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Intergroup Communication with Autistic People via Music: An Imagined Contact Study

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Abstract: Autistic people, as is the case with many health conditions, are subject to stigmatization. We aim to ameliorate this situation and increase positive attitudes toward autistic people. Grounded in the imagined contact hypothesis, we investigated the effect of imagined musical interaction with an autistic person on non-autistic people's attitudes toward autistic people in general. We conducted an online experiment in which non-autistic college students ($N = 443$) were randomly assigned to 2 (music vs. non-musical) × 2 (autistic student vs. non-autistic student) conditions. Thus, participants imagined communicating with an autistic (or non-autistic) peer student while doing a music-related (or math-related) school activity. Imagining musical (vs. non-musical) interactions with an autistic person marginally significantly increased a sense of synchronization with the target, which then contributed to reduced social distance. Results were discussed in relation to the imagined contact hypothesis and the broader applicability of music to reduce stigma.

Keywords: imagined contact; intergroup communication; autism stigma

1. Introduction

Autism spectrum condition is a neurodevelopmental disability that poses significant social communication and behavioral challenges (Centers for Disease Control and Prevention, 2023). In the US, the autistic population is estimated to be about 2.8% of children (National Institute of Mental Health, 2023). Autistic people reported experiencing more stigmatization than their non-autistic counterparts (Papadopoulos et al., 2019). In addition, although levels of needed support differ from person to person, autistic people's quality of life tends to be low due to their high levels of perceived stress (Centers for Disease Control and Prevention, 2023; Lord et al., 2020). Although the medical community historically regarded autism as a disease to be cured, the minority model suggests that it is part of a diverse human variation, and "disability" only emerges in the conflict between autistic and non-autistic needs (Botha & Frost, 2020; Lam et al., 2021). In support of this model, one contributor to autistic people's lower quality of life is intergroup friction between autistics and non-autistics—communication between autistic people and non-autistic people is less successful than that among autistic people or non-autistic people (Crompton et al., 2020). Hence, we argue that the future of health communication practices regarding autism should center on an intergroup (autistic and non-autistic people) perspective.

We aimed to find a communicative way to ameliorate this situation by improving relations between autistic and non-autistic people. To do so, we used an intergroup contact intervention. In the following sections, we describe imagined contact, a form of simulated intergroup contact that requires less time and effort than direct contact. Then, we discuss music as a medium to facilitate imagined contact and present the hypotheses that motivate our research.

2. Literature Review

2.1. Intergroup Contact Theory

Allport et al.'s (1954) contact hypothesis provided a theoretical understanding of how direct contact with an outgroup member creates the potential for better intergroup relations. The contact hypothesis states that intergroup interactions (men talking with women or Black with White) in equal, supportive, and cooperative arrangements will propagate positive intergroup attitudes (Allport et al., 1954). This hypothesis developed into contact theory to further explain how contact facilitates prejudice reduction (Pettigrew, 1998). A meta-analytic review of the theory indicated broad support for contact theory (Pettigrew & Tropp, 2006). However, direct contact can be hard to manipulate in some cases, such as when one group is a small minority, society is segregated, or if direct contact involves considerable anxiety or feelings of threat (Ginevra et al., 2021).

Imagined contact is useful when direct interventions are hard to implement: Imagined contact involves mentally visualizing interacting with someone from an outgroup. This improves attitudes toward the outgroup in similar ways to direct contact (Crisp & Turner, 2009). Imagined contact is an effective and efficient way to increase people's willingness to embrace outgroups and seek future contact with them (Crisp & Turner, 2012). Miles and Crisp (2014) conducted a meta-analysis of the imagined contact hypothesis and found a significant relationship between imagined contact and prejudice reduction. Additionally, they discovered that the more elaborate the instruction to imagine was, the stronger the effect (Miles & Crisp, 2014).

2.2. Imagined Contact with Autistic People

The imagined approach has been used in studies regarding autism and pertinent mental disorders. Imagined contact improved attitudes toward a hypothetical peer student with Asperger's syndrome (a condition that now is a part of autism spectrum disorder: Fleva, 2015), including when the contact was with someone exhibiting stereotypical autistic behaviors (albeit only with male targets: Bierce et al., 2024). Imagined contact interventions, particularly with positive scenarios, also contribute to better intergroup attitudes toward people with intellectual disabilities and schizophrenia (Ginevra et al., 2021; West et al., 2011).

However, such endeavors to improve outgroup attitudes paid little attention to the kind of activity through which imagined contact happens. Recent research showed that contact involving music can be particularly effective at improving intergroup attitudes (Case et al., 2022). In their longitudinal study, Kuchenbrandt et al. (2014) found that Germans having musical contact with Poles improved attitudes toward Poles as a group. Intergroup musical contact with autistic people is yet to be studied, although other creative-arts-based interventions have been shown to have potential (e.g., theatrical performances about and by autistic people: Massa et al., 2020). Hence, we explore the effectiveness of music as a medium of imagined contact in the context of health stigma.

2.3. Imagined Contact through Music

Music offers a promising arena for intergroup contact. Music is a communication medium where people can rely on semantic ambiguity (Cross, 2003). Hence, musical experiences often involve diverse interpretations, allowing for enjoyment without the need for consensus. This characteristic of music facilitates positive interactions with others, reducing the likelihood of misunderstanding or conflict (Howell, 2023). Moreover, music elicits a wide range of emotions among people (Konečni, 2008). For example, listening to a national anthem might evoke a collective feeling of pride and patriotism, or an electronic dance music festival might evoke excitement and happiness. Therefore, music allows people to share their own emotions and experience the emotions of others, which positively influences attitudes toward members of different social groups (Vuoskoski et al., 2017).

Music, as a form of indirect contact, results in positive intergroup outcomes. White participants reported a greater willingness to engage with Arabs after exposure to a video featuring interaction involving music (vs. technology) between White and Arab people (Harwood et al., 2016). Watching Chinese musicians' (vs. sports) performance resulted in positive attitudes toward Chinese people among Americans (Gim & Harwood, 2024). Therefore, we predict applying music (vs. non-music) to imagined contact situations will be effective in improving attitudes toward people with autism. However, the type of music and modality of the intervention are still at issue. Music preferences might be as diverse as people's personalities and music taste disagreement might intervene in smooth and positive interactions (e.g., Rentfrow & Gosling, 2006). Previous studies (e.g., Harwood et al., 2016) typically emphasized music listening as a means of interaction rather than music playing, as many people do not possess sufficient proficiency in playing instruments. Nevertheless, the nature of the target participants (university students enrolled in a class) indicated that active participation would be a suitable approach. Because of that, we decided to opt for musical playing interaction while the specifics (types of music, use of instruments,

environments, complexity, etc.) of the musical interaction were left up to the participants. Taken together, our first hypothesis is as follows.

H1. *Imagined musical (vs. non-musical) contact with a target autistic (vs. non-autistic) person positively influences attitudes toward autistic people.*

Next, we discuss two mechanisms that we propose underlie this prediction.

2.3.1. Music Specific Mechanism 1: Synchronization

We predict that synchronization is a key mechanism for the imagined musical contact effect. During musical interactions, spontaneous synchronized movements among people are prevalent, as human brains are sensitive to the regularity of musical rhythm (D'Ausilio et al., 2015). We often find people synchronously moving their heads, hands, and legs in time with musical beats and rhythms. Interpersonal synchronization reinforces affinity to each other, which positively influences attitudes toward other social groups (Wiltermuth, 2012). For example, imagining synchronous movements with others (vs. alone) significantly improved group cohesion (Cross et al., 2017). Similarly, Hungarians who imagined synchronous (vs. non-synchronous) walking with a Romani person reported more positive attitudes toward Romani people (Atherton et al., 2019).

2.3.2. Music Specific Mechanism 2: Empathy

Various musical elements, such as tempo, volume, and melody, help communicate our emotions. Such properties of music make it a "super-expressive" tool (i.e., it expresses emotions with more intensity than verbal communication, for instance: Brown, 2001; Juslin & Västfjäll, 2008) In social interaction, these musical characteristics foster the sharing and empathizing of emotions (Miu & Vuoskoski, 2017). For instance, people reported that listening to music together with their parents enables them to feel their parents' emotions and empathize with them (Wallace & Harwood, 2018). Similarly, Harwood and Wallace (2022) found a positive correlation between dyadic musical activity with friends and empathic responses. Levine and Hogg (2010) argue that intergroup empathy is a precursor to improved intergroup attitudes, as it can evoke positive feelings toward outgroups. A meta-analysis of intergroup contact research demonstrated empathy as a critical mediator between intergroup contact and prejudice reduction (Pettigrew & Tropp, 2008).

H2. *The effect of imagined musical (vs. non-musical) contact on attitudes toward autistic people is mediated by (a) synchronization and (b) empathy. Musical contact results in a higher perception of (a) synchronization with and (b) empathy toward the target autistic person, which positively influences attitudes toward autistic people.*

Figure 1 illustrates our broader model. We hypothesize that imagined musical (vs. non-musical) interaction enhances synchronization and empathy with the target person in the interaction. Those experiences of emotional and physical connection subsequently affect attitudes about people with autism, but only when the target person in the imagined interaction is autistic (hence the moderation of the second path in the figure).

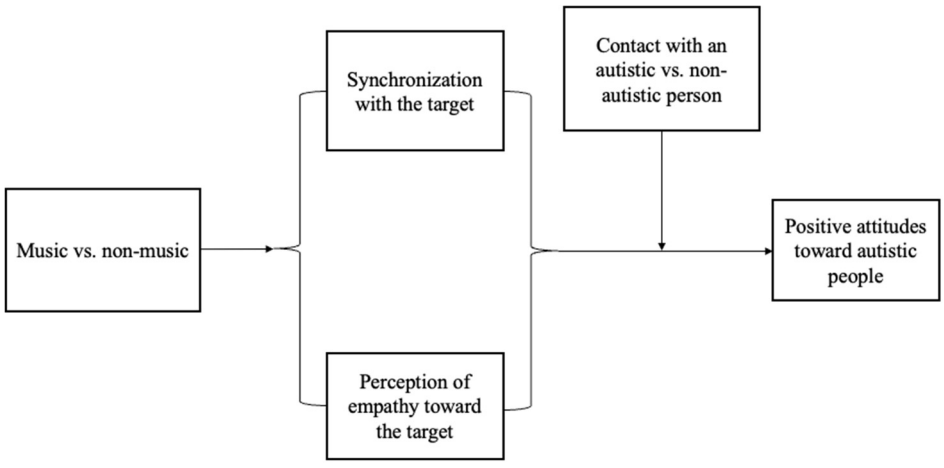

Figure 1. Model for the Mediated Moderation Relationship.

3. Methodology

3.1. Participants

We recruited undergraduate students ($N = 652$) enrolled in a communication course at a large public university in the Southwestern US, upon a priori power analysis using G*Power ($\alpha = 0.05$, power = 0.95, f = 0.20) indicated a required $N = 327$ for a 2 × 2 ANOVA. Participants were granted course credit in exchange for their participation. Since the study's aim is to understand the effects of intergroup contact on attitudes toward autistic people, participants who indicated that they were autistic ($N = 13$) were excluded from the study. Anyone who failed attention/manipulation checks or wished to be excluded from data analysis was also excluded from analysis ($N = 196$), resulting in a final sample size of 443 students. The participants were relatively young ($M = 20.95$ years old, $SD = 4.06$, Range = 17–61), predominantly female ($N = 310$, 70.0%; males: $N = 132$, 29.8%; others: $N = 1$, 0.2%) and White ($N = 349$, 78.8%; Hispanic: $N = 78$, 17.6%; African-American: $N = 40$, 9.0%; Asian: $N = 28$, 6.3%; Middle Eastern: $N = 10$, 2.3%; Native American; $N = 9$, 2.0%; Pacific Islander: $N = 4$, 0.9%).

3.2. Procedure

We conducted an online experiment through Qualtrics. First, participants answered general demographic questions along with questions asking about their perceived levels of math and music skills. Then, the participants engaged in a mental visualization task in which they imagined communicating with an autistic (or non-autistic) peer while doing a music-related (or math-related) school activity. In the activity, participants were instructed to visualize a female classmate, specified as either autistic or non-autistic, and verbally describe their mental image for 30 s. Subsequently, they imagined a collaborative class project with the same classmate, with the project being either music- or math-related, and described their imagined interaction for 60 s. The specific details of the mental visualization were up to the participants. Using their own digital devices, participants engaged in the online mental visualization task from the convenience of their preferred settings.

We chose math as a relevant non-musical control activity due to its salience in students' lives (at the relevant university, they all must complete math requirements) and due to it being unlikely to elicit feelings of synchronization or empathy. In addition, without an imagined contact control, we would have been unable to isolate the effects of music, as any observed changes could have been attributed to either music or the presence of imagined contact, creating a confounding variable. Hence, participants were randomly assigned in a 2 (music vs. math) × 2 (autistic student vs. non-autistic target) all between-subjects experimental design. Right after the message stimuli, the participants filled out a post-experimental questionnaire reflecting the measures described next.

3.3. Measurements

3.3.1. Empathy

Participants' empathy toward the target student was measured on a 5-point Likert scale ("*strongly disagree*" to "*strongly agree*"; $M = 3.99$, $SD = 0.67$, $\alpha = 0.76$) with four items. Participants reported how much they could feel, identify, and experience the student's emotions, as well as the genuineness of the student's emotions (e.g., "I could feel the student's emotions") (adapted from Shen, 2010).

3.3.2. Synchronization

Participants' perceived synchronization with the target student was assessed with five items adapted from Case et al. (2022). Participants rated how synchronized and coordinated they felt with the imagined student on a 5-point Likert scale ("*strongly disagree*" to "*strongly agree*"; $M = 3.35$, $SD = 0.86$, $\alpha = 0.85$). An example item includes "In my head, I imagined myself moving like the student."

3.3.3. Feelings toward Autistic People

Participants' general feelings toward autistic people in general was measured with a feeling thermometer (0: *uncomfortable*–10: *comfortable*; $M = 8.40$, $SD = 1.73$).

3.3.4. Autism Social Distance Scale

Participants' social distance toward autistic people in general was measured on a 5-point Likert scale ("*strongly disagree*" to "*strongly agree*"; $M = 1.76$, $SD = 0.68$, $\alpha = 0.90$) with 11 items. Sample items included "I would be willing to move next door to someone autistic." or "I would NOT be willing to go to a formal event with

someone autistic." Some items were reverse-coded (adapted from Bogardus (1933) and Gillespie-Lynch et al., 2019). We measured both feelings and social distance to capture both general and relatively specific aspects of prejudice.

4. Results

H1 predicted that imagining interacting with an autistic student would improve attitudes toward autistic people. H1 was explored with a 2 (autistic vs. non-autistic target) × 2 (contact condition: music vs. math) ANOVA with feelings and social distance as dependent variables. A marginally significant main effect for autism of target on the feeling thermometer dependent variable supported contact theory, $F(1, 439) = 2.78$, $p = 0.96$, partial $\eta^2 = 0.01$. People in the autistic target condition reported more positive feelings ($M = 8.54$, $SD = 1.66$) than those in the non-autistic condition ($M = 8.24$, $SD = 1.80$). The interaction effect was marginally significant, $F(1, 439) = 3.82$, $p = 0.51$, partial $\eta^2 = 0.01$. As shown in Table 1, tests of simple main effects indicated that imagined interaction with an autistic student resulted in more positive feelings toward autistic people when it involved doing a math, but not a musical, activity (Table 1). This is the opposite of what was predicted in H1.

Table 1. Means (and Standard Deviations) of Feeling Thermometer and Social Distance for Autism by Music Interactions.

	Autism	Non-Autism
Feeling Thermometer		
Music	8.46_a (1.72)	8.51_a (1.72)
Math	8.62_a (1.72)	8.03_b (1.71)
Social Distance		
Music	1.68_a (0.68)	1.72_a (0.68)
Math	1.73_a (0.68)	1.90_a (0.68)

Note: Means with different subscripts across columns differ significantly ($p < 0.05$); simple main effects were tested with F statistics using *MSw* from the omnibus ANOVA. The feeling thermometer was on a 0–10 scale and social distance was on a 1–5 scale.

H2 predicted that the effect of imagined musical (vs. non-musical) contact on attitudes toward autistic people is mediated, such that musical contact results in higher perception of (a) synchronization with and (b) empathy toward the target autistic person, which positively influences feelings and decreases social distance toward autistic people (see Figure 1). To test this model, four analyses were run (2 mediator variables × 2 outcome variables) using PROCESS model 14 (Hayes, 2022). Only the analysis involving synchronization and social distance revealed a marginally significant conditional indirect effect, Index of Moderated Mediation 90% Confidence Interval (CI) [−0.06, −0.00]. Imagined musical interaction marginally and positively influenced perceived synchronization ($B = 0.14$, $p = 0.08$), and the relationship between perceived synchronization and social distance was moderated by autism spectrum disorder (ASD) condition ($B = -0.21$, $p = 0.00$). Examination of simple slopes revealed that the effect of perceived synchronization on social distance was nonsignificant when the target student was non-autistic ($B = -0.01$, $p > 0.05$) but significant in the autistic target student condition ($B = -0.21$, $p < 0.001$, 90% CI [−0.30, −0.12]). In the autistic condition, more synchronization with the fellow student resulted in less social distance towards autistic people. This effect provides a small amount of support for H2.

5. Discussion

5.1. General Discussion

Autism is a stigmatized health condition; stigma towards autistic people affects the quality of communication they experience and, hence, their quality of life. Guided by contact theory, we sought to investigate if imagined contact through musical activity will bring about positive intergroup outcomes for autistic people in the form of more positive attitudes among non-autistic individuals. Our findings supported the broad predictions of intergroup contact theory for this group. Imagining contact with an autistic individual resulted in more positive overall reported feelings about autistic people in general. However, contrary to our hypothesis, this effect occurred only when participants imagined interaction in a math-related activity but not a music-related activity. H2 posited that the associations between musical interaction and intergroup attitudes are mediated by empathy and synchronization. The results indicated that imagining a musical task does invoke more synchronization than

imagining a math task and that perceived synchronization with an autistic target reduces perceived social distance toward autistic people in general. Hence, we found some support for our second hypothesis.

Overall, we found more limited effects for musical contact than expected. It might have been easier for our respondents to imagine interactions involving math than music. Solving math problems is a more concrete behavior than "playing music," especially perhaps for participants with limited music skills (Birtel & Crisp, 2012). Although we asked about the participants' level of musical (and math) skill and matched their partner's competence to their own in the prompt, participants less versed in music may have struggled to imagine playing music with anyone else. Musical contact is effective in other settings, but imagined contact perhaps requires prompts focused on easily imagined and familiar tasks for all respondents. We also suspect that stereotypes around autistic people (e.g., that they are mathematical geniuses: Quirici, 2015) might underlie the favorable effects for our math condition.

5.2. Limitations

Several limitations are worth noting. First, the present study used convenience samples from communication courses at a university. Thus, the conclusion drawn from this study may not apply to populations with different characteristics. Our effects might have been stronger if we combined our imagined contact manipulation with a more direct form of contact, such as actual interpersonal or parasocial contact (Wojcieszak et al., 2020). Crisp and Turner (2009) contended that imagined contact is part of a journey of intergroup contact with certain groups—perhaps as a first step. Therefore, this research plays an important role in providing insight into the initial stages of contact with autistic people.

5.3. Implications for Future Directions

Although autism stigma is embedded in the daily miscommunication between autistic people and non-autistic people, intergroup scholarship paid little attention to the issue surrounding autism (Mitchell et al., 2021). The present study set out to provide empirical evidence for the imagined intergroup contact intervention's effectiveness in reducing autism stigma. An implication of this is the possibility that the intervention approach is beneficial but perhaps needs more concrete consideration of stimuli and context. Specifically, a natural progression of this work is to analyze music-specific variables such as music liking, preference, or competence. For instance, wide range of musical characteristics, including music consumption and processing patterns, differ from one person to another (Corrigall & Schellenberg, 2015; Koelsch et al., 2003). Hence, it would be interesting to see how those differences might play a role in intergroup settings involving music. In any respect, greater efforts both in research and practice are needed to ensure autistic people will suffer less from stigma (Kim et al., 2024).

Author Contributions

M.S.: conceptualization, data curation, formal analysis, investigation, project administration, visualization, writing—original draft preparation; H.G.: conceptualization, methodology, writing— original draft preparation, reviewing and editing; J.H.: supervision, methodology, writing—reviewing and editing. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Review Board of the University of Arizona (STUDY00002617 and 28 February 2023).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data and materials necessary to reproduce the findings reported in this manuscript are available at https://osf.io/7nprk/?view_only=bb0b8485142b4aa29f622b69067723c5 (accessed on 9 May 2025).

Conflicts of Interest

The authors declare no conflict of interest.

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