejudice by reducing anxiety and by shaping the automatic (less controlled and conscious) attitudes that individuals have toward individuals with IDD. As seen in Fig. 1B, the results further suggested that quality of contact predicted lower levels of sheltering attitudes, in part through quality of contact's association with intergroup anxiety (accounting for roughly 60% of the covariance between those variables). Thus, higher quality of contact predicted lower intergroup anxiety, which in turn predicted lower levels of sheltering. This offered support for Hypothesis 4A, suggesting that quality of contact might weaken sheltering attitudes in part by reducing intergroup anxiety. As seen in Fig. 1C, the results also suggested that quality of contact predicted higher levels of empowerment attitudes, in part through quality of contact's association with intergroup anxiety (accounting for roughly 10% of the covariance between those variables). Hence, higher quality of contact predicted lower intergroup anxiety, which in turn predicted higher levels of empowerment attitudes. This offered support for Hypothesis 4A, and suggests that spending quality time with individuals with IDD may increase attitudes that support the empowerment of people with IDD, partially through decreasing the discomfort of these interactions. Recognizing that these indirect pathways represent significant variance in the relationship between quality of contact and explicit prejudice adds clarity to the role of anxiety in intergroup interactions and suggests that quality of contact is not only associated with decreased negative attitudes, it is also influential in changing the affective tone of an interaction.

#### 4. Discussion

We hypothesized that the quality and the quantity of interactions participants had with individuals with IDD would shape their explicit and implicit attitudes toward this group. This multidimensional investigation of contact and attitudes expanded the past literature to provide a more thorough understanding of this relationship in IDD. Furthermore, the current study extended our understanding of this relationship by examining the role of intergroup anxiety and positive implicit attitudes as potential mediators in the association between contact and explicit prejudice.

Contact with individuals with IDD did indeed relate significantly to attitudes toward this group. Importantly, the nature of the contact that participants experienced with those with IDD was notably and distinctly related to their attitudes: there was a different pattern of results for quality of contact vs. quantity of contact. Specifically, *quality* of contact was associated with lower levels of prejudice toward individuals with IDD, a finding that is in line with previous research (Barr & Bracchitta, 2012; McManus et al., 2010; Piercy et al., 2002). Explicit prejudice, measured by self-report, is a direct manner of measuring attitudes toward individuals with IDD. Higher levels of quality of contact were significantly related to participants supporting the inclusion and autonomy of those with IDD as well as empowering people with IDD to stand up for their rights and lead meaningful lives. Importantly, these findings held after controlling for the quantity of contact experienced, demographic variables, and social desirability biases.

We extended our investigation of prejudice by measuring implicit attitudes in an effort to capture subtle and automatic feelings toward individuals with IDD. The current study included implicit measurement of attitudes to contribute to the paucity of past research investigating these more subtle attitudes toward individuals with IDD (McCaughy & Strohmer, 2005; Pruett & Chan, 2006). Implicit measurement of attitudes is also important because it has been more closely linked to behaviors that are not consciously controlled (Ajzen & Fishbein, 2005; Fazio & Olson, 2003) and thus may provide information on the potential link between these attitudes and discrimination toward individuals with IDD. Measures of quality of contact were significantly related to implicit attitudes associating disability with positive constructs. Thus, those participants who indicated that they had experienced higher levels of quality contact with individuals with IDD had an easier time pairing disability with something positive and valuable. Importantly, a similar relationship emerged between quality of contact and both explicit and implicit attitudes toward individuals with IDD. Collectively, these results suggest a consistent and meaningful relationship between higher levels of quality contact and decreased explicit negative attitudes as well as increased positive associations with disability.

Analyses with *quantity* of contact revealed a different and unexpected pattern of results. While certain past studies have found a negative relationship between quantity of contact and prejudice (e.g., Manetti et al., 2001) and others have found a lack of a relationship between quantity of contact and prejudice (e.g., McManus et al., 2010), the current study found that quantity of contact was related to *higher* levels of explicit prejudice, specifically higher ratings of exclusion and sheltering. Thus, more exposure (after controlling for the quality of that exposure) was associated with attitudes supporting the exclusion of those with IDD from mainstream society and the caring of those with IDD in a way that reduces their autonomy. The careful analysis of each aspect of contact controlling for the other may have contributed to the unique finding in the current study. This new finding relating quantity of contact with greater prejudice is both critically important and intuitive;

if the quality of contact is not specifically considered, greater levels of exposure may be experienced as uncomfortable or unpleasant and this may lead to associating these negative experiences with the individuals with IDD themselves. Quantity of contact was not related to implicit attitudes or explicit ratings of empowerment, suggesting that the amount of exposure that participants had with individuals with IDD was not influential enough to shape their positive attitudes toward IDD.

These findings support the primary idea noted in the contact hypothesis: it is necessary to have certain conditions of contact met in order to improve attitudes, and simple, mere exposure may not be influential enough to increase positive attitudes. Our study goes beyond this, as the first study to assert that mere quantity of contact alone may actually do more harm than good in shaping attitudes toward individuals with IDD. Interactions with individuals with IDD that do not feel voluntary, cooperative, and intimate may be associated with an increase in negative attitudes. On the other hand, contact that is perceived as equal, cooperative, and pleasant encourages the growth of positive attitudes and may lead to a decrease in prejudice. These findings, which are both in line with past research and contribute valuable, new information represent a crucial addition to the literature. They suggest a potentially harmful effect of neutral to low-quality experiences with individuals with IDD and stress the importance of developing high-quality interaction opportunities.

This study also began to look at mechanisms and found indirect relationships incorporating intergroup anxiety and implicit positive attitudes as mediators between quality of contact and explicit prejudice. Because this is a cross-sectional study, the direction of causation is uncertain, however, this possible mediation may help to shed light on potential factors relating contact to prejudice. The results of numerous past studies investigating intergroup anxiety in the relationship between contact and prejudice in a variety of other populations are consistent with the results of the current study, adding support for the potential role of intergroup anxiety as a mediator (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Page-Gould, Mendoza-Denton, & Tropp, 2008; Paolini, Hewstone, Cairns, & Voci, 2004; Pettigrew, 1998; Stephan, Stephan, & Gudykunst, 1999; Voci & Hewstone, 2003). In the current study, intergroup anxiety in the presence of those with IDD decreased as a person experienced a higher level of quality contact. Stated in another way, a person who spends positive, quality time with a person(s) with IDD may enjoy and feel more comfortable in similar interactions in the future, and this in turn may promote future interactions with, and positive attitudes toward members of this group. In this way, reducing intergroup anxiety creates an environment that not only reduces prejudice, but also makes the interaction more pleasant and sought after, suggesting a continually beneficial cycle. The further addition of implicit attitudes as a mechanism between quality of contact and exclusion suggests that enriching contact may partially shape explicit prejudice through the increase of implicit positive attitudes. All together, these associations shed light on the potential, meaningful impact of years of varying levels of contact on shaping attitudes toward individuals with IDD.

#### 4.1. *Clinical implications*

The implications of these results suggest promising ways of implementing these findings in community programs as well as in general, daily interactions. The most robust implication of the current study is that quality of contact is highly influential in shaping positive attitudes. Programs that focus on increasing the mere exposure level between typically developing individuals and individuals with IDD may not be creating maximally beneficial or effective interactions. As we have found, mere exposure may actually be harmful and foster a higher degree of negative attitudes. Programs should focus on creating interactions that support equality, cooperation, and sincerity, and that are truly enjoyed by both groups of people. One way this can be accomplished is by creating tasks that require all involved to work together to achieve an equally shared goal. As an example of the influence of high quality integration, working together was shown to be effective in shaping attitudes in a study by Piercy et al. (2002), which emphasized the importance of cooperative-learning procedures (a high-quality form of contact) in increasing social acceptance of peers with IDD.

The role of intergroup anxiety should also be recognized as a critical component in this relationship. As this study's results suggest, high quality contact increased the comfort level of intergroup interactions. Additional factors that augment feelings of comfort and ease will be important topics for future studies, including intervention research. This may include psychoeducation on IDD, as well as emphasizing the value that all individuals bring to any interaction. Finding opportunities to increase the comfort level of individuals may play a large role in reducing prejudice, as well as promoting repeated interaction. A study by Cameron and Rutland (2006) looked at this relationship in a slightly different way by using indirect contact through story telling about friendships between individuals with a disability and typically developing peers followed by classroom discussion. Similar to our findings, they showed that this type of quality contact helped to reduce anxious feelings and increase positivity toward individuals with a disability. Indirect contact may thus allow for a reduction in anxiety and negative attitudes even if direct contact is not always feasible. Prejudice could thus be more effectively addressed by targeting, directly or indirectly, the anxious feelings people might experience when interacting with individuals with IDD. Understanding the mechanistic role of intergroup anxiety may increase our ability to intervene and foster a key element in this cycle that can lead to continued interactions and growth in positive attitudes.

Children and adolescents increasingly have opportunities for interactions with peers with IDD through inclusive education, although these interactions can vary in the degree to which they are integrative and cooperative (Fennick & Royle, 2003; Piercy et al., 2002). As individuals with IDD age, it is critical to increase opportunities for quality interactions in a variety of settings for adults. Examples of these include inclusive work environments, programs to increase access to college, structured volunteer programs, as well as informal, everyday contact in the community that allows for meaningful interactions. Increases in these opportunities to connect would allow for better integration and hopefully a more widespread reduction in negative attitudes.

#### 4.2. Future directions

Several avenues of future research naturally follow from the current project's findings. First, the results from this study inform us on the attitudes and experience of typically developing individuals as they interact with individuals with IDD. While this has implications for the individuals with IDD through the downstream effects of prejudice and discrimination, it does not clarify the direct experience of those with IDD in these same interactions. Very little research has investigated the experience of individuals with a disability *themselves* in inclusive settings, leaving a large gap in our understanding of the efficacy of these practices. Future research should explore the impact of inclusion on the individuals with IDD to assess their perceived level of contact, their comfort level during interactions, and their resulting attitudes toward themselves and others.

Additionally, while these results shed light on the relationship between contact and attitudes, continued work investigating discriminatory behavior is necessary to fully understand the implications of intergroup contact. The relationship between attitudes and *behavior* can be quite complex, and they may not have a direct or obvious association (Fazio & Roskos-Ewoldsen, 2005). Dovidio, Gaertner, and Kawakami (2002) looked at prejudice toward different races and found that both implicit and explicit measurements of attitude relate differently to the shaping of behavior. Implicit attitudes seem to influence non-verbal, subconscious acts (i.e., facial expressions, eye contact, and other actions people believe are not indicative of prejudicial attitudes) whereas explicit attitudes relate to overt, consciously controlled behaviors (i.e., actions that are clearly driven by prejudice). Future research on the relationship between contact, attitudes, and behavior in IDD is needed to understand the impact of decreased prejudice on discriminatory behavior and to determine how both implicit and explicit prejudice relate to a variety of actual behaviors when interacting with those with IDD.

Furthermore, because inclusive opportunities in neighborhood schools and general education classrooms did not become regular practice until the 1990s, future research should aim to see if the benefits of these continually improving programs are seen in the younger populations who recently received or are currently experiencing these opportunities. The fairly recent push for inclusion has led to the majority (over 60%) of children with disabilities receiving education in a regular classroom for 80% or more of their day (US DE NCES, 2013). While the presence of inclusive practices has increased in the last few decades, the quality of these interactions is likely to vary across programs, providing the opportunity to study the impact of contact on attitudes and behaviors in these different settings. Specifically, it would be helpful to investigate how the relationship between quality of contact and decreased prejudice in children in these new youth programs varies as the level of quality increases.

Future work would also benefit from exploring how the nature of the relationship with the individual with IDD informs these results. Past research has found this to be an important factor in the association between contact and prejudice (Barr & Bracchitta, 2012). In the current study, the measures of quality and quantity of contact focused on any individual with IDD, which may or may not have included a family member. It could be that having a close family member with IDD could have a markedly different impact on respondents' attitudes. In the current study, 37 respondents (6.7%) reported having a close family member with an IDD (i.e., a parent, child, or sibling with IDD). However, a dichotomous variable coding this status only demonstrated nominal to non-significant correlations with the outcome measures in the study (all  $r$ 's less than .21), and the small number prohibited any meaningful moderation analyses. Thus, future work could oversample such individuals to more thoroughly explore how such familial exposure might moderate the findings presented in this paper.

Finally, the cross-sectional design of the current study does not allow for conclusions regarding causality between contact, prejudice, and any mediating factors. While we are able to glean the probable direction of causation based on past research (Corrigan et al., 2003) and the design of our study (capturing past contact and current attitudes), a longitudinal study design is needed to confirm whether greater contact leads to less prejudice and/or if greater prejudice leads to a decreased desire to interact. Additionally, while our identification of intergroup anxiety and positive implicit attitudes as mediators allowed for an enhanced understanding of our model, exploring other possible mediating factors in the relationship between contact and prejudice would add to this complex relationship. Based on the existing literature regarding mediation in prejudice formation, possible mechanisms may include knowledge about disability, perceived behavioral control, self-disclosure, and personality variables.

While there are ways to expand upon the results of the current study, the present findings help to clarify the impact of contact on attitudes toward individuals with IDD. These results provide insight into present attitudes toward those with IDD and help us to better understand ways in which we may be able to decrease prejudice and support the development of positive attitudes at a societal level.

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