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Meet Up Buddy Up: effective strategies to promote 4th grade students' intergroup prosocial behavior

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Introduction: Given the changing demographics in the U.S., it has become increasingly important to promote prosocial behavior toward those dissimilar from oneself. This research is the first to examine the degree to which children's group-based prosocial behavior, specifically, prosocial behavior directed to other-gender peers, can be promoted through simple classroom-based intervention strategies.

Methods: Using a randomized controlled trial (RCT) pre- and post-design with 346 4th graders from four schools in the Southwest U.S. over 1 academic year, we examined the effect of simultaneously implementing two strategies for promoting relationships among diverse peers, *Meet Up and Buddy Up (MUBU)*. *MU* involved promoting group/classroom level peer interactions whereas *BU* focused on dyadic peer interactions.

Results and discussion: Path analysis yielded support for our hypothesis that *MUBU* effectively increased children's other-gender prosociality above and beyond baseline prosociality. The finding speaks to the utility of relationship-building for enhancing children's intergroup prosocial behavior. We discussed implications for research and educational practices.

KEYWORDS

elementary school, universal intervention, prosocial behavior, intergroup relation, peer relations

Introduction

Prosocial behavior refers to voluntary behaviors aimed to benefit others (Eisenberg et al., 2015). Given the demographic changes as well as the current sociopolitical and cultural climate of divisiveness among groups within the United States and internationally, it is increasingly important to not only promote prosocial behavior but to increase prosocial behavior directed toward those who are dissimilar from oneself. Such intergroup prosocial behavior can foster social harmony, belongingness, and even public health on a societal level (Cuddy et al., 2007; Dinic and Bodroža, 2020; Killen and Dahl, 2021). In addition, intergroup prosocial behavior can improve mental health and physical health and reduce discrimination, aggression, and victimization on an individual level, for those who exhibit and for those who receive prosocial behavior (Oliner and Oliner, 1988; Van Willigen, 2000; Graziano and Habashi, 2010; Weinstein and Ryan, 2010; Jung and Schröder-Abé, 2019).

To increase the likelihood that one's prosocial behaviors are directed toward diverse others, it is important to target the development of such prosocial actions early in life as these serve as a foundation for later prosocial actions (Rutland and Killen, 2015). Middle childhood is a critical developmental stage for fostering prosocial behavior as children's sociocognitive capacities mature, their social mobility increases, and the salience of peer relationships intensifies (Carlo et al., 2003; Rubin et al., 2007; Rutland and Killen, 2015). Efforts to enhance children's prosocial behavior toward diverse others during this important developmental stage have potential to contribute to positive changes in how diverse individuals interact and treat one another into adolescence (middle and high school), young adulthood (college), and adulthood (workplace).

To study prosocial behavior directed to diverse others, in the present study we focused on prosocial behavior directed toward other-gender peers. Gender is a central social identity by which children organize their social lives such that through early and middle childhood children tend to engage in play activities more often with same-gender peers than with other-gender peers, and thus form gendered peer cultures in terms of activities, interests, mannerisms, and behaviors (Maccoby, 1998). Although limited, research evidence is accruing that not only do adults engage in prosocial behavior favoring ingroup members when it comes to gender (e.g., Xiao et al., 2022c), children and adolescents do as well. Indeed, research shows that children are relatively unlikely to direct prosocial behavior toward gender-based outgroup members (Weller and Lagattuta, 2014; Renno and Shutts, 2015; Xiao et al., 2022b). In other words, children tend to direct and receive fewer instances of prosocial behavior to and from other-gender peers than to and from same-gender peers. Thus, fostering prosocial behavior toward other-gender peers¹ is of critical need, given the potential to promote children's wellbeing, intergroup harmony, and social cooperation. To our knowledge, the current study is the first to examine whether children's prosocial behavior toward outgroup members can be promoted through simple classroom-based interventions.

Relationship-building as a promotive strategy

Prior research has established the factors that predict general prosocial development (Eisenberg et al., 2015, 2016). However, recently, there is increasing attention to consider the target of prosocial behaviors (Carlo and Padilla-Walker, 2020) and there is a growing accumulation of evidence that children are more prosocial toward ingroup than outgroup members, including targets who are

the same gender relative to targets who are the other gender (e.g., Renno and Shutts, 2015). However, it is unclear how to promote children's prosocial behavior toward outgroup members, such as other-gender peers (cf. McLoughlin and Over, 2019).

One reasonable starting place is to test whether strategies designed to promote positive intergroup relationships in general might also be effective in increasing children's intergroup prosocial behavior. Fostering positive peer interactions and relationships among diverse children should enhance prosocial behavior toward diverse others for at least two reasons. First, at least to some extent, children's biased prosocial behavior likely results from group-based segregated peer relationships (Rutland and Killen, 2017). There is ample research showing that children tend to develop friendships with peers who are similar across various domains such as interests, behavioral styles, and academic abilities (Kupersmidt et al., 1995; Graham et al., 1998; Liberman and Shaw, 2019)—this is the idea of homophily (McPherson et al., 2001). In the case of gender, this tendency is well-documented. Researchers have shown that individuals engage in gender-segregated activities across most cultures (Whiting and Edwards, 1988), developmental stages (Mehta and Strough, 2009; Field and Martin, 2016), and historical time (Lockheed and Harris, 1982; Martin et al., in press). Although not entirely understood, it is likely that children tend to be more prosocial to same-gender peers than to other-gender peers because of their strong tendency to interact with, and form relationships with, same-gender peers more than other-gender peers (Zosuls et al., 2011; Xiao et al., 2019). Through gender-segregated activities and increased exposure to same-gender peers, children perceive more same-gender similarity and hold more prejudice toward other-gender peers, which likely also manifests in biased prosocial behavior (Martin and Fabes, 2001; Xiao et al., 2019). Thus, providing children with opportunities to build positive interactions and relationships with other-gender peers may promote children's feelings of similarity to other-gender peers, which in turn might increase the likelihood of children's prosocial behavior toward those peers (Turner and Cameron, 2016). One of our goals in the study is to examine this potential mediation link.

The idea that relationship building among diverse peers could benefit children's prosocial behavior is also grounded in theory. Specifically, Intergroup Contact Theory (ICT; Allport, 1954) posits that contact, especially positive contact, with outgroup members can reduce outgroup prejudice through various mechanisms, such as reduced anxiety and enhanced empathy (Pettigrew and Tropp, 2008). Gender is often not the focal group membership in prior work aimed to improve intergroup attitudes or behaviors; indeed, the majority of intergroup research focuses on race/ethnicity, nationality, and religion (Pettigrew and Tropp, 2006; Davies et al., 2011). However, recent research indicates that intergroup contact, in particular, other-gender friendships, plays a positive role in promoting children's gender-based attitudes, behaviors, and relations with children (Martin et al., 2017b; Xiao et al., 2022b), with adolescents (Field and Martin, 2016), and with young adults (Jenkins et al., 2022). Thus, to enhance children's prosocial behavior toward others who are dissimilar from oneself, facilitating meaningful contact and relationship building among diverse peers (e.g., in gender,

¹ In this work, other-gender peers refer to those who are different in gender from oneself thereby acknowledging that gender is not a binary but instead recognizes that there are many forms of gender that may differ from one's own gender. However, in this study, all children were identified by schools as girls or boys.

race/ethnicity) is a promising promotive approach (Turner and Cameron, 2016).

Meet Up and Buddy Up and prosocial behavior

To promote positive contact, researchers have argued for the importance of enhancing youth's confidence in and readiness to interact with diverse peers (Turner and Cameron, 2016). Decades of research on peers suggest that peer experiences operate both at the dyadic level (e.g., dyadic peer interactions) and at the group/classroom level (e.g., classroom norms and social networks) and that both of these are associated with children's adjustment (Dika and Singh, 2002; Rubin et al., 2007; Cappella et al., 2013). Specifically, with support from teachers, at the dyadic level, children could be encouraged to engage in positive and frequent interactions with peers who differ from themselves in salient social group memberships such as gender. At the group (class) level, this may mean creating opportunities and norms for all students to learn to interact with each other, listen to each other, and communicate with each other through teacher-guided opportunities. The intergroup intervention strategies of *Meet Up and Buddy Up* (MUBU) do just this. MUBU are two components of a larger Social Emotional Learning (SEL) program, *Harmony*, which is a free, universal, teacher-facilitated program designed to improve diverse peer relationships among preschool and school-age children through relationship-building activities and everyday practices (Fabes et al., 2019). A unique aspect of the MUBU components is the focus on relationship building among diverse peers (across an array of characteristics, including gender) at both the dyadic/small group (accomplished via *Buddy Up*) and large group (accomplished via *Meet Up*) levels.

Specifically, *Meet Up* was designed to enhance social inclusion and connectedness by fostering a sense of community within a classroom, rather than separate group-based peer cultures, such as gendered peer cultures (Maccoby, 1998). *Meet Up* activities include regular discussions throughout the semester among all students in the classroom, for example, by sharing the highs and lows of everyone's experiences and by establishing their classroom's social norms together through discussions. By participating in these classroom discussions, students could learn about other students' likes, dislikes, opinions, and personalities in their classroom, especially those that they might not generally interact with, such as other-gender peers. And as such, students learn to find commonalities and appreciate their differences with teachers' support.

Buddy Up involves providing students with the opportunity to work directly with diverse others on the dyadic/small group level repeatedly throughout a week. Specifically, teachers pair each student with one or two other students (per teachers' discretion) and assign the pair/small group as "buddies" for a week. The buddies then engage in everyday classroom activities, such as problem-solving, together throughout the week. "Buddies" are rotated weekly to maximize the amount of interactions among unfamiliar, and potentially different, students (across a range of characteristics). Through these

teacher-supported activities, students have the opportunity to learn about, and learn from, others who are different from themselves.

Our goal in this study was to simultaneously test the effects of MUBU on children's gender-based intergroup prosocial behavior. To date, there have been no assessments of the *Meet Up* strategy, but researchers have demonstrated that similar strategies aimed at creating a positive, caring, classroom environment are beneficial to school age children's social and academic competence (e.g., the Responsive Classroom approach; Rimm-Kaufman and Chiu, 2007). Additionally, there has only been one trial of the *Buddy Up* (BU) intervention strategy with a sample of preschoolers. In this trial, teachers paired preschoolers with *other-gender peers* as their "buddies" whenever possible. The researchers found that BU mitigated declines in other-gender peer play (Hanish et al., 2021) and improved preschoolers' prosocial behavior through having more other-gender friends over one semester's time (Xiao et al., 2022a). Moreover, further analyses of these data revealed positive effects on the overall quality of dyadic peer interactions, including those with other-gender peers (Hanish et al., 2022). Together these findings suggest that BU might be promising in improving children's prosocial behavior toward other-gender peers, but testing BU with older children has not yet taken place. Such a conclusion is partially supported by Van Ryzin et al. (2020) who found that a similar collaborative learning strategy with middle schoolers increased prosocial behavior and reduced bullying.

The current study

Promoting prosocial behavior toward those who are different from oneself is highly important in current times where acts of overt and implicit bias and discrimination occur frequently (Rutland and Killen, 2015; Spinrad et al., 2022). The goal of the present research was to simultaneously examine whether MU and BU could effectively promote fourth-graders' prosocial behavior toward other-gender peers. Both strategies were designed to foster children's positive peer interactions and relationships with diverse others; one at the dyadic/small group level, one at the classroom level. This work could inform understanding of the degree to which children's prosocial behavior toward diverse others can be promoted by using simple classroom-based strategies. Our first goal was to examine the efficacy of MUBU on students' prosocial behavior toward other-gender peers. Because the program exposed students to diverse others in their classrooms, drawing from ICT and prior research (Pettigrew and Tropp, 2006; Crystal et al., 2008), we hypothesized that MUBU would be effective in promoting prosocial behavior toward other-gender peers (Hypothesis 1). Our second goal was to examine children's perceived other-gender similarity as a mediator. To accomplish this goal, we adapted a method of assessing gender typicality in which "similarity" to same- and other-gender peers is assessed (Martin et al., 2017a). For this study, we used only the other-gender similarity measure and asked fewer questions than in the original version. As a mediator, we expected that MUBU would increase children's felt similarity to other-gender peers, and then in turn, would increase their prosocial behavior toward other-gender peers (Hypothesis 2).

Materials and methods

Participants

Participants were recruited from 15 4th-grade classes in four public elementary schools in a public school district in the Southwestern United States. After receiving approval from the university's Institutional Review Board, the research team obtained approval from the school district, principals, and teachers to participate in the study. Among the participating classrooms, the average class size was 23, ranging from 15 to 30. Consent forms were given to teachers to distribute to students on the 1st day of school. After parents gave permission for students to participate, students were provided an assent form, and only those who assented to participate were included in the study. The consent rate for intervention classes is 80% and for control classes is 71%.

The sample consisted of 346 4th graders (Mean age = 9.40 years, $SD = 0.40$). Schools provided gender data; 53.5% ($n = 185$) were girls and 46.5% ($n = 161$) were boys. None were identified as non-binary. Parents (62.0% mothers and 8.1% fathers with the remainder being grandmother, stepfather, or stepmother, and 29% with missing data) reported on children's race/ethnicity. Just over half of the students were non-Hispanic White (54.9%; $n = 190$). The remainder were Latinx (10.1%; $n = 35$), Asian (2%; $n = 7$), Black (1.7%; $n = 6$), Native American (0.3%; $n = 1$), or other (12.4%; $n = 43$). Another 18.5% ($n = 64$) had missing data on race and ethnicity. Children came from families who, on average, had obtained education beyond high school. Of the 280 parents who provided education information, about half (48.6%) were college graduates or had obtained higher education. Most of the remaining families had completed some college or had obtained an Associate degree (41.1%). Only 8.2% of the reporting parents reported a high school degree or GED as their highest level of education and only 2.1% had not graduated from high school. Moreover, based on reports from the 268 parents who provided income data; the average annual household income ranged from \$70,000 to \$79,000. Lastly, 87.1% of the students came from two-parent households, and 12.9% came from single-parent households.

Power analysis

We conducted power analysis using G*power 3.1.9.6 (Faul et al., 2007). With an alpha of 0.05, the sample size of 346 should provide 80% power to detect even small correlations (at 0.15), or 99.99% power to detect medium correlations (at 0.30) assuming a two-tailed test. To detect the intervention effect, using G*power's test of mean difference between two dependent means, assuming alpha of 0.05, with 346 participants, there is 73.79, 99.99, and 100% of power to detect small (Cohen's $d_z = 0.14$), medium (Cohen's $d_z = 0.35$), and large effect size (Cohen's $d_z = 0.57$; Lakens, 2017).

Procedures

Study design

Using a randomized controlled trial (RCT), pre-post design, the *Meet Up Buddy Up* (MUBU) intervention was administered over an academic year with the pre-test in August, implementation

from the end of August to the end of February, and the post-test in March. Two of the participating schools were randomly assigned to the intervention condition (coded as 1) and the other two were assigned to the control condition (coded as 0). Teachers at the two intervention schools (nine classrooms) implemented MUBU with students, whereas teachers at two control schools (six classrooms) went about business-as-usual.

Intervention procedures

We developed MUBU by working closely with teachers in all phases of program design. Teachers provided insights about inclusion and about issues in the classroom, offered suggestions about intervention activities and strategies. These insights were integrated into program design. Once the interventions were developed, the MU and BU strategies were trialed in classrooms, and we adopted teachers' suggested modifications. We also made sure to include teachers who were working with students from various ethnic racial and socioeconomic backgrounds as well as students from different grade levels (from preschool to elementary school). In developing the strategies, our goal was to ensure that all MUBU activities are easy to implement, could be easily and flexibly incorporated within classroom routines, and did not require additional resources from teachers or students beyond what is normally available in classrooms (see a more detailed description of the MUBU program in Fabes et al., 2019).

For *Meet Up*, which operates at the classroom level, throughout the semester, teachers led the entire class in several activities. Beginning within the first 1–2 weeks of the semester, teachers involved students in the process of establishing classroom norms and expectations for how they wanted to interact with each other. During this process, students generated and agreed upon ideas such as “we should help and respect each other” while teachers guided and supported the process. After this initial phase, every day, students in the class would gather during a specific time, the *Meet Up* time (generally mornings), to discuss and share their social experiences and interactions with their classmates that day. The experiences could be positive or negative. During this time, teachers supervised the discussions to support students in respectful listening and inclusive discussions. The purpose of these discussions was to enable the students to work cooperatively to meet the class goals for positive social interactions, which students developed at the beginning of the school year. These discussions occurred in both small and large groups. Teachers were also encouraged to provide students with feedback throughout the school day and to provide students with positive opportunities to redo interactions if needed to meet classroom goals.

For *Buddy Up*, at the dyad level, teachers assigned “buddies” such that every child would have the opportunity to be paired with every other child to maximize students' exposure to and interactions with diverse peers. Teachers rotated the “buddies” every week such that students would work with their specific buddy throughout a week on various dyadic or small group activities which were consistent with the teachers'

plans (e.g., reading together, going to lunch together) which were positively toned. We asked teachers to prioritize pairing children with diverse peers, such as other-gender peers, when possible and to not make their pairing decisions obvious to the students (although we did not specifically assess this in fidelity data). For at least 4 days of the week, teachers were asked to implement at least one *BU* activity. These frequent *BU* activities enabled students to have ample opportunities to interact with diverse peers in their classroom throughout the semester.

Fidelity data

We obtained fidelity data including data on implementation frequency, quality, satisfaction, and usability/feasibility at the classroom level using teacher report, student report, and observer report. On a weekly basis, teachers in the intervention classroom logged their participation in *MUBU* each day (Monday to Friday). Specifically, they rated four and eight items about the quality and frequency of *BU* and *MU* activities respectively for each day in that week (e.g., “Did you complete *BU/MU* today?” “How well did *BU/MU* go?”). On average, teachers spent 18.16 min ($SD = 9.75$) on *BU* activities and 12.49 min ($SD = 3.76$) on *MU* activities per day. Teachers reported that both *BU* ($M = 3.67$, $SD = 0.33$) and *MU* ($M = 3.69$, $SD = 0.30$) went well overall on a 4-point Likert scale (0 = *Not at all well* to 4 = *Very well*).

Two observers were involved in monthly observations for *Meet Up* activities for intervention classrooms as well as one observation of classroom practices for both intervention and control classrooms at the end of the year. For 5 months during the intervention, the observers rated seven items to evaluate the degree of adherence with *MU* activities (e.g., “Did the teacher gather students in a circle?” see all items in [Appendix A](#)). All items were rated as 0 = *no*, 1 = *yes*. A percentage of adherence was calculated by averaging the two observers’ ratings. Over the 5 months, the average adherence percentage was 77.47 ($SD = 11.32$).

Twice a year (mid-year and post-test), students rated their satisfaction and comfort with *BU* and *MU* a 4-point Likert scale (0 = *Not at all* to 3 = *A lot*). These scores were then averaged. Specifically, students rated 14 items about *BU*, $M_s = 2.39$ and 2.41, $SD_s = 0.54$ and 0.57 at each assessment (e.g., “I felt comfortable participating in activities with my buddies” see [Appendix B](#) for all items). And they rated *MU* with 16 items, $M_s = 2.30$ and 2.36, $SD_s = 0.53$ and 0.53 at each assessment (e.g., “Our classroom goals taught me how to treat my classmates with more respect”).

Similarly, teachers rated their satisfaction with *MU* and *BU* using a 13-item 4-point Likert scale (0 = *strongly disagree* to 3 = *strongly agree*; e.g., “I would recommend *MU/BU* to another teacher”). Overall, teachers were highly satisfied with both *MU* ($M_s = 2.45$ and 2.73, $SD_s = 0.40$ and 0.28 at each assessment) and *BU* ($M_s = 2.67$ and 2.74, $SD_s = 0.28$ and 0.34 at each assessment). Teachers rated the usability and feasibility of the program with 15 items (e.g., “The training prepared me to implement [the program] effectively”) on a 4-point Likert scale (0 = *strongly disagree* to 3 = *strongly agree*) at three occasions: post-training, pre-test, and mid-year ($M_s = 2.44$, 2.53, and 2.76, $SD_s = 0.35$, 0.37, and 0.19).

Measures

Pretest (T1) data were collected at the beginning of the fall semester (August/September) and posttest (T2) data were collected in the following spring semester (February/March). For their participation, teachers received modest compensation and students received a university pencil for their time.

Prosocial behavior

We assessed students’ intergroup prosocial behavior using peer ratings. Specifically, each student was asked to rate the item “How often is [classmate name] nice to you? (helps you, says nice things to or about you, does things to support you, includes you)” on a 5-point scale (0 = *Not at all*, to 4 = *A lot*). The students rated every other participating student within their classrooms. Scores from peers were used to determine prosociality. We created a “total prosociality” score for target X by first averaging the score of all of X’s classmates’ ratings of X, and then standardizing this score within class. Further, based on the raters’ gender (i.e., boy/girl), we calculated and standardized each student’s “prosocial behavior toward girls” (i.e., girls’ ratings of a student) and “prosocial behavior toward boys” (i.e., boys’ rating of a student) within each class to account for classroom variations given that the peer ratings were done within class. Then, based on each student’s (i.e., the nominee) gender and the rater’s gender, we calculated the final scores of prosocial behaviors to other-gender peers (i.e., other gender prosociality). For example, to determine how prosocial the girl, Alex, is to other-gender peers (i.e., boys), we used boys’ ratings of how prosocial Alex was to them. Although there is no way to calculate the reliability of peer nominations, this method is commonly used in peer and prosocial research (e.g., [Schonert-Reichl et al., 2012](#); [Caprara et al., 2015](#); [Xiao et al., 2022b](#)).

Perceived similarity to other-gender peers

Children reported their perceived similarity to other-gender peers by rating two questions on a 5-point scale with a graphic/circle measure (0 = *farthest apart* to 4 = *overlapping*). Specifically, for each question, children were presented with a graph depicting varying relations between two circles, one small one representing themselves, and one larger one representing other boys/girls. Students rated how similar they feel to other girls/boys and how much they look like other girls/boys. That is, there were two questions, each repeated twice, once about girls and once about boys [e.g., “Fill in the bubble that shows how similar you feel to (other) girls”], yielding a total of four items. Here we used ratings for other-gender peers—meaning girls’ ratings of similarity to boys, and boys’ ratings of similarity to girls. Specifically, we created children’s other-gender similarity by recoding the items based on participating students’ gender and then averaging the two items. For example, a girl’s rating on how similar she feels to boys, and how much she looks like boys, were recoded as similarity to other-gender peers. In the current study, these two items on general similarity and appearance were correlated from 0.61 to 0.65 across pre- and post-test variables and within gender (e.g., pre-test girl item 1 with pre-test girl item 2) suggesting it is reasonable to combine these items. An expanded version of this

scale (5 questions repeated for girls and boys—10 items total) has been previously validated with children, adolescents, and adults across several samples (Martin et al., 2017a; Andrews et al., 2019; Endendijk et al., 2019).

Covariates

We included the following demographic variables as control variables in all inferential analyses: child gender (i.e., girls vs. boys), child age (in years), child ethnicity (i.e., White vs. non-White), child family household (i.e., two parents vs. single parent), parental education (i.e., some or no college vs. college graduate or above), and annual household income (i.e., under \$80,000 vs. \$80,000 and above). In addition, we also included children's overall prosocial behavior at T1 (average ratings across all peers in the classroom), which captures children's baseline prosociality.

Analytic strategies

Using SPSS version 28, we first conducted attrition analyses to determine if students who attrited were different from those who did not. Next, we conducted descriptive analyses and examined the effects of potential covariates on the dependent variable (i.e., other-gender prosociality at T2) by computing independent-sample *t*-tests for child gender, child ethnicity, household income, parental education, child family household composition, and we conducted bivariate correlations for child age and total prosocial behavior at T1. Because children in our study were nested within classes, we computed Intraclass Correlations (ICCs) to examine how much variance in T2 other-gender prosociality was explained by classes: 38.94% of variance in T2 other-gender prosociality was explained by which classroom a child was in.

Second, inferential analyses were conducted in *Mplus* version 8.3. Given that our study focused on the individual level, we used the Bayesian Markov chain Monte Carlo (MCMC) approach to address the data clustering² which is a recommended approach based on prior simulation research on small level 2 sample sizes with clustered data (McNeish and Stapleton, 2016). This approach has also been used in previous empirical research (e.g., Chen et al., 2020; Xiao et al., 2022a). We set the prior distributions of the variances of exogenous variables as Inverse Gamma [IG (0.01, 0.01)], and used *Mplus*'s default for the prior distributions of other parameters (Muthén and Muthén, 2012). The 95% confidence interval was used to estimate whether the effects were statistically significant. The effects are statistically significant when the 95% confidence intervals do not include zero.

The focal endogenous/outcome variable was the change in children's prosocial behavior toward other-gender peers from pre- to post-test. To assess this, we specified a two-wave Latent Change Score model (2W-LCS; Henk and Castro-Schilo, 2016). Compared with the traditional differences score approach, 2W-LCS is a less biased method that allows for creating an error-free latent variable to capture the change of other-gender prosociality over time (i.e.,

indicated by the mean of the latent variable) and the variability in within-person change (i.e., indicated by the variance of the latent variable). Specifically, the latent change score of other-gender prosociality was created by regressing T2 other-gender prosociality on T1 other-gender prosociality, with the path coefficient fixed at 1. The autoregression from T1 other-gender prosociality to T2 other-gender prosociality was fixed at 1 and their correlation was fixed at 0. We also fixed the intercept and residual of T2 other-gender prosociality at 0.

The Latent Change Score and MCMC approaches were applied to all our inferential analyses. To address the first research goal on intervention effect, we examined whether the intervention accounts for change in children's other-gender prosociality over and above the demographic control variables and T1 total prosociality. To examine the second research goal, we examined whether perceived similarity to other-gender peers at T2 served as the mediator of the relation between intervention condition and other-gender prosociality change, following prior simulation research on two-wave mediation analyses (Valente and MacKinnon, 2017). Specifically, we regressed T2 other-gender similarity on the intervention conditions (i.e., *a* path) and regressed the latent change score of other-gender prosociality on T2 other-gender similarity (i.e., *b* path). The product of *a* path and *b* path indicated the indirect effects. In this model, we also included demographic variables, T1 other-gender similarity, and T1 total prosociality as the covariates. Demographics and T1 total prosociality were included as covariates in this model.

Results

Attrition analyses

Only 12 children attrited at post-test (T2) (e.g., moved to a different school). To examine whether attrited children differed from the rest in demographics and main study variables, we conducted Chi-square tests for dichotomous variables (i.e., child gender, child ethnicity, parental education, household income, child family household) and independent samples *t*-tests for continuous variables (i.e., child age and all main variables). There was a significant difference only for T1 total prosociality, $t_{(332)} = 2.57, p = 0.01, d = 0.79$, with attrited children being less prosocial ($M = -0.74, SD = 0.79$) than the rest of participants ($M = 0.03, SD = 0.98$).

Descriptive analyses

Next, we examined descriptive statistics and relations among variables. The absolute values of skewness and kurtosis for each main variable were below 2 and thus the variables were considered normally distributed (Curran et al., 1996). The descriptive statistics of dichotomous demographics variables on other-gender prosociality are shown in Table 1. The results suggested that girls were more prosocial at T1 to other-gender peers than were boys, $t_{(331)} = 3.70, p < 0.001, d = 0.40$, but not at T2, $t_{(330)} = 1.75, p = 0.08, d = 0.19$. Children in two-parent households and single-parent households did not differ in other-gender prosociality at T1,

² Multilevel modeling would be more appropriate to use when there are research questions about factors at different levels.

TABLE 1 Descriptive statistics of other-gender prosociality at T1 and T2.

	T1 other-gender prosocial			T2 other-gender prosocial		
	N	M	SD	N	M	SD
Child gender						
Female	177	-0.29	0.84	180	-0.25	0.91
Male	157	-0.61	0.72	152	-0.42	0.86
Child ethnicity						
White	188	-0.43	0.83	183	-0.37	0.95
Non-white	90	-0.45	0.70	89	-0.24	0.77
Parental education						
Some or no college	141	-0.45	0.80	137	-0.38	0.96
College graduate or above	135	-0.44	0.80	133	-0.28	0.83
Household income						
Under \$80,000	122	-0.42	0.79	116	-0.36	0.96
\$80,000 and above	136	-0.42	0.78	137	-0.31	0.86
Family household						
Single parents	36	-0.56	0.99	35	-0.62	1.07
Two parents	239	-0.43	0.77	233	-0.28	0.87

$t_{(42)} = -0.78, p = 0.44, d = -0.17$, but they differed at T2, $t_{(266)} = -2.05, p = 0.04, d = -0.37$ with children in two-parent household being higher than those in single-parent household. The zero-order correlations for continuous covariates and main variables are shown in Table 2. T1 total prosociality was significantly correlated with other-gender prosociality at T1, $r_{(334)} = 0.74, p < 0.001$, as well as at T2, $r_{(322)} = 0.54, p < 0.001$. Other-gender similarity was not correlated with other-gender prosociality, either at T1 or T2. Based on the above analyses, we included child gender, family household composition, and T1 total prosociality as covariates in our following inferential analyses.

Descriptive statistics for main variables by intervention condition are shown in Table 3. In general, no significant differences were found in other-gender prosociality between the intervention group and the control group at T1, $t_{(222)} = 1.16, p = 0.25, d = 0.14$, or T2, $t_{(330)} = -0.77, p = 0.44, d = -0.09$. The intervention group did not differ from the control group on T1 other-gender similarity [$t_{(323)} = 0.40, p = 0.69, d = 0.05$], but scored significantly lower than the control group on T2 other-gender similarity [$t_{(217)} = 2.45, p = 0.02, d = 0.29$].

Inferential analyses

Consistent with Hypothesis 1, the main effect of intervention on change in other-gender prosociality was significant

(see Figure 1). Specifically, children's other-gender prosociality increased more in the intervention group than in the control group [$\beta = 0.11, 95\% \text{ CI } (0.01, 0.22)$] after controlling for the effects of child gender [$\beta = 0.03, 95\% \text{ CI } (-0.09, 0.14)$], family household composition [$\beta = 0.10, 95\% \text{ CI } (-0.01, 0.22)$], and T1 total prosociality [$\beta = -0.14, 95\% \text{ CI } (-0.25, -0.03)$].

As for the mechanism of the intervention effect, we did not find support for Hypothesis 2. Other-gender similarity at T2 did not serve as a mediator between intervention effect and other-gender prosociality change, with the product of the *a* and *b* paths being non-significant [$\beta = -0.00, 95\% \text{ CI } (-0.04, 0.03)$]. Specifically, *MUBU* predicted T2 other-gender similarity [$\beta = -0.13, 95\% \text{ CI } (-0.23, -0.03)$]; however, T2 other-gender similarity did not predict changes in T2 other-gender prosociality [$\beta = 0.02, 95\% \text{ CI } (-0.10, 0.13)$]. That is, the *a* path was statistically significant but not the *b* path.

Discussion

In this research we examined the degree to which children's group-based prosocial behavior could be promoted through intervention strategies. Specifically, we examined a randomized controlled trial (RCT) of the *Meet Up* and *Buddy Up* (*MUBU*) strategies, which were designed to support students to build relationships with diverse peers in their classrooms. Using latent change score modeling and Bayesian estimation, we found that *MUBU* was effective in increasing children's prosocial behavior toward other-gender peers one semester later even after controlling for a students' baseline total prosociality and demographic variables. We also examined the role of children's perceived similarity to other-gender peers, a theory-driven potential third variable, but found that it did not mediate the intervention effects in this trial. Detailed discussion for each finding is presented below.

The power of relationship building

The finding that *MUBU* effectively promoted children's prosocial behavior toward other-gender peers over time is important for several reasons. First, despite the obvious value in socializing children to be kind and helpful toward others who are different, there are few empirically tested, theory-driven interventions that *promote* such prosocial behaviors, especially in real-life settings such as school classrooms (Cameron et al., 2016). Instead, much of this literature has focused on basic science aimed to *understand* factors related to children's intergroup prosocial behavior (Carlo and Padilla-Walker, 2020; Spinrad et al., 2022). While there is some work focusing on enhancing children's intergroup prosocial behavior in the laboratory (e.g., McLoughlin and Over, 2019 on immigrant status), these effects may not translate to real-life settings. The current research focuses on enhancing children's prosocial behavior in such real-life settings (e.g., in students' classrooms), providing evidence that such improvement is possible for children in the middle to late childhood period. Whether these strategies would effectively improve younger children's, or adolescents', prosocial behavior toward other-gender

TABLE 2 Means, standard deviations, and correlations for continuous covariates and main variables.

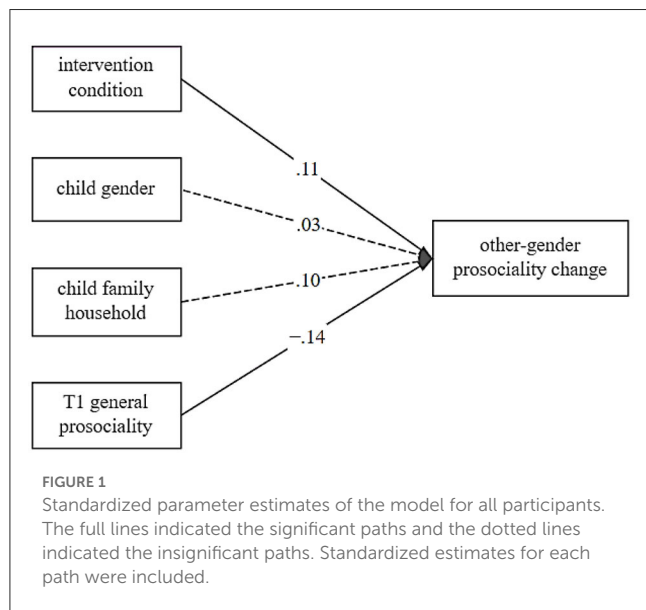
	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Child age	9.40	0.40						
2. T1 total prosociality	0.00	0.98	−0.03					
3. T1 other-gender similarity	0.94	1.03	0.05	−0.05				
4. T1 other-gender prosociality	−0.44	0.80	−0.03	0.74***	−0.02			
5. T2 other-gender similarity	1.05	0.93	0.04	0.16**	0.27***	0.15**		
6. T2 other-gender prosociality	−0.33	0.89	−0.01	0.54***	−0.02	0.52***	0.10	

***p* < 0.01.
 ****p* < 0.001.

TABLE 3 Descriptive statistics of main variables by intervention condition.

Variables	Control			Intervention			Total		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
T1 other-gender similarity	0.97	1.06	120	0.92	1.02	205	0.94	1.03	325
T2 other-gender similarity	1.22 _a	1.05	125	0.95 _b	0.83	208	1.05	0.93	333
T1 other-gender prosociality	−0.37	0.90	125	−0.48	0.74	209	−0.44	0.80	334
T2 other-gender prosociality	−0.38	0.89	124	−0.30	0.89	208	−0.33	0.89	332

For the total sample, kurtosis ranged from 0.34 to 1.36, skewness ranged from −0.82 to 1.29. Subscripts “a” and “b” in rows indicate significant mean differences at *p* < 0.05, with “a” indicating the higher mean.



peers, or to or peers who differ on other characteristics, needs to be examined in future work.

Second, this finding expands the implications of ICT, which has largely been used to inform research on cognitive aspects of prejudice such as biased attitudes (Pettigrew and Tropp, 2006; Davies et al., 2011). It has rarely, however, been used to inform behavioral aspects of prejudice (Fiske, 2000), with the exception of intergroup conflict and aggression (e.g., Schmid et al., 2014). Indeed, attitudes are often precursors of behaviors

(Ajzen and Fishbein, 2005) and one might argue that to change one’s intergroup behaviors, we first need to change their attitudes. This may be true, but the current finding indicates that targeted positive intergroup contact did have *direct* impact on changing children’s gender-based prosocial behaviors over one semester’s time. One possible explanation for this finding is that, because *MU* and *BU* facilitated children’s access to and engagement with more diverse peers, it created more opportunities for prosocial behavior. If so, it would suggest that children’s biased prosocial behavior favoring their ingroup is related to their greater access to ingroup peers. This possibility could be tested in future research. Given the rigor in an RCT design, this finding provides relatively strong evidence of the benefit of intentionally structuring and supporting children’s opportunities to interact with diverse peers (e.g., Turner and Cameron, 2016). An important question to address in future research is whether and how long such an intervention effect will remain by including short- and long-term follow-up assessments.

Relatedly, this finding provides some indication that relationship-building strategies at both the dyadic level (e.g., *BU*) and at the group/classroom level (e.g., *MU*) likely are important in contributing to children’s prosocial behavior toward other-gender peers. However, in the present study we were not able to tease the *MU* and *BU* portions apart as they were simultaneously implemented. Whether one component may be more or less effective than the other is a question for future investigation. However, it is important to note that the *MU* and *BU* portions were developed together based on prior research on peer experiences at both dyadic and group levels and children’s adjustment (Dika and Singh, 2002; Rubin et al., 2007; Cappella et al., 2013).

Perceived other-gender similarity

Given that children tend to befriend peers who are similar to themselves (McPherson et al., 2001), one of our assumptions for children's biased prosocial behavior favoring same-gender peers was that they felt more similarity to same- than other-gender peers and thus were more likely to be prosocial to those who were perceived to be more like them. Thus, we expected that children who felt more similarity to other-gender peers would also tend to show more prosocial behavior toward other-gender peers. Although there has been some empirical and theoretical support of this idea in previous research (Aboud and Fenwick, 1999; Turner and Cameron, 2016; Xiao et al., 2022b), in the current RCT trial, children's felt similarity to other-gender peers did not predict changes in other-gender prosocial behavior. This may be due to the limitation in assessment: only two time points were assessed (i.e., pre- and post-assessment design). However, there is indication that felt similarity to other-gender peers was related to children's prosocial behavior toward other-gender peers when examining bivariate zero-order correlations. This suggests that improving children's other-gender similarity might be a promising mechanism through which one can foster children's other-gender prosocial behavior.

That *MUBU* was not particularly effective in enhancing children's felt similarity to other-gender peers might be both because neither strategy focused specifically on gender, rather, they were designed to provide children more opportunities to interact with diverse peers in general (e.g., language, gender, and ethnicity). It is also possible that students felt more similar to the specific other-gender peers in their classroom, but not other-gender peers generally. Testing this requires a peer-report measure that asks students to rate their perceived similarities toward each peer in their class rather than overall to boys and girls. Regardless, the finding suggests that perhaps children did not need to feel more similar to other-gender peers to engage in more prosocial behaviors toward them; instead, simply having some positive interactions with other-gender peers can foster prosocial behavior, or there are other mechanisms at play that we did not assess. Given the robustness of children's gender-based cognitive biases (Martin, 1989; Zosuls et al., 2011; Gasparini et al., 2015; Xiao et al., 2019), this finding also suggests that changing children's felt similarity to other-gender peers may be difficult and require more targeted intervention strategies focusing specifically on gender (like prior the *BU* trial; Hanish et al., 2021, 2022). The effort also deserves more developmental considerations by targeting older children and adolescents who are likely more capable and likely to make behavioral decisions on the basis of nuanced information such as gender-based similarity, than simpler information such as gender (Martin et al., 1990; Xiao et al., 2022b).

Strengths, limitations, and future directions

This research has several strengths. First, the use of an RCT design allows rigorous testing of the causal effect of the intervention on outcomes. Another strength of the current study

is employing peers to measure intergroup prosocial behavior. Specifically, we used peer nominations, which is a versatile method that allows researchers to collect information from those most directly involved in intergroup prosociality—namely, one's peers. Additionally, this method allows for assessments to be summarized for target children and groups. For instance, even though we did not ask specifically about the gender of the target of one's prosocial behavior, we were able to utilize other data available to us (i.e., the gender of each person in the class) to calculate children's prosocial behavior toward other-gender peers. Another strength of the study is our use of Bayesian estimation to address research questions, which allowed us to account for the relatively small level 2 sample size (i.e., relatively few classrooms; McNeish and Stapleton, 2016; Chen et al., 2020).

As with all research, this study is not without limitations. First, although enhancing students' prosocial behavior toward diverse others across various group memberships is important, we only assessed prosocial behavior directed to other-gender peers but could not include race/ethnicity due to limited diversity on this dimension. With increased ethnic racial diversity in a sample, researchers could also examine such research questions about peers who are same/different in race, or even consider both the gender and race/ethnicity information. The current participants were students from public schools in the Southwest with limited ethnic-racial diversity (54.9% were White European American and 10.1% Latinx), with very few students of color (e.g., Asian) within each classroom, which makes it challenging to assess students' prosocial behavior toward others who are different in race/ethnicity (e.g., White children's prosocial behavior toward Asian children). Other methods such as vignettes would be useful in future research to examine such research questions. Another limitation is that we were not able to assess the effect of *MU* and *BU* strategies separately. This was because all participating intervention classrooms engaged in both *MU* and *BU*. Future trials of *MUBU* with more classrooms and varying conditions (i.e., a *MUBU*, a *MU*, and a *BU* condition, along with a control condition) could allow for researchers to examine whether one intervention was more influential than the other or if they work best together. However, it is worth noting that we have tested *BU* separately in prior preschool trials and found that it benefits children's general peer interactions such as their global prosocial behavior and interaction quality (Hanish et al., 2022; Xiao et al., 2022a). Further, because we only included 4th graders in this trial, how well the findings could apply to younger and older children require future investigation. The prior trial of *BU* with preschoolers suggests that *MUBU* may be effective with younger children too, but testing is needed to inform whether *MUBU* may also be applicable for older children or adolescents.

Despite these limitations, the current RCT trial of *MUBU* provided critical information, and the first evidence, on the degree to which children's prosocial behavior toward diverse others can be enhanced and how. This issue is of contemporary importance. Findings indicate that providing 4th graders the opportunities to interact and form relationships with diverse peers through both dyadic and classroom-level interactions helped enhance school-age children's prosocial behavior toward other-gender peers.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Arizona State University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

SX wrote the first draft of the manuscript (except main results), performed some of the statistical analysis, and mentored HR with analyses. HR performed some of the statistical analysis and drafting the results section. LH contributed to detailed reading and provided multiple rounds of editing for the paper. CFM contributed to data collection, data cleaning, and study conceptualization. LH, CLM, and RF contributed to conception, design, and implementation of the study. All authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fdyps.2023.1177566/full#supplementary-material>

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