RESEARCH ARTICLE | OPEN ACCESS

Intentionality and Congruence Cues Shape Young Children's Perceptions of Identity-Based Group Membership

Brenda C. Straka[1] | Adam Stanaland[2] | Sarah E. Gaither[3,4]

[1]Department of Psychology, University of Illinois, Urbana-Champaign, Illinois, USA | [2]Department of Psychology, University of Richmond, Richmond, Virginia, USA | [3]Department of Psychology and Neuroscience, Duke University, Durham, North Carolina, USA | [4]Faculty Affiliate at the Samuel DuBois Cook Center on Social Equity and the Center on Health and Society, Duke University, Durham, North Carolina, USA

Correspondence: Brenda C. Straka (bstraka@illinois.edu) | Adam Stanaland (adam.stanaland@richmond.edu)

ABSTRACT

As young as 3 years old, children rely on a mutual intentionality framework to confer group membership—that is, agreement between a joiner ("I want to be in your group") and group ("We want you to be in our group"). Here, we tested whether children apply this cognitive framework in the context of identity-based groups, specifically gender and race. In Study 1 (preregistered), we asked a large sample of 3–8-year-olds ($N = 448$; 224 girls) whether a novel joiner character (girl, boy) could join a group (girls, boys) based on joiner-group intentions (non-mutual, mutual) and joiner-group gender congruence (incongruent [e.g., girl-to-boys], congruent [e.g., girl-to-girls]). Study 2 (preregistered; $N = 433$; 208 minoritized race) followed the same structure as Study 1 but instead varied the race of the joiner (Black, White) and group (Black, White). In both studies, participants as young as 3 years old relied on a mutual intentionality framework to confer group membership. This effect strengthened with age, replicating past work and newly showing that children rely on mutual intentions in the context of identity-based groups. An exploratory integrative data analysis (IDA) comparing across studies revealed that participants additionally relied on joiner-group gender congruence to confer group membership as young as 3 years old (Study 1) but did not rely on joiner-group racial congruence until 5 years old (Study 2). It appears, then, that young children's determination of group membership is influenced by interactive cognitive processes that incorporate others' mental processes (intentions) and their emerging understanding of the social world (identity-based group boundaries).

1 | Introduction

In everyday life, people rely on group boundaries to navigate complex social worlds. How do young children determine these boundaries and who is—or is not—a member of a social group? To make sense of their social environments, children rely on "naïve sociologies" or lay theories about social groups and their characteristics (Hirschfeld 1996). One such lay theory that children hold according to a social-relational perspective is that children expect there to be coalitional relationships between group members (Hirschfeld 1996; Rhodes 2012). For example, children expect members of social groups—even those who do not share meaningful real-world markers—to have certain relational and coalitional obligations to one

---

Brenda C. Straka and Adam Stanaland contributed equally to this work.

Summary

- Young children rely on a mutual intentionality framework to confer group membership for identity-based groups, specifically gender and race.

- Participants were using intentionality-based cues to confer group membership as young as 3 years old, and this increased with age across both gender and race groups.

- With age, participants increasingly relied on identity-based cues to determine group membership and relied more strongly (and earlier) on gender-based cues compared to race-based cues.

- When participants relied more strongly on identity-based cues, they relied less strongly on intentionality cues, suggesting a cognitive "tradeoff" in how children confer group membership.

another (e.g., Kalish and Lawson 2008; Rhodes and Chalik 2013).

Drawing on this social-relational perspective, Noyes and Dunham (2017) proposed that children apply a cognitive framework of *mutual intentionality* to justify causal beliefs about novel group membership. A mutual intentionality framework suggests that if both an individual and the group *mutually* agree (i.e., "I want to be in your group" *and* "We want you to be in our group"), then an individual is a member of said group. However, for certain groups, children also apply an essentialist perspective—that is, believing that group membership is conferred on the basis of underlying and immutable "essences" (e.g., Diesendruck and HaLevi 2006; Gelman 2003, 2004; Hirschfeld 1996; Rhodes and Mandalaywala 2017). For example, very young children apply an essentialist framework to gender groups (e.g., Rhodes and Mandalaywala 2017), and with age, they apply essentialist thinking to racial-ethnic groups as well (e.g., Rhodes and Gelman 2009; Hirschfeld 1995).

Although previous research suggests that children (4–9-year-olds) do not apply a mutual intentionality framework to essentialized groups, such as gender (Noyes and Dunham 2017), recent work finds that children do apply a mutual intentionality framework across certain real-world groups (i.e., family) that maintain essentialized and entitative qualities (i.e., a group's perceived quality of being a "real" group or not; Plötner et al. 2016; Straka et al. 2021). Given that children in this age range (3–8 years old) can hold strong essentialist beliefs about gender and race, here we tested whether children across this same age range apply a mutual intentionality framework as a causal justification for a novel character to join either an other-gender or other-race group, as well as whether these cognitive processes shift across development.

1.1 | Joiner-Group Intentionality

Past work has demonstrated that children as young as 3 years old use a mutual intentionality framework to determine group membership (Straka et al. 2021). When both a novel joiner character and an existing group mutually share intentions about group membership, children understand this justifies group membership (e.g., "She is in the group."). However, if either party expresses a lack of intent or desire to be in said group, then children fail to confer group membership (e.g., "He is not in the group"). These non-mutual intentions can take the form of "individual-only" intentions (i.e., "I want to be in the group, but the group doesn't want me") or "group-only" intentions (i.e., "The group wants me, but I don't want to be in the group"). In both cases, even young children are able to determine that when mutual intentionality is *not* present, group membership is *not* conferred or present (Straka et al. 2021).

Importantly, past work has shown that children's use of mutual intentionality cues to determine group membership strengthens as children develop. Straka et al. (2021) found that older children (5-year-olds) demonstrated a greater propensity to confer group membership when intentions were mutual and not confer membership when intentions were non-mutual compared to younger children (3-year-olds). As such, it appears that joiner-group mutual intentionality may be one important cognitive mechanism underlying children's understanding of entitative group membership.

1.2 | Joiner-Group Identity Congruence: Gender and Race

Another important cognitive mechanism underlying children's perceptions of groups is their reliance on identity-based markers, such as gender and race. Children perceptually distinguish gender and race as important social markers within the first year of life (e.g., Quinn et al. 2002; Kelly et al. 2009) and rely on these markers to delineate group membership across childhood (Gelman 2003, 2004; Rhodes, Gelman, and Karuza 2014). Although research has documented children's reliance on other group markers like socioeconomic status (e.g., del Rio and Strasser 2011; Straka et al. 2024), nationality (e.g., Davoodi et al. 2020; Hussak and Cimpian 2019), and religion (Chalik, Leslie, and Rhodes 2017; Smyth et al. 2017), gender and race are two identity-based groups that consistently emerge as central in children's cognition about group membership boundaries (Davoodi et al. 2020; Hirschfeld 1995; Pauker et al. 2016; Rhodes, Gelman, and Karuza 2014; Rhodes and Gelman 2009; Rhodes and Moty 2020).

Regarding gender specifically, children as young as 2 years old can classify their own and others' gender (Stennes et al. 2005; Campbell, Shirley, and Caygill 2002). By 3 years old, children believe that there are fundamental, natural, and discrete differences between boys and girls (Rhodes and Gelman 2009; Rhodes, Gelman, and Karuza 2014), which appears to be consistent in different cultures (e.g., both North American and Israeli cultures; Birnbaum et al. 2010; Diesendruck and HaLevi 2006; Diesendruck et al. 2013). Moreover, children's reliance on gender as a causal cue may vary by their own gender: Past work finds that boys may rely on gender more so than girls as an organizing principle about social information (Gelman et al. 2004). Further, research with adult samples finds that men are more gender-essentialist than women (e.g., Gelman, Heyman, and Legare 2007; Smiler and Gelman 2008), yet it remains unclear if and when these differences develop in childhood, particularly in the context of intentionality cues.

In contrast to gender, children's reliance on race as a group boundary is more variable and slower to develop (e.g., Disendruck et al. 2013; Hirschfeld 1995; Mandalaywala et al. 2019; Pauker et al. 2016; Rhodes and Gelman 2009). Evidence on when this develops is mixed depending on the task children are tested with (e.g., Kinzler and Dautel 2012; Gaither et al. 2014; Pauker, Ambady, and Apfelbaum 2010), the component of cognition investigated (e.g., Hirschfeld 1995; Mandalaywala et al. 2019), and the cultural context (e.g., Diesendruck et al. 2013). For example, children exposed to racial outgroups were less likely than those exposed to fewer racial outgroups to view race as a causal group boundary, regardless of their race (Pauker et al. 2016; Mandalaywala et al. 2019; Rhodes and Gelman 2009), suggesting that these processes may develop as a function of children's differential social development. Given that racial minority children are especially likely to experience racial discrimination compared to White children (Brody et al. 2006; Goff et al. 2014), these socialization experiences may lead racial minority children to rely on race as an earlier and stronger delineator of group boundaries and membership than White children.

1.3 | Intentionality in the Context of Identity-Based Groups

Noyes and Dunham (2017) conducted an initial test pertaining to whether children apply mutual intentionality in the context of gender, using a transformation paradigm as a test of children's causal beliefs (e.g., Keil 1992). Specifically, participants were asked whether a target child's gender could change (e.g., a girl transforming to a boy) when mutual intentionality was present and/or when representative group features (e.g., hair) were altered (e.g., "Sarah says she does not want to be a girl, so she decides to put on boys' clothes and hair"). Their results showed that even when mutual intentions were present, children did not endorse categorical change, suggesting that children's strongly essentialized views of gender may override their reliance on intentionality to constitute group membership in a transformation paradigm.

This transformation paradigm is informative of children's causal reasoning regarding children's perception of social category stability: Even under mutual intentions, children do not believe that a highly essentialized group membership, like gender, can *change*. However, more research is needed to understand how this applies to children's attitudes toward gender transformation and transgender identity more broadly (see Gülgöz et al. 2018 as example). Though recent years have seen a rise in children seeking to change their gender assigned at birth (Respaut and Terhune 2022), the majority of children may not encounter frequent instances of gender transformation in their everyday lives. As such, we sought to extend past work on mutual intentionality and strict essentialism (Noyes and Dunham 2017) into a more everyday context that children might often encounter. Specifically, instead of asking children if, for example, Sarah becomes a boy (an essentialist, transformational perspective), here we asked children if Sarah could be in the boys' group. We view this additional question as important firstly to children's everyday experiences (e.g., exclusion), and most obviously marginalized and minoritized children (e.g., girls, Black children) being excluded from majority-only groups (e.g.,

group-based discrimination). Also, however, this could have implications for social progress, specifically can a man join a women's group while marching in a protest? Or, similarly, can a White person join a Black Lives Matter group while protesting? Theoretically, this research may inform how interactive cognitive processes—intentionality versus their emerging understanding identity-based groups—shape how they view and confer social groups. Specifically, knowing children have multiple ways of considering group membership, here we aimed to test how these two processes (intentionality and identity-based group membership) interact to drive children's group perceptions is an important question both practically and theoretically.

Lastly, we note that essentialism is defined only in part by a given social category's stability over time, as was tested using a transformation paradigm. Essentialism also encompasses beliefs that categories reflect real distinctions found in nature (natural kinds), that identity-based groups have strict, discrete boundaries, are homogenous (members share similarities), and have intrinsic causal value (see Rhodes and Mandalaywala 2017 for a review). As such, it might be the case that all children reject cross-identity-group joining (e.g., a girl joining a boy group) even under mutual intentions because children believe that these groups are natural kinds with strict, discrete boundaries. However, it could be that certain children allow cross-identity-group joining under mutual intentions, for example, younger children or gender/race majority children who have not yet realized, learned, or internalized society's delineation of people into identity-based groups. To address these potential hypotheses, here we tested the development of children's conferral of group membership based not only on mutual intentions (or lack thereof) but also identity-based congruence between joiners and groups, specifically gender (girl, boy; Study 1) and race (Black, White; Study 2).

2 | The Present Studies

This research explored whether children ages 3–8 years old confer group membership under a mutual intentionality framework for two identity-based groups: gender and race. We tested this age range because children begin to demonstrate an understanding of identity-based group membership (race and gender) as early as 3 years old (Gelman 2003, 2004) and the strength of these beliefs further crystallizes through childhood (e.g., Davoodi et al. 2020; Diesendruck et al. 2013; Pauker et al. 2016; Rhodes and Gelman 2009).

In Study 1, we tested whether children differentially confer membership of a gender-based group when mutual intentionality is present versus not, as well as if joiner-group genders are congruent versus incongruent. Similarly, Study 2 tested whether racial-ethnic majority and minority children differentially confer joining a race-based group when mutual intentionality is present or not and when joiner-group races were congruent versus incongruent. Note that in Study 1, we used joiner and group labels explicitly referring to gender (i.e., Girls, Boys) whereas in Study 2, we instead used covert labels (e.g., Flurps, Zazzes) that avoided explicitly labeling race (i.e., Blacks, Whites). This was done to avoid issues that might arise from explicitly labeling race (e.g., potentially making parents/families uncomfortable with having their children participate as many parents do not openly discuss

race with their children, see Wu et al. (2022), especially given that some data collection was done using a community collaborator space.

We held several preregistered hypotheses concerning Study 1 (gender) and Study 2 (race), which are listed below. The original preregistration is accessible here (hyperlink), and the transparent changes document is accessible here (hyperlink; see item 3 and item 4, subsection *d* since other parts of this document pertain only to Straka et al. 2021). Lastly, note that although the hypotheses presented below are substantively identical to our preregistered hypotheses, we have merely consolidated the wording here to increase readability.

Hypothesis 1. *Following Noyes and Dunham (2017) who suggested that a mutual intentionality framework applies only to non-essentialized groups—and given that children become increasingly rigid in their thinking about race and gender in middle childhood (e.g., Davoodi et al. 2020; Diesendruck et al. 2013; Pauker et al. 2016; Rhodes and Gelman 2009)—we predicted that children's use of mutual intentionality to confer group membership would decrease with age as older children defer more strongly to identity-based group boundaries.*

Hypothesis 2. *Based on past research on gender differences (e.g., Ruble and Martin 1998; Gelman, Heyman, and Legare 2007) and a minority perspective on cognitive flexibility (e.g., Peterson and Nemeth 1996), we predicted that boys (Study 1) and White children (Study 2) would be more rigid about conferring group joining compared to girls (Study 1) and racial-ethnic minority children (Study 2).*

Hypothesis 3. *When joiners and groups have congruent identities or characteristics (e.g., in Study 1, boy joining a boy group; in Study 2, White character joining a White group), we predicted that conferral of group membership would be higher than for incongruent pairs (e.g., boy joining a girl group, Black character joining a White group). We also explored if certain characters' group membership influences children's conferral of group membership (e.g., are White characters allowed more often to join a Black group vs. Black characters joining a White group?).*

3 | Study 1 (Gender) Method

3.1 | Participants

3.1.1 | Recruitment

Participants were recruited from Spring 2018 to Fall 2021. Prior to COVID-19, participants were recruited in the southeastern US at local science museums, community events, and through a departmental database. Starting Fall of 2020, participants were recruited via online databases (e.g., *Children Helping Science*) and participated via Zoom. Families were compensated a $10 Amazon e-gift card in-lab or via Zoom, or with a small prize (e.g., sticker, per external organization partner preferences). Per our preregistration, participants were excluded from analysis if (i) they did not clearly vocalize at least 50% of their responses ($n = 26$), (ii) they wanted to leave the study ($n = 0$), (iii) their parents interfered by indicating the response their child should give (n

= 0), (iv) the experimenter flagged them as highly distracted or disengaged during the study ($n = 19$), and/or if (v) they were not in the target age range or were missing necessary demographic data (i.e., age, gender; $n = 2$).[1]

3.1.2 | Sample Size Justification

We aimed to recruit 3–8-year-olds consisting of a minimum of 30 girls and 30 boys within each age group (Straka et al. 2021). Given the uncertainty of testing over Zoom during the COVID-19 pandemic and in efforts to keep cell sizes comparable, we oversampled participants recruited via this method, resulting in our final sample size, $N = 448$, which is approximately 37 participants per cell.[2] As final robustness checks given the complexity of our mixed-model design, we also computed model-based semi-parametric bootstrap 95% confidence intervals for the odds ratio of each predictor in our model with $n = 1000$ resampling iterations (reported in Results; Efron 1987).

3.1.3 | Sample Demographics

The final analyzed sample size was 448 participants ages 3–8 years old consisting of 224 girls and 224 boys. The sample was 68.3% White ($n = 306$), 13.4% Multiracial-ethnic ($n = 60$), 7.6% Asian or Asian American ($n = 34$), 5.4% Hispanic/Latine ($n = 24$), 1.6% Black or African American ($n = 7$), 0.7% of an unlisted race-ethnicity ($n = 3$), and 3.1% no race-ethnicity reported ($n = 14$). Participants were approximately evenly distributed across age groups: $n_3 = 69$, $n_4 = 73$, $n_5 = 87$, $n_6 = 80$, $n_7 = 71$, $n_8 = 68$.

3.2 | Design and Procedure

3.2.1 | Stimuli

Cartoon image stimuli (Figure 1) were adapted from previous work (Noyes and Dunham 2017; Straka et al. 2021) to depict a group that consisted of all male or female characters. As the identity group of focus in Study 1 was gender, these stimuli were depicted to not vary in their race (i.e., all characters were depicted as White). Twelve additional individual characters (adapted from the same stimuli) were created to be paired with one of three intention conditions: (i) individual-only– the novel individual wants to join the group but the existing group does not want the individual to join, (ii) group-only– the existing group wants the novel individual to join but the individual does not want to join, and (iii) mutual– both the individual wants to join and the group wants the novel character to join as well. These unique characters were assigned different names and were edited with different hair and clothing.

3.2.2 | Procedure

Using a 4 (Congruence: individual boy joining boy-group, individual boy joining girl-group, individual girl joining girl-group, and individual girl joining boy-group) × 3 (Intentionality: individual-only, group-only, mutual) within-subject design, each participant was presented with 12 conditions in a randomized order. For each of the 12 trials, participants saw one of two gendered groups (a

FIGURE 1 | Study 1 group and joiner stimuli. *Note:* Stimuli of boy and girl groups, and examples of individual characters (joiners).

group of boys or girls) paired with one of two gendered joiners (an individual boy or girl) associated with one of three different intentionality types (individual-only, group-only, mutual). The script used to signal the different intentionality types was adapted from Noyes and Dunham (2017) and Straka et al. (2021).

In each session, one of the two gendered groups was first randomly presented to the participant on the iPad screen and the experimenter would verbally label the group (e.g., "*Look! These kids here are all boys.*"). Next, participants were introduced to a novel individual that represented either a congruent gender match (boy joiner and boy group) or an incongruent gender match to the existing group (boy joiner and girl group), and this character was paired with an intentionality type. Intentionality types and character pairings were randomized across trials. The experimenter acknowledged the new character and stated the intentionality of both the group and the individual (e.g., group-only intentionality: "*Look! This is Eric. The boys want Eric to be in the boys. Eric tells the boys he cannot be in the boys*"). Next, participants were asked "*Is [Solo Character Name] in the [Group Name] or not in the [Group Name]?*" and their verbal response ("yes" or "no") was recorded. If participants did not respond with "yes" or "no" (i.e., no response or "I don't know") the experimenter restated the question with the additional phrase "*Do you think yes or no?*" If the participant did not respond a second time, the experiment left the response blank and continued to the next randomized set. Additionally, participants were asked, "*Can you tell me why you think so?*" and their responses were recorded by the experimenter (see Supporting Appendix B for additional exploratory analyses). This procedure continued until all characters, groups, and intentions were presented for a total of 12 trials per participant. All study stimuli can be accessed on OSF (hyperlink).

4 | Study 1 (Gender) Results

4.1 | Analysis Plan

Study 1 evaluated participants' conferral of group membership as a function of joiner-group intentionality, joiner-group gender congruence, participant age, and participant gender. As preregistered, this evaluation was conducted by testing a binary logistic

regression model (Bates et al. 2023) in R version 4.3.1 (R Core Team 2023).

Given that previous research found no significant difference in levels of group conferral between non-mutual intentionality types (i.e., individual- vs. group-only; Straka et al. 2021), we first tested whether means between non-mutual intentionality types significantly differed in the present study. Additionally, as preregistered, we tested whether the means between the two gender congruent levels (boy-to-boys, girl-to-girls), as well as the means between the two gender incongruent levels (boy-to-girls, girl-to-boys), were significantly different, as well as if participant gender affected these results. Results revealed no significant differences, ps > 0.226 (Supporting Appendix A, Figure S1), suggesting that none of the aforementioned differences significantly influenced our dependent measure. To simplify our analyses, we thus combined the two non-mutual intentionality conditions into one "Non-mutual Intentions" condition, the two gender-congruent conditions into one "Congruent" condition, and the two gender-incongruent conditions into one "Incongruent" condition.

Next, we fit the binary mixed effect logistic regression model predicting group membership conferral ("*Is [Solo Character Name] in the [Group Name] or not in the [Group Name]?*": no = 0, yes = 1) from the interaction between participant age (continuous, between-subjects), participant gender (categorical, between-subjects: 0 = girl, 1 = boy), joiner-group intentionality (categorical, within-subjects: 0 = non-mutual, 1 = mutual), and joiner-group gender congruence (categorical, within-subjects: 0 = incongruent, 1 = congruent) with a random intercept for participant. All predictor variables were mean-centered prior to analysis for ease of interpretation. Finally, as mentioned, semi-parametric bootstrap confidence intervals of the odds ratios were computed to assist in determining meaningfully significant predictors. Data and R code are available on OSF.

4.2 | Model Results

Full model results are presented in Table S1, and below we discuss the three two-way interactions that were statistically significant. Note that all significant main effects were qualified by these two-way interactions, so they will not be discussed separately. For
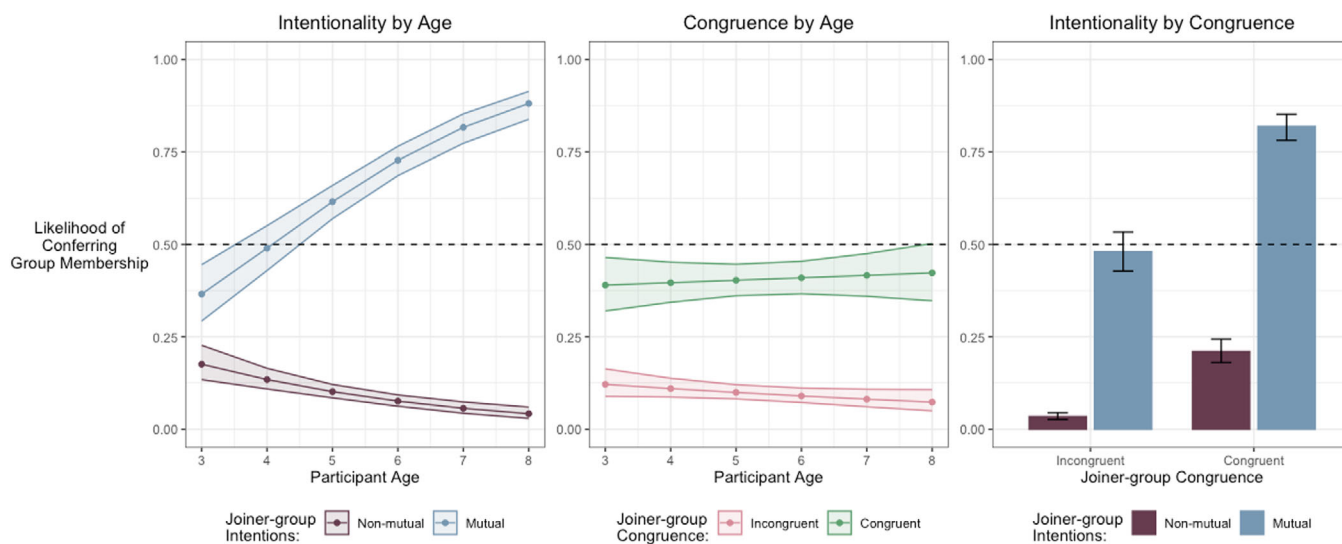
FIGURE 2 | Likelihood of conferring group membership as a function of significant interactions in Study 1 (gender stimuli). *Note:* Significant ($p < 0.05$) interactions from Study 1 are presented: intentionality by age (left), congruence by age (middle), and intentionality by congruence (right). Plotted values represent predicted values, and error regions/bars represent 95% confidence intervals. Dashed lines are included to facilitate comparisons to chance (= 0.50).

interactions including age, follow-up analyses are located in the Tables S2 and S3.

4.2.1 | Intentionality by Age Interaction

There was a significant two-way interaction between intentionality and participant age, $b = 0.83$, SE = 0.06, OR = 2.28, 95% CI (2.05, 2.60), $p < 0.001$ (Figure 2, left), indicating that older participants were more likely than younger participants to confer group membership on the basis of intentionality—that is, when joiner-group intentions were mutual versus when they were non-mutual. More specifically, participants were 1.67 times more likely with each additional year in age to confer group membership under mutual intentions, $b = 0.51$, SE = 0.06, OR = 1.67, $p < 0.001$, and 1.37 times less likely to confer group membership under non-mutual intentions, $b = -0.31$, SE = 0.06, OR = 0.73, $p < 0.001$. Put differently, the effect of intentionality on group membership conferral was much stronger among older participants than younger participants. For example, at 3 years old, participants were 2.75 times more likely to confer group membership under mutual intentions versus non-mutual; by age 8, this likelihood strongly increases, with participants being 170.32 times more likely to do so. This full set of pairwise comparisons by age is presented in Table S2.

4.2.2 | Congruence by Age Interaction

There was also a significant two-way interaction between joiner-group gender congruence and participant age, $b = 0.13$, SE = 0.06, OR = 1.14, 95% CI (1.02, 1.27), $p = 0.022$ (Figure 2, middle), suggesting that older participants were more likely than younger participants to confer group membership on the basis of gender congruence—that is when joiner-group genders were congruent (e.g., boy joining a boy group) versus when they were incongruent (e.g., boy joining a girl group). For example, at 3

years old, participants were 4.71 times more likely to confer group membership under mutual intentions versus non-mutual; by age 8, this likelihood increases, with children being 8.01 times more likely to do so. It appears, then, that although children of all ages confer group membership on the basis of gender congruence, this effect strengthens slightly with age (although to a lesser extent compared to children's use of intentionality cues). The full set of pairwise comparisons by age is presented in Table S3.

4.2.3 | Intentionality by Congruence Interaction

Lastly, there was a significant two-way interaction between intentionality and congruence, $b = -0.44$, SE = 0.18, OR = 0.64, 95% CI (0.45, 0.92), $p = 0.014$ (Figure 2, right). Probing this interaction, when joiner-group genders were incongruent, there was a stronger effect of intentionality, $b = 3.28$, SE = 0.15, OR = 26.6, $p < 0.001$, compared to when joiner-group genders were congruent, $b = 2.84$, SE = 0.13, OR = 17.1, $p < 0.001$. This difference may indicate that when participants encountered conflicting identity-based information (e.g., a boy joining a girl group), they may have relied more strongly on intentionality cues (versus when identity-based information about joining was more straightforward, e.g., a boy joining a boy group).

5 | Study 2 (Race) Method

Study 2 followed the same method as Study 1, but instead of varying the gender of the joiner and group, we varied joiner and group race (Black, White) depicted through skin color as the salient characteristics. As such, instead of testing participant gender, we tested participant race-ethnicity (minoritized race vs. majority race [White]). In an effort to be inclusive toward our available community sample and to reach our targeted sample size during the COVID-19 pandemic, we expanded our original preregistration plan to include other racially minoritized children in addition to Black children.

FIGURE 3 | Study 2 group and joiner stimuli. *Note:* Stimuli of Black (Zaz) and White (Flurp) groups, and example of individual characters (joiners).

5.1 | Participants

5.1.1 | Recruitment

Participants were recruited via the same method as Study 1 over approximately the same time period. Per our preregistration, participants were excluded from analysis if (i) they did not clearly vocalize at least 50% of their responses ($n = 23$), (ii) they wanted to leave the study ($n = 0$), (iii) their parents interfered ($n = 0$), (iv) the experimenter flagged them as highly distracted or disengaged during the study ($n = 11$), and/or if (v) they were not in the target age range or were missing necessary demographic data (i.e., age, race; $n = 17$).

5.1.2 | Sample Size Justification

Like Study 1, we aimed to recruit 3–8-year-olds consisting of a minimum of 30 racial-ethnic minority and 30 racial-ethnic majority children within each age group (e.g., see transparent changes document). Again, given the uncertainty of testing over Zoom during the COVID-19 pandemic and in efforts to keep cell sizes comparable, we oversampled participants recruited via this method, resulting in our final sample size, $N = 433$, which is approximately 36 participants per cell. Lastly, semi-parametric bootstrap 95% confidence intervals were again calculated for the odds ratio of each predictor.

5.1.3 | Sample Demographics

The final analyzed sample size was 433 participants ages 3–8 years old consisting of 225 girls, 207 boys, and 1 non-binary child. The sample was 51.2% monoracial White ($n = 225$) and 48.2% racial-ethnic minority ($n = 208$), of which 16.6% (of the total sample) were identified by their parents as Black or African American ($n = 72$), 6.0% as Asian or Asian American ($n = 26$), 5.1% as Hispanic/Latino/a/e ($n = 22$), 18.2% as multiracial ($n = 78$), and 2.3% of an unlisted race-ethnicity ($n = 10$). Participants were evenly distributed across age: $n_3 = 72$, $n_4 = 71$, $n_5 = 70$, $n_6 = 69$, $n_7 = 72$, and $n_8 = 79$.

5.2 | Stimuli

Cartoon image stimuli (Figure 3) were adapted from previous work to depict a group that consisted of either all Black or all White characters based on skin tone as a defining characteristic and one that is saliently recognized by children (Rhodes and Brickman 2011; Rhodes and Chalik 2013; Noyes and Dunham 2017; Straka et al. 2021). These groups were referred to as either "the Flurps" or "the Zazzes." Made-up group names were chosen to reference the racial groups to avoid ethical concerns over explicit labels, such as referring to characters as "Blacks" and teaching children to race words that their parents might not have taught them yet. Similarly, although joiners were depicted as Black and White characters, they were referred to by name only (e.g., "Will"). As the social group of focus in Study 2 was race, these stimuli were depicted to not vary in their gender; all characters were depicted as male. The procedure for presenting these joiner-group pairs was identical to Study 1, resulting in 12 trials per participant. All study stimuli can be accessed on OSF (hyperlink).

6 | Study 2 (Race) Results

6.1 | Analysis Plan

Study 2 followed the same analytic strategy as Study 1 with the following changes. Instead of manipulating joiner and group gender, here we manipulated joiner race (Black, White) and group race (Black, White). Also, instead of testing participant gender, here our analyses tested participant race-ethnicity (majority race [White], minoritized race).

As in Study 1, we first tested whether means between non-mutual intentionality types significantly differed in the present study. Additionally, as preregistered, we tested whether the means between the two race congruent levels (Black character joining a Black group, White character joining a White group) and race incongruent levels (Black character joining a White group, White character joining a Black group) were significantly different, as well as if participant race-ethnicity affected these results. Results revealed no significant differences, $ps > 0.206$
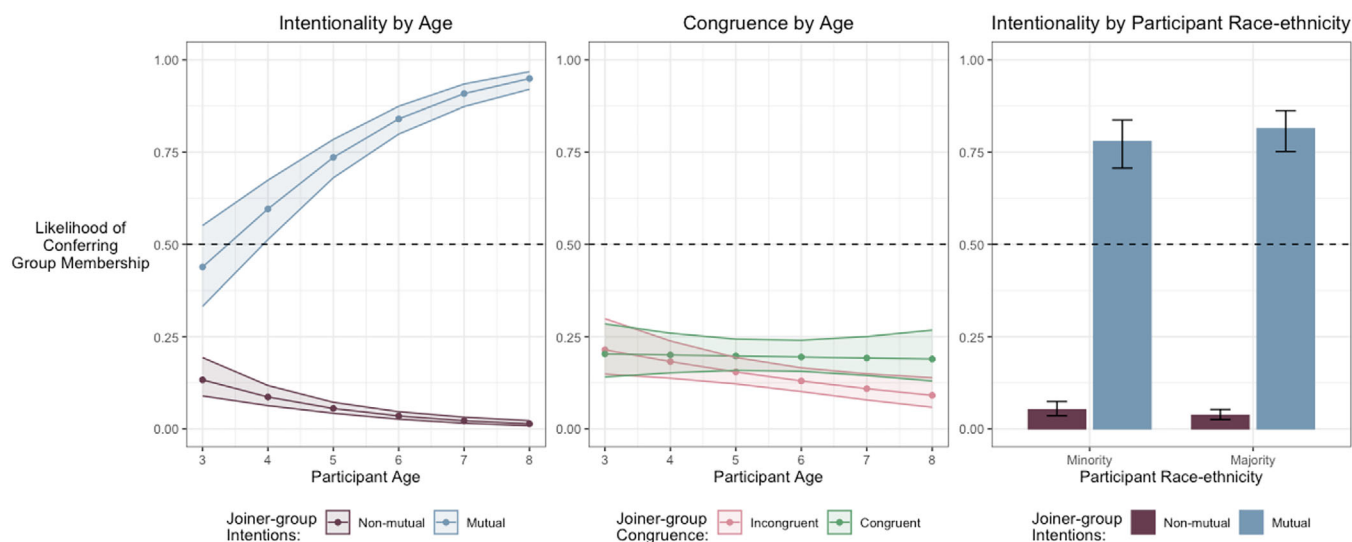
FIGURE 4 | Likelihood of conferring group membership as a function of significant interactions in Study 2 (race stimuli). *Note:* Significant ($p < 0.05$) interactions from Study 2 are presented: intentionality by age (left), congruence by age (middle), and intentionality by race (right). Plotted values represent predicted values and error regions/bars represent 95% confidence intervals. Dashed lines are included to facilitate comparisons to chance (= 0.50).

(Supporting Appendix A, Figure S1), suggesting that none of the aforementioned differences significantly influenced our dependent measure. To again simplify our analyses, we combined the two non-mutual intentionality conditions into one "Non-mutual Intentions" condition, the two race-congruent conditions into one "Congruent" condition, and the two race-incongruent conditions into one "Incongruent" condition.

Next, we fit the binary mixed effect logistic regression model predicting group membership conferral from the interaction between participant age (continuous, between-subjects), participant race-ethnicity (categorical, between-subjects: 0 = minoritized, 1 = majority/White), joiner-group intentionality (categorical, within-subjects: 0 = non-mutual, 1 = mutual), and joiner-group gender congruence (categorical, within-subjects: 0 = incongruent, 1 = congruent) with a random intercept for participant. All predictor variables were again mean-centered prior to analysis, and semi-parametric bootstrap 95% confidence intervals of the odds ratios were again calculated. Data and R code are available on OSF.

6.2 | Model Results

Full model results are presented in Table S4, and here we discuss the three significant two-way interactions that again qualified all significant main effects. Results from pairwise comparisons including age-related interactions are in Tables S5 and S6.

6.2.1 | Intentionality by Age Interaction

This interaction replicates the same effect found in Study 1. There was a significant two-way interaction between intentionality and participant age, $b = 1.12$, SE $= 0.07$, OR $= 3.06$, 95% CI (2.64, 3.61), $p < 0.001$ (Figure 4, left), indicating that older participants again were more likely than younger participants to confer

group membership on the basis of intentionality—that is, when joiner-group intentions were mutual versus when they were non-mutual. Here, participants were 1.89 times more likely with each additional year in age to confer group membership under mutual intentions, $b = 0.64$, SE $= 0.08$, OR $= 1.89$, $p < 0.001$, and 1.61 times less likely to confer group membership under non-mutual intentions, $b = -0.48$, SE $= 0.08$, OR $= 0.62$, $p < 0.001$. As such, the effect of intentionality on membership conferral was again much stronger among older participants than younger participants. At 3 years old, for example, participants were 5.00 times more likely to confer group membership under mutual intentions versus non-mutual; by age 8, this likelihood dramatically increased, with children being 1359.54 times more likely to do so. This full set of pairwise comparisons by age is presented in Table S5.

6.2.2 | Congruence by Age Interaction

As in Study 1, there was also a significant two-way interaction between age and congruence, $b = 0.18$, SE $= 0.06$, OR $= 1.20$, 95% CI (1.06, 1.33), $p = 0.002$ (Figure 4, middle). Diverging from Study 1—where we found that participants conferred group membership more readily under gender congruence, regardless of their age—here, that was not the case. Among our youngest participants (3- and 4-year-olds), joiner-group racial congruence did *not* predict group membership conferral, ps > 0.45 (Table S6). Only at age 5 and older did racial congruence matter in participants' conferral of group membership, ps < 0.005, an effect that also strengthened with age. For example, 5-year-olds were 1.33 times as likely to confer group membership when joiner-group races were congruent (compared to incongruent), whereas 8-year-olds were 2.38 times as likely to do so. This is in line with past work citing that children's gender knowledge and essentialized thinking develop somewhat earlier than their racial knowledge and racial essentialism (Rhodes and Mandalaywala 2019).

Of note, this developmental trend was driven by participants' denial of membership conferral under incongruent conditions

(e.g., Black character joining a White group), $b = -0.20$, SE $= 0.08$, OR $= 0.81$, $p = 0.009$, such that with each year in age, participants were 1.24 times less likely to confer membership when joiner-group pairs were incongruent. Conversely, across age, there was no change in participants' likelihood to confer group membership when joiner-group pairs were congruent (e.g., Black character joining a Black group; $p = 0.812$). Altogether, these results show that participants began to discern group membership conferral from race at age 5, this strengthened with age and was driven by their tendency to *deny* group membership when joiner-group pairs were racially *incongruent*.

6.2.3 | Intentionality by Race Interaction

Lastly, there was a significant interaction between intentionality and participant race-ethnicity, $b = 0.58$, SE $= 0.25$, OR $= 1.78$, 95% CI (1.06, 3.01), $p = 0.020$ (Figure 4, right). Probing this interaction, we found that although racial-ethnic minority and majority (White) participants both relied on mutual intentionality to confer group membership, this effect was stronger for majority participants ($b = 4.75$, SE $= 0.19$, OR $= 115.6$, $p < 0.001$) than minority participants ($b = 4.17$, SE $= 0.19$, OR $= 64.9$, $p < 0.001$), which may indicate that majority/White participants in our sample relied more strongly on intentionality cues to confer group membership than racial-ethnic minority children.

7 | Integrative Data Analysis (IDA)

Lastly, we conducted an IDA of Studies 1 and 2. IDA is a statistical method that allows for the simultaneous analysis of multiple data sets when the method and design between studies are very similar, as in the present research (Curran and Hussong 2009). We conducted this exploratory (i.e., not preregistered) analysis to explore similarities and differences between Studies 1 and 2 that may have important implications for children's reasoning about group membership in the context of intentionality based on different identity-based groups (i.e., gender vs. race).

7.1 | Analysis Plan and Model Results

To conduct this IDA, we merged the datasets from Studies 1 and 2 into one dataset, $N = 881$, and added a variable indicating the original study. We again tested a binomial logistic regression model, predicting conferral of group membership from age, intentionality, congruence, and, newly, study version (between-subjects; Study 1 or Study 2). Predictors were again mean-centered, and full model results are presented in Table S7. Semi-parametric bootstrap 95% confidence intervals are again calculated. We focus on three significant interactions (one three-way, two two-way) that qualified all significant lower-order effects.

7.1.1 | Intentionality by Age by Study Interaction

There was a significant three-way interaction between intentionality, participant age, and study, $b = 0.21$, SE $= 0.09$, OR $= 1.23$, 95% CI (1.02 – 1.44), $p = 0.021$ (Figure 5, top). To probe this interaction, we tested for the effect of study in the non-mutual and mutual

intentionality conditions by age (Table S8). Among 3-year-olds, there was no difference between the studies in either the mutual or non-mutual conditions (ps > 0.130). That is, 3-year-olds relied on a mutual intentionality framework similarly in both studies to confer group membership. Among 4-year-olds, the study still did not predict group membership conferral in the non-mutual condition ($p = 0.380$), yet it did positively predict group conferral in the mutual condition ($b = 0.46$, SE $= 0.21$, OR $= 1.59$, $p = 0.024$). That is, under mutual intentions, 4-year-olds in Study 2 (race) were more likely than those in Study 1 (gender) to confer group membership. By age 5, the study predicted group membership conferral in both intentionality conditions (ps < 0.040). That is, 5-year-olds in Study 2 (race) were more likely than 5-year-olds in Study 1 (gender) to confer group membership under mutual conditions and less likely to do so under non-mutual conditions. This effect strengthened with age (see Table S8), suggesting that starting at age 5, older participants in Study 2 (race) relied more strongly on intentionality cues to confer group membership than older participants in Study 1 (gender) than younger participants in both studies.

7.1.2 | Congruence by Study Interaction

There was a significant interaction between congruence and study, $b = -1.60$, SE $= 0.14$, OR $= 0.20$, 95% CI (0.15, 0.26), $p < 0.001$ (Figure 5, lower left), suggesting that participants reliance on identity-based congruence cues varied by study. Specifically, pairwise comparisons revealed that the study significantly predicted group membership conferral in both congruence conditions: positively when joiner-group pairs were incongruent ($b = 0.84$, SE $= 0.16$, OR $= 2.31$, $p < 0.001$) and negatively when joiner-group pairs were congruent ($b = -0.71$, SE $= 0.15$, OR $= 0.49$, $p < 0.001$). That is, participants in Study 1 (gender) were *less* likely to confer group membership under incongruent conditions as well as *more* likely to confer group membership under congruent conditions compared to Study 2 (race). This suggests that participants in Study 1 relied more strongly on gender congruence cues than participants in Study 2 relied on race congruence cues to confer group membership.

7.1.3 | Congruence by Age Interaction

Lastly, there was a significant interaction between congruence and participant age, $b = 0.16$, SE $= 0.04$, OR $= 1.18$, 95% CI (1.08, 1.27), $p < 0.001$ (Figure 5, lower right), suggesting that—regardless of study (i.e., identity type)—older participants were more likely to rely on identity-based congruence cues than younger participants. The lack of a significant interaction with "study" variable, here, indicates that although participants in Study 1 (gender) relied more strongly on congruence cues than those in Study 2 (race), the patterns across age were similar. In both studies, participants were decreasingly likely, with age, to confer group membership when joiner-group identities were incongruent, $b = -0.15$, SE $= 0.05$, OR $= 0.86$, $p = 0.002$—with no age-related change under identity congruence, $p = 0.916$. The full set of pairwise comparisons by age is presented in Table S9.
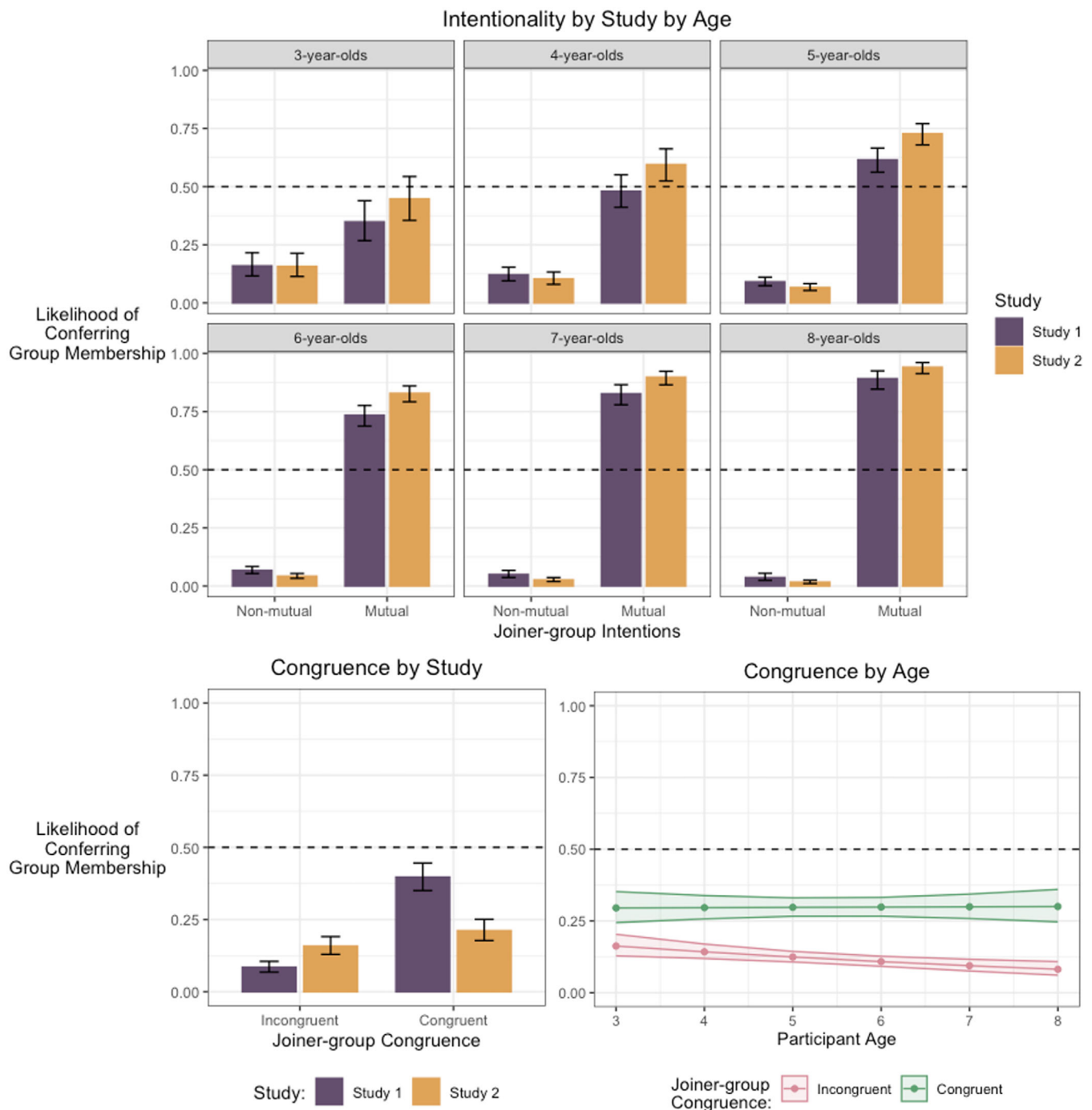
FIGURE 5 | Likelihood of conferring group membership as a function of significant interactions in the IDA. *Note:* Significant ($p < 0.05$) interactions from the IDA are presented: intentionality by study by age (top), congruence by study (lower left), and congruence by age (lower right). Plotted values represent predicted values and error regions/bars represent 95% confidence intervals. Dashed lines are included to facilitate comparisons to chance (= 0.50). IDA indicates integrative data analysis.

8 | General Discussion

The present work tested how children understand group membership based on their emerging use of a mutual intentionality framework in the context of two identity-based groups: gender (Study 1) and race (Study 2). Given that children become more rigid in their thinking about gender and race across middle childhood (e.g., Davoodi et al. 2020; Diesendruck et al. 2013; Pauker et al. 2016; Rhodes and Gelman 2009) and previous

research suggesting that a mutual intentionality framework may not apply to essentialized groups (Noyes and Dunham 2017), we hypothesized (H1) that children's use of mutual intentionality to confer group membership would decrease with age as children instead rely on identity-based group cues. Instead, in both studies, we found that participants as young as 3 years old were more likely to rely on mutual intentions to confer group membership and that this effect strengthened with age (replicating Straka et al. 2021). Regarding our other hypotheses:

Hypothesis 2. *Although we hypothesized that boys and possibly White children would be less likely to confer group joining than girls and racial-ethnic minority children, these hypotheses were unsupported.*

Hypothesis 3. *We hypothesized when joiners and groups have congruent identities (e.g., a boy joining a boy group), children would be more likely to confer group membership compared to incongruent pairings. This hypothesis was supported in both studies. However, our exploratory hypotheses that children might allow more joining for boys and White characters compared to girls and racial-ethnic minority characters were unsupported.*

8.1 | Theoretical Implications

We contend that—even when considering identity-based group boundaries pertaining to gender and race—young children rely on a mutual intentionality framework to confer group membership. In the present work, we relied on a boundary-based, nominal groups paradigm rather than a transformation paradigm (Noyes and Dunham 2017). This suggests that at least pertaining to identity-based group boundaries without transformation as an option to join, children rely on intentionality-based cues to confer group membership. More specifically, the results from Study 1, Study 2, and the IDA suggest that although children were relying on identity-based cues to confer group membership (more so for cross-gender joining than cross-race joining), this congruence process did not thwart their allowance of cross-group joining under mutual intentions. Specifically, as young as 3 years old, children demonstrate a bias against cross-gender joining but do not demonstrate a similar bias against cross-race joining until 5 years old. This finding aligns with past work showing that, during this developmental period, gender is an earlier and more rigidly endorsed group boundary than race (e.g., Rhodes and Mandalaywala 2019) and that children's reliance on race cues such as skin tone as used in the present study does not come "online" until later than gender cues.

Examining the two processes simultaneously, our IDA results suggest a tradeoff in children's reliance on intentionality versus identity-based cues to confer group membership. We found that children deferred more strongly—and from a younger age—to gender cues compared to race cues. Contrary to our hypothesis, when these cues came online, children did not disavow mutual intentions. Yet when children's reliance on identity-based cues was more present (as in Study 1), they relied less strongly on intentionality cues compared to when identity-based cues were less salient (as in Study 2). As such, it may be the case that when identity-based cues are more accessible to children, they rely less strongly on intentionality cues. Again, this pattern across studies suggests a cognitive tradeoff in how children confer group membership, deferring more strongly to intentionality cues until their reliance on identity-based cues emerges in development.

8.2 | Practical Implications

Although often taken for granted in everyday life, making sense of social groups is a complex social phenomenon with implications mitigating of real-world, group-based phenomena such as out-grouping, ostracism, discrimination, and prejudice. Under what conditions do young children allow for cross-identity-group joining, what might affect these processes (e.g., the presence of mutual intentions), and how do these patterns develop with age? Practically, our results are both hopeful and concerning. On the one hand, children's increasing use of mutual intentions with age suggests that the mere agreement between a joiner and group confers group membership and belonging—thus, signaling an egalitarian pathway toward inclusion. Yet, social groups, particularly identity-based groups, are deeply embedded in our social worlds and cognition. Our findings suggest that as children age, they develop group-based thinking about gender and race, which may challenge their application of the more egalitarian intentionality framework to confer group membership. This data also further supports the fact that as children develop, they have multiple ways of considering group membership. Theories such as developmental intergroup theory have proposed that intergroup harmony may be fostered by mitigating the early development of children's essentialist thinking (Bigler and Liben 2007). Here, we have shown that children also rely on mutual intentions in their intergroup thinking, even in the context of identity-based groups. This suggests that one possible pathway toward promoting intergroup harmony could be promoting children's reliance on intentionally cues whilst dissuading them from relying exclusively on identity-based cues to determine group membership (i.e., intervention to promote these processes).

8.3 | Limitations and Future Directions

As with any experimental research on abstract concepts, there are limitations to the present research. One possible limitation was our use of the explicit group label for gender (i.e., "boy" and "girl") but not for racial groups (i.e., "Zaz" and "Flurp" used instead of "White" and "Black" group). As mentioned, made-up group names were chosen for the racial group to avoid ethical concerns over labeling, such as referring to characters as "Blacks" and teaching children race words they might not have learned yet. Meanwhile, this design choice allowed these studies to reflect the real-world context in which these labels are often used, wherein gender labels are utilized explicitly, compared to racial labels. Based on past research showing that race essentialism develops later in development than gender essentialism (e.g., Pauker et al. 2016), we contend that the differences we observed were because children are later to develop racial than gender rigidity. Still, a fruitful area of research would be to test how explicit versus implicit labeling of identity-based groups affects children's perceptions of group membership, inclusion, stereotyping, and discrimination—a question central to Bigler and Liben (2007)'s aforementioned developmental intergroup theory.

In the current research, gender and race were tested separately. As such, future research is necessary to explore how target intersectionality influences children's understanding of group membership. Further, the current study included only two gender groups (male and female) and two racial groups (Black and White) as stimuli, and the sample of Black children was relatively small, limiting the generalizability of these results. It remains unclear whether the mutual intentionality framework would be applied broadly across other gender and racial groups. Finally, the present study relied on explicit verbal expression of mutual

intentionality and children's explicit verbal expression of conferring group membership. Future research is needed to explore how group-joining intentionality may be more subtly expressed and affirmed—for example, using a resource allocation or seating distance task.

9 | Conclusion

The present tested whether children rely on mutual intentions to confer group membership in the context of identity-based group boundaries (here, gender and race). Results revealed that as young as 3 years old, children distinguish between mutual and non-mutual intentionality—even when they also relied on gender- and race-based cues—such that they are more likely to confer group membership to a joiner when mutual intentionality is present. This effect strengthened significantly with age, although children were less reliant on intentionality cues when identity-based cues were more salient (i.e., when considering gender compared to race-ethnic identity cues). Our research thus reveals an interesting cognitive process, whereby children interactively rely on intentionality- and identity-based cues in a "tradeoff" manner to determine who can (and cannot) be a member of a group.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Preregistration, transparent changes, study materials, data, and R code are available on Open Science Framework (https://osf.io/zg2se/).

Endnotes

[1] Here and in Study 2, an additional analysis was conducted to determine if the onset of the COVID-19 pandemic influenced responses. This variable (onset) was included as a covariate but did not significantly influence our results. Moreover, as a robustness check against potential researcher subjectivity, we ran analyses including children who were deemed as distracted; again, the results of these analyses were the same as those presented in-text.

[2] We also conducted analyses using only the first 30 boys and girls initially collected in Studies 1 and 2. The effects are present in the smaller sample but stronger and clearer with the larger sample, so we retained the full collected sample. For brevity, analyses pertaining to COVID-19, distracted children, and the smaller initial sample are not included in the manuscript or supplemental material but are readily available upon request.

References

Bates, D., M. Maechler, B. Bolker, et al. 2023. *lme4: Linear Mixed-Effects Models Using "Eigen" and S4 (1.1-35.1)* [Computer software].

Bigler, R. S., and L. S. Liben. 2007. "Developmental Intergroup Theory: Explaining and Reducing Children's Social Stereotyping and Prejudice." *Current Directions in Psychological Science* 16, no. 3: 162–166. https://doi.org/10.1111/j.1467-8721.2007.00496.x.

Birnbaum, D., I. Deeb, G. Segall, A. Ben-Eliyahu, and G. Diesendruck. 2010. "The Development of Social Essentialism: The Case of Israeli Children's Inferences About Jews and Arabs." *Child Development* 81, no. 3: 757–777. https://doi.org/10.1111/j.1467-8624.2010.01432.x.

Brody, G. H., Y.-F. Chen, V. M. Murry, et al. 2006. "Perceived Discrimination and the Adjustment of African American Youths: A Five-Year Longitudinal Analysis With Contextual Moderation Effects." *Child Development* 77, no. 5: 1170–1189. https://doi.org/10.1111/j.1467-8624.2006.00927.x.

Campbell, A., L. Shirley, and L. Caygill. 2002. "Sex-Typed Preferences in Three Domains: Do Two-Year-Olds Need Cognitive Variables?." *British Journal of Psychology (London, England: 1953)* 93, no. Pt 2: 203–217. https://doi.org/10.1348/000712602162544.

Chalik, L., S.-J. Leslie, and M. Rhodes. 2017. "Cultural Context Shapes Essentialist Beliefs About Religion." *Developmental Psychology* 53, no. 6: 1178–1187. https://doi.org/10.1037/dev0000301.

Curran, P. J., and A. M. Hussong. 2009. "Integrative Data Analysis: The Simultaneous Analysis of Multiple Data Sets." *Psychological Methods* 14, no. 2: 81–100. https://doi.org/10.1037/a0015914.

Davoodi, T., G. Soley, P. L. Harris, and P. R. Blake. 2020. "Essentialization of Social Categories Across Development in Two Cultures." *Child Development* 91, no. 1: 289–306. https://doi.org/10.1111/cdev.13209.

del Río, M. F., and K. Strasser. 2011. "Chilean Children's Essentialist Reasoning About Poverty." *British Journal of Developmental Psychology* 29, no. 4: 722–743. https://doi.org/10.1348/2044-835X.002005.

Diesendruck, G., R. Goldfein, M. Rhodes, S. Gelman, and N. Neumark. 2013. "Cross-Cultural Differences in Children's Beliefs About the Objectivity of Social Categories." *Child Development* 84, no. 6: 1906–1917. https://doi.org/10.1111/cdev.12108.

Diesendruck, G., and H. HaLevi. 2006. "The Role of Language, Appearance, and Culture in Children's Social Category-Based Induction." *Child Development* 77, no. 3: 539–553. https://doi.org/10.1111/j.1467-8624.2006.00889.x.

Efron, B. 1987. "Better Bootstrap Confidence Intervals." *Journal of the American Statistical Association* 82, no. 397: 171–185. https://doi.org/10.2307/2289144.

Gaither, S. E., J. R. Schultz, K. Pauker, S. R. Sommers, K. B. Maddox, and N. Ambady. 2014. "Essentialist Thinking Predicts Decrements in Children's Memory for Racially Ambiguous Faces." *Developmental Psychology* 50, no. 2: 482–488. https://doi.org/10.1037/a0033493.

Gelman, S. 2004. "Psychological Essentialism in Children." *Trends in Cognitive Sciences* 8, no. 9: 404–409. https://doi.org/10.1016/j.tics.2004.07.001.

Gelman, S. A. 2003. *The Essential Child: Origins of Essentialism in Everyday Thought*, x,382. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195154061.001.0001.

Gelman, S. A., G. D. Heyman, and C. H. Legare. 2007. "Developmental Changes in the Coherence of Essentialist Beliefs About Psychological Characteristics." *Child Development* 78, no. 3: 757–774. https://doi.org/10.1111/j.1467-8624.2007.01031.x.

Gelman, S. A., M. G. Taylor, S. P. Nguyen, C. Leaper, and R. S. Bigler. 2004. "Mother-Child Conversations About Gender: Understanding the Acquisition of Essentialist Beliefs." *Monographs of the Society for Research in Child Development* 69, no. 1: i142.

Goff, P. A., M. C. Jackson, B. A. L. Di Leone, C. M. Culotta, and N. A. DiTomasso. 2014. "The Essence of Innocence: Consequences of Dehumanizing Black Children." *Journal of Personality and Social Psychology* 106, no. 4: 526–545. https://doi.org/10.1037/a0035663.

Gülgöz, S., E. M. Gomez, M. R. DeMeules, and K. R. Olson. 2018. "Children's Evaluation and Categorization of Transgender Children." *Journal of Cognition and Development* 19, no. 4: 325–344. https://doi.org/10.1080/15248372.2018.1498338.

Hirschfeld, L. A. 1995. "Do Children Have a Theory of Race?." *Cognition* 54: 209–252.

Hirschfeld, L. A. 1996. *Race in the Making: Cognition, Culture, and the Child's Construction of Human Kinds*. The MIT Press. https://mitpress.mit.edu/books/race-making.

Hussak, L. J., and A. Cimpian. 2019. "It Feels Like It's in Your Body": How Children in the United States Think About Nationality." *Journal of Experimental Psychology: General* 148, no. 7: 1153–1168. https://doi.org/10.1037/xge0000567.

Kalish, C. W., and C. A. Lawson. 2008. "Development of Social Category Representations: Early Appreciation of Roles and Deontic Relations." *Child Development* 79, no. 3: 577–593.

Kelly, D. J., S. Liu, K. Lee, et al. 2009. "Development of the Other-Race Effect During Infancy: Evidence Toward Universality?." *Journal of Experimental Child Psychology* 104, no. 1: 105–114. https://doi.org/10.1016/j.jecp.2009.01.006.

Kinzler, K. D., and J. B. Dautel. 2012. "Children's Essentialist Reasoning About Language and Race." *Developmental Science* 15, no. 1: 131–138. https://doi.org/10.1111/j.1467-7687.2011.01101.x.

Mandalaywala, T. M., G. Ranger-Murdock, D. M. Amodio, and M. Rhodes. 2019. "The Nature and Consequences of Essentialist Beliefs about Race in Early Childhood." *Child Development* 90, no. 4: e437–e453. https://doi.org/10.1111/cdev.13008.

Noyes, A., and Y. Dunham. 2017. "Mutual Intentions as a Causal Framework for Social Groups." *Cognition* 162: 133–142. https://doi.org/10.1016/j.cognition.2017.02.007.

Pauker, K., N. Ambady, and E. P. Apfelbaum. 2010. "Race Salience and Essentialist Thinking in Racial Stereotype Development." *Child Development* 81, no. 6: 1799–1813. https://doi.org/10.1111/j.1467-8624.2010.01511.x.

Pauker, K., Y. Xu, A. Williams, and A. M. Biddle. 2016. "Race Essentialism and Social Contextual Differences in Children's Racial Stereotyping." *Child Development* 87, no. 5: 1409–1422. https://doi.org/10.1111/cdev.12592.

Peterson, R. S., and C. J. Nemeth. 1996. "Focus Versus Flexibility Majority and Minority Influence Can Both Improve Performance." *Personality and Social Psychology Bulletin* 22, no. 1: 14–23. https://doi.org/10.1177/0146167296221002.

Plötner, M., H. Over, M. Carpenter, and M. Tomasello. 2016. "What Is a Group? Young Children's Perceptions of Different Types of Groups and Group Entitativity." *PLoS ONE* 11, no. 3: e0152001. https://doi.org/10.1371/journal.pone.0152001.

Quinn, P. C., J. Yahr, A. Kuhn, A. M. Slater, and O. Pascalis. 2002. "Representation of the Gender of Human Faces by Infants: A Preference for Female." *Perception* 31, no. 9: 1109–1121. https://doi.org/10.1068/p3331.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing* [Computer software].

Respaut, R., and C. Terhune. 2022, October 6. Number of Transgender Children Seeking Treatment Surges in U.S. *Reuters*. https://www.reuters.com/investigates/special-report/usa-transyouth-data/.

Rhodes, M. 2012. "Naïve Theories of Social Groups." *Child Development* 83, no. 6: 1900–1916. https://doi.org/10.1111/j.1467-8624.2012.01835.x.

Rhodes, M., and L. Chalik. 2013. "Social Categories as Markers of Intrinsic Interpersonal Obligations." *Psychological Science* 24, no. 6: 999–1006. https://doi.org/10.1177/0956797612466267.

Rhodes, M., and S. A. Gelman. 2009. "A Developmental Examination of the Conceptual Structure of Animal, Artifact, and human Social Categories Across Two Cultural Contexts." *Cognitive Psychology* 59, no. 3: 244–274. https://doi.org/10.1016/j.cogpsych.2009.05.001.

Rhodes, M., S. A. Gelman, and J. C. Karuza. 2014. "Preschool Ontology: The Role of Beliefs About Category Boundaries in Early Categorization." *Journal of Cognition and Development: Official Journal of the Cognitive Development Society* 15, no. 1: 78–93. https://doi.org/10.1080/15248372.2012.713875.

Rhodes, M., and T. M. Mandalaywala. 2017. "The Development and Developmental Consequences of Social Essentialism." *WIREs Cognitive Science* 8, no. 4: e1437. https://doi.org/10.1002/wcs.1437.

Rhodes, M., and K. Moty. 2020. "What Is Social Essentialism and How Does It Develop?." *Advances in Child Development and Behavior* 59: 1–30. https://doi.org/10.1016/bs.acdb.2020.05.001.

Ruble, D. N., and C. L. Martin. 1998. "Gender Development." In *Handbook of Child Psychology: Social, Emotional, and Personality Development Vol. 3*, 5th edition., 933–1016. John Wiley & Sons, Inc.

Smiler, A. P., and S. A. Gelman. 2008. "Determinants of Gender Essentialism in College Students." *Sex Roles* 58, no. 11: 864–874. https://doi.org/10.1007/s11199-008-9402-x.

Smyth, K., A. Feeney, R. C. Eidson, and J. D. Coley. 2017. "Development of Essentialist Thinking About Religion Categories in Northern Ireland (and the United States)." *Developmental Psychology* 53, no. 3: 475–496. https://doi.org/10.1037/dev0000253.

Stennes, L. M., M. M. Burch, M. G. Sen, and P. J. Bauer. 2005. "A Longitudinal Study of Gendered Vocabulary and Communicative Action in Young Children." *Developmental Psychology* 41, no. 1: 75–88. https://doi.org/10.1037/0012-1649.41.1.75.

Straka, B. C., A. Albuja, J. Leer, K. Brauher, and S. E. Gaither. 2024. "The Rich Get Richer? Children's Reasoning About Socioeconomic Status Predicts Inclusion and Resource Bias." *Developmental Psychology* 60, no. 3: 505–521. https://doi.org/10.1037/dev0001655.

Straka, B. C., A. Stanaland, M. Tomasello, and S. E. Gaither. 2021. "Who Can be in a Group? 3- to 5-Year-Old Children Construe Realistic Social Groups Through Mutual Intentionality." *Cognitive Development* 60: 101097. https://doi.org/10.1016/j.cogdev.2021.101097.

Wu, D., S. Sánchez, and S. Perry. 2022. "Will Talking About Race Make My Child Racist?" Dispelling Myths to Encourage Honest White U.S. Parent-Child Conversations About Race and Racism." *Current Opinion in Psychology* 47: 101420. https://doi.org/10.1016/j.copsyc.2022.101420.

Supporting Information

Additional supporting information can be found online in the Supporting Information section.