Cognition 239 (2023) 105561

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/cognit

Infants' biased individuation of in-group members

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ARTICLE INFO

Keywords:
Individuation
Group membership
Intergroup bias
Infants

ABSTRACT

Adults tend to construe members of their group as "unique individuals" more than members of other groups. This study investigated whether infants exhibit this tendency, even in regard to unfamiliar arbitrary groups. Ninety-six White 1-year-olds were assigned to an Ingroup, Outgroup, or No-Group condition, based on whether or not they shared two preferences (food and shirt color) with women appearing on video sequences. In the critical trial, infants saw two women (Ingroup, Outgroup, or No-Group) – one at a time – appearing from behind a curtain. The curtain opened to reveal only one woman. Infants in the Ingroup condition looked longer at this display than infants in the other two conditions. This suggests that infants in the Ingroup condition had a stronger expectation than those in the other two conditions that there would be two women behind the curtain. In other words, infants individuated in-group members more than out-group members.

1. Introduction

Social psychologists have for long noticed the ease, and robustness, with which adults develop discriminatory attitudes and behaviors that favor their "in-group" (those similar to them) and undermine their "out-group" (those different from them – Allport, 1954; Tajfel, 1982). Recent developmental work reveals that such inter-group biases seem to appear already in infancy. That is, already by 1-year of age, infants have positive associations towards, and prefer to interact with and imitate individuals of their familiar racial or linguistic group over individuals from unfamiliar groups (Buttelmann, Zmyj, Daum, & Carpenter, 2013; Kinzler, Dupoux, & Spelke, 2007; Pun, Ferera, Diesendruck, Hamlin, & Baron, 2017; Xiao et al., 2018). The question that sparked the present work is whether similar inter-group *representational* biases associated with adults' attitudinal biases, are also present in infants.

One of the key representational biases arguably underlying adults' inter-group attitudes is the asymmetric construal of in-groups and out-groups. In particular, whereas the in-group is typically construed as consisting of a diverse set of unique *individuals*, the out-group is viewed as consisting of a more homogeneous set of *category exemplars* (Brewer, 1988; Fiske & Neuberg, 1990; Ostrom, Carpenter, Sedikides, & Li, 1993). One phenomenon directly manifesting these distinctive construals is the "out-group homogeneity effect" (Judd & Park, 1988; Simon & Brown, 1987), whereby out-group members, compared to in-group ones, are rated as less widely distributed on any given trait, as more similar to one another on various traits, and as more similar to the group stereotype (see Boldry, Gaertner, & Quinn, 2007, for a review). In general, according to a number of social psychologists, whereas adults may be motivated to engage with in-group members at the level of the individual, they are satisfied by construing out-group members as category exemplars (Fiske & Neuberg, 1990; Hugenberg & Sacco, 2008; Macrae & Bodenhausen, 2000). Consequently, adults will be driven to focus on identity-diagnostic features of in-group members – thus leading to individuation, but on category-diagnostic features of out-group members – thus encouraging categorization (Hugenberg, Young, Bernstein, & Sacco, 2010).

Following this insight from the adult literature, we asked whether even infants might process in- and out-group members in an analogously biased manner. Namely, would infants be more likely to individuate in-group than out-group members? To address this question, we relied on a well-established literature regarding the development of infants' capacity to individuate *objects*. Starting with seminal work conducted by Xu and Carey (1996), developmental psychologists have uncovered that between 9- to 13-months of age, infants develop the capacity to rely on different properties of objects to individuate them (Cacchione, Schaub, & Rakoczy, 2013; Wilcox & Baillargeon, 1998; Xu, 2007). For instance, in a recent study by Stavans, Lin, Wu, and Baillargeon (2019), 10-month-olds were exposed to either a single object (a doll), two different objects from the same category (e.g., two dolls with different hair color), or two different objects from different categories (e.g., a doll

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https://doi.org/10.1016/j.cognition.2023.105561
Received 11 September 2022; Received in revised form 3 July 2023; Accepted 10 July 2023
Available online 14 July 2023

and a rabbit), appearing from behind a screen, one at a time, on either side of the screen. In all conditions, the screen then dropped to reveal only one object (one doll). Results showed that infants looked the longest at the test event in the different objects-different categories condition, and that in fact there was no difference in their looking time between the first two conditions. As the authors concluded: a) infants had successfully individuated the two objects from the distinct categories and thus expected to find two objects behind the screen – being surprised when that was not the case, and b) infants had failed to individuate the two objects from the same category, and thus did not expect to find two objects behind the screen (Stavans et al., 2019).

Summarizing this literature, Stavans et al. (2019) note that with age, infants become capable of individuating objects based on subtler cues. Thus, whereas at 9-months of age they are capable of individuating objects when objects belong to distinct ontological categories (e.g., animate/inanimate, human/not-human, Bonatti, Frot, Zangl, & Mehler, 2002; Surian & Caldi, 2010), by 12-months they can rely on distinctions based on basic-level categories (e.g., ball-duck; Xu & Carey, 1996), but arguably only later based on superficial features within basic-level kinds (e.g., color; Xu, Carey, & Quint, 2004). In other words, to the extent that any two entities are conceived by infants as being of the same kind, their capacity to individuate them is hampered. Applying this conclusion to the social domain, we hypothesized that if infants are more likely to conceive of out-group compared to in-group members as homogeneous category exemplars, then infants may have a harder time individuating out-group than in-group members.

The goal of the present work was to assess whether the mere group membership of individuals would impact infants' individuation capacity. Thus to address this goal, we employed a "minimal group paradigm" (Dunham, 2018; Tajfel, 1982), such that the only difference between in- and out-group members was whether or not they shared the infants' group membership. Relying on a technique adopted in a number of studies with infants (e.g., Gerson, Bekkering, & Hunnius, 2017; Hamlin, Mahajan, Liberman, & Wynn, 2013; Mahajan & Wynn, 2012; Ting, He, & Baillargeon, 2019), we first assessed one-year-olds' preferences for both clothing color and food items, and then exposed them to videos of women either matching infants' preferences (the infants' so-called "in-group"), or mismatching them ("out-group") (a portion of the infants participated in a control condition in which there was no relation between the women and the infants' preferences) (see Liberman, Kinzler, & Woodward, 2021, for a discussion of infants' reliance on shared preferences to infer affiliation). All women were White – as were the infants – and the women in the in-group and out-group conditions were in fact the same ones. In other words, the women in the in- and out-groups were equal in their un/familiarity to the infants. We then presented videos similar to those used in studies on object individuation (e.g., Stavans et al., 2019, Experiment 1). Here infants saw either one ("Same" condition) or two ("Different" condition) women appearing and disappearing from behind a curtain, never simultaneously. In the experimental conditions, women were either from the infants' in-group (i.e., wore shirts of the infants' preferred color) or out-group (i.e., wore shirts of the infants' rejected color). After this hiding phase, infants saw the curtain open revealing only one woman.

The rationale of the task is that if infants individuate the two women in the Different condition, then they should be surprised to see only one woman behind the curtain, and thus look at the event for a long time. The hypothesis was that infants would be more likely to individuate in-group than out-group women, and thus look longer at the one-woman test event in the in-group than in the out-group condition. We also included a "no-group" control condition, in which there was no relation between infants' choices and the shirt-color of the women in the videos. The inclusion of this condition helped address the directionality of the effect, i.e., does "in-groupiness" boost individuation, "out-groupiness" dampens it, or both? Lastly, we tested infants within the age range in which developments in infants' object individuation capacities in these tasks have been documented. We used a wide age range because we had no a priori way of determining where in the "featural" to "ontological" continuum, would group membership distinctions fall in infants' eyes.

2. Method

2.1. Participants

One-hundred and forty-seven White infants were tested overall. Fifty-one of them were excluded for various reasons: a) Infants who, in the manipulation check, were not consistent with their first choice with regard to preference for apron color ($n = 13$); b) Technical problems with the eye-tracker (e.g., no eye movement data) ($n = 15$); c) Lack of cooperation in the study by the mother (e.g., the mother pointed at the screen) ($n = 3$); or d) Restlessness of the infant (e.g., started crying or moved constantly during the procedure, $n = 20$). Infants excluded for reasons b-d did not provide looking time data. The final sample thus consisted of 96 one-year-olds (50% female, *Mean age* = 11.7 months, *SD* = 1.5 months, *Range* = 9.0–14.8 months), 32 in the Ingroup condition (16 "Same", 16 "Different"), 32 in the Outgroup condition (16 "Same", 16 "Different"), and 32 in the No-Group condition (16 "Same", 16 "Different"). Only infants with signed consent forms participated in the study (see Supplementary Material for recruitment details, demographic information, and number of excluded infants, per condition).

Previous studies using similar methodologies have rendered *large* effect sizes for interactions analogous to the one assessed here between group membership condition and type of targets (see Stavans & Baillargeon, 2018; Surian & Caldi, 2010; Wilcox & Baillargeon, 1998). Using G*Power3.1.9.7, setting alpha = 0.05, power = 0.80, and f = 0.40 (large effect size), would require a total of 64 infants for a 2 × 3 design. Given our wide age range, we tested 96, more conservatively using a "conventional" $n = 16$ per design-cell.

2.2. Design

Participants were randomly assigned to one of 6 between-subjects conditions, resulting from the crossing of two factors: group membership of the targets (Ingroup, Outgroup, No-Group) and type of targets hidden (Same, Different). An ANOVA on children's mean ages showed no significant differences across group membership conditions, $F(1, 96) = 0.72$, $p = 0.489$, $\eta^2 = 0.016$, between types of target, $F(1, 96) = 0.145$, $p = 0.704$, $\eta^2 = 0.002$, and no significant interaction between these factors, $F(1, 96) = 0.302$, $p = 0.740$, $\eta^2 = 0.007$. Also, there were no significant differences in the gender distribution among group membership conditions in the same target condition, $X^2(2, N = 48) = 0.167$, $p = 0.920$, or the different target conditions, $X^2(1, N = 48) = 2.170$, $p = 0.338$.

2.3. Procedure

Each infant, accompanied by one or both parents, participated in one lab visit that lasted approximately 30 min (see Supplementary Material for warm-up details). After warming-up in a play-room, the four-phase experimental procedure started.

In the Preferences Phase, the experimenter presented to infants in the Ingroup and Outgroup conditions aprons of two distinct colors (yellow and green), and encouraged them to choose one ("Which one do you like?"). Subsequently, the experimenter placed two small bowls, equidistant from the infant, containing one of two types of food (crackers or green peas), and again encouraged infants to choose one. In the No-Group condition, the procedure was identical except the items the experimenter presented for infants to choose differed. Namely, infants were encouraged to choose: a) one of two puppets dressed with shirts from two different colors (red or blue), and b) one of two different types of food: a sweet snack or mini carrots. In all conditions and trials, choices were coded according to the first item (e.g., food) the infant picked up. Coding was done immediately, by the experimenter interacting with the

infant. There were no cases in which the experimenter could not determine which item the infant chose.

In the Group Establishment Phase, infants in all conditions were then seated in an infant-seat 60 cm away from a 22″ screen, with a mounted eye-tracker below it (see Supplementary Material for information on the eye-tracker). After calibration, the four video-sequences of this phase started. The videos showed two actresses making two choices, twice each. The actresses wore one of two colored shirts (yellow or green) according to the infants' condition. Namely, whereas in the Ingroup condition, the actresses wore shirts of the same color as the infant's chosen apron, in the Outgroup condition, the actresses wore shirts of the contrasting color. In the No-Group condition, given that infants had not chosen between yellow or green aprons, these colors presumably were irrelevant for group membership. For the sake of balance, half of the infants in this condition watched the videos of the actresses in yellow shirts, and the other half the video with actresses in green shirts.

Each video sequence started with a woman (Actress A) standing in front of a black background, with a table and two bowls on it, in front of her (see Fig. 1). In all conditions, the bowls contained the two food items infants in the Ingroup and Outgroup conditions had been presented in the Preferences Phase: crackers and green peas. In the Ingroup condition, Actress A approached the bowls, tasted the food the infant had chosen, expressed a positive reaction ("Mmmm, crackers/green peas"), then tasted the food not chosen by the infant, and expressed a negative reaction ("Ewww, green peas/crackers"). In the Outgroup condition, the actress performed the exact same actions, but reacted to her tasting in the opposite fashion (i.e., disliked what the infant had chosen, and vice-versa). The experimenter explicitly pointed out the actresses' color and food preferences to the infant, and whether it was similar or different from the infants' (e.g., in the Ingroup condition: "Look, she also likes the color yellow, like you [pointing to the infant's apron]. And she likes crackers, like you."; in the Ougroup condition: "Look, she likes the color green, you chose yellow. And she likes green peas, you chose crackers."). In the No-Group condition, the actress approached the table with these same two bowls (i.e., food items unrelated to the food items infants in this condition had been presented in the Preferences Phase), and simply stood in front of the table, looking up, and then expressing a positive and then negative reaction not directed at the food items.

In order to impart on infants the similarity or dissimilarity between their group membership and the actresses', this sequence was repeated four times, twice with two different actresses. Thus after seeing Actress A conclude her selections, the video restarted with that same actress again approaching the bowls and making food selections. And after her second selection, the video displayed a new actress – Actress B – again for two trials, making the same selections and reactions as those of Actress A. In other words, infants in the Ingroup condition saw two different actresses who shared the same preferences as them, and heard the experimenter emphasize this similarity to them. In turn, infants in the Outgroup condition saw two different actresses whose preferences were the opposite of the infant's, a fact that the experimenter also highlighted each time. The location of the food bowls on the table (crackers on the right, green peas on the left/ crackers on the left, green peas on the right) and the order of the actresses' reactions to the foods (like first, dislike second / dislike first, like second) were both counterbalanced across the four trials. The whole video-sequence was just under a minute long.

In the third – Hiding – phase, infants watched a brief video displaying either one (Same condition) or two (Different conditions) *new* actress/es wearing yellow (Ingroup if the infant had chosen a yellow apron / Outgroup if the infant had chosen a green apron) or green shirts (Ingroup if the infant had chosen a green apron / Outgroup if the infant had chosen a yellow apron). The video consisted of a single trial, in which one or two actresses appeared getting in and out from behind a curtain, placed in the center of the screen, one actress at a time (see Fig. 1). Each appearance of an actress lasted 8 s, and occurred twice on each side. In the Same condition, only one actress – Actress D – appeared during this phase ("target" actress). In the Different condition, there were two actresses (Actress D, and yet a new one – Actress C), with each actress appearing twice from one of the two sides, and never simultaneously. The last of the two actresses to appear in the Different condition was Actress D (i.e., the same who appeared in the Same condition). As with the previous phase, in this phase too the actresses were the same in all three group membership conditions. Given that our goal was to examine when infants are capable of individuating women, we had to make individuation non-trivial. For this reason, in the Hiding phase, we purposefully used as actresses two women who were fairly similar on a number of salient features, e.g., ethnicity, hair colors and styles, body build, no glasses, etc. Further important to note, infants did not see any of the four actresses in person.

The final – Test – phase followed immediately, and it was identical in the Same and Different conditions. In it, the curtain opened, revealing only Actress D. The video froze once the actress was in full display. Infants' looking time started being measured at this point. In order to more robustly assess infants' reactions, each infant saw two test trials. The first trial lasted for 10 s., and the second trial lasted until the infant looked away from the screen for 3 s. Infants' looking time was recorded by the eye-tracker.

At the end of the Test Phase, two manipulation checks were performed. The main check was for the consistency in the infants' preference for apron color, so as to ascertain that infants indeed viewed the actresses in the Hiding and Test phases as similar or not to them. We

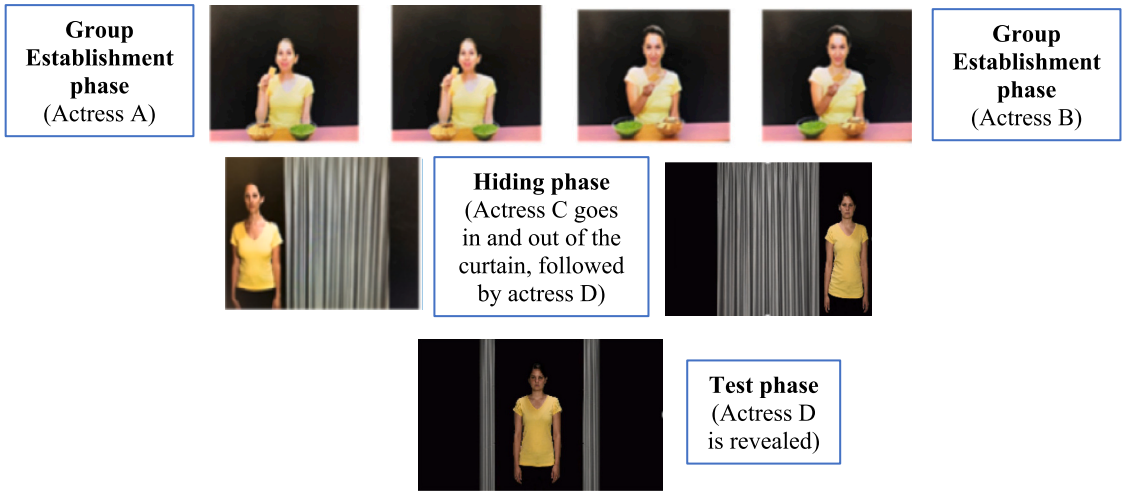

Fig. 1. Stills-illustration of the procedure, in the Different condition. The picture in the Test Phase depicts the end-point of the "opening-of-the-curtain" event.

found that out of the 109 infants who concluded the procedure, 13 of them were inconsistent in their choice of apron color. Therefore, in the analysis reported below we included only the 96 infants who were consistent (analysis including all 109 infants rendered the same significant interaction as reported below, at $p = 0.015$). (See Supplementary Material for details on the second manipulation check.)

3. Results

3.1. Coding

To calculate infants' looking time, the area of interest (AOI) was the screen, which included both the actress and the background. As described above, infants participated in two test trials. The length of the first one was set a priori (10 s.), and thus infants' looking time during this trial was the total amount of time that infants looked at the AOI during the 10 s. or up to the point where they looked away for >3 s. The length of the second trial was infant-driven, namely, it lasted until the infant looked away for >3 s. Thirty-two of the 96 infants did not complete the two trials. Thus, in order to maximize the data points, and yet control for substantial differences in the variance of length of looking between the two trials, looking times at the screen in each test trial were converted into standardized scores, and these were then averaged across the two test trials. These average z-scores were used as the dependent variable in the analyses.

3.2. Analyses

Analyses were conducted using a two-way analysis of variance (ANOVA), with group membership (Ingroup/Outgroup/No-Group) and target type (Same/Different) as between-subjects factors, age (in days) as a covariate, and z-scores of the looking time as dependent variables (analyses using the mean looking time as dependent variable, rendered similar results, see Supplementary Material). Overall, there was a significant effect of group membership, $F\,(2, 89) = 3.193$, $p = 0.046$, $\eta^2 = 0.067$, such that infants in the Ingroup condition looked longer at the outcome ($M = 0.259$, $SE = 0.143$) than infants in the Outgroup condition ($M = -0.077$, $SE = 0.143$) and infants in the No-Group condition ($M = -0.241$, $SE = 0.143$). There was no main effect of target type, $F\,(1, 89) = 0.341$, $p = 0.561$, $\eta^2 = 0.004$, nor of age, $F\,(1, 89) = 0.249$, $p = 0.619$, $\eta^2 = 0.003$. Importantly, there was a significant two-way interaction between group membership and target type, $F\,(2, 89) = 3.424$, $p = 0.037$, $\eta^2 = 0.071$.

To identify the source of this interaction, we first split the data by group membership and conducted independent samples *t*-tests for the effect of target type. These analyses revealed a significant difference between the Same and Different target type conditions only in the Ingroup condition, $t\,(30) = -2.122$, $p = 0.042$. As can be seen in Fig. 2, infants in the Ingroup condition looked significantly longer at the outcome of the test trial in the Different than in the Same condition. The difference between target types was not significant either in the Outgroup ($p = 0.270$) or in the No-Group condition ($p = 0.823$). Complementarily, we split the data also by target type and conducted one-way ANOVAs to assess the effect of group membership. These analyses revealed no significant difference among group membership conditions in the Same condition, $p = 0.434$, indicating that a priori, infants were equally attentive to the test trials across conditions. Crucially, the analysis revealed a significant difference among groups in the Different condition, $F\,(2, 45) = 4.779$, $p = 0.013$, $\eta^2 = 0.177$. Post hoc Scheffe comparisons revealed that in the Different condition, infants in the Ingroup condition looked significantly longer at the test event ($M = 0.610$, $SE = 0.276$) than infants in the Outgroup ($M = -0.260$, $SE = 0.259$), and the No-Group ($M = -0.259$, $SE = 0.121$, $ps < 0.05$) conditions. There was no difference between the latter two conditions.

4. Discussion

The goal of the present study was to assess whether infants construe in- and out-group members differently. In particular, we asked whether infants are more prone to individuate in-group than out-group members. To that end, we engaged 1-year-olds in a minimal group paradigm, by which they were exposed to either people with the same two preferences as them (in-group members) or opposite ones (out-group members) (similar to Hamlin et al., 2013; Mahajan & Wynn, 2012). A third group of infants participated in a control condition, in which there was no relation between their preferences and those of the displayed actresses. In the critical trials, all infants saw videos of two women appearing – one at a time – from behind a curtain. The curtain then opened revealing

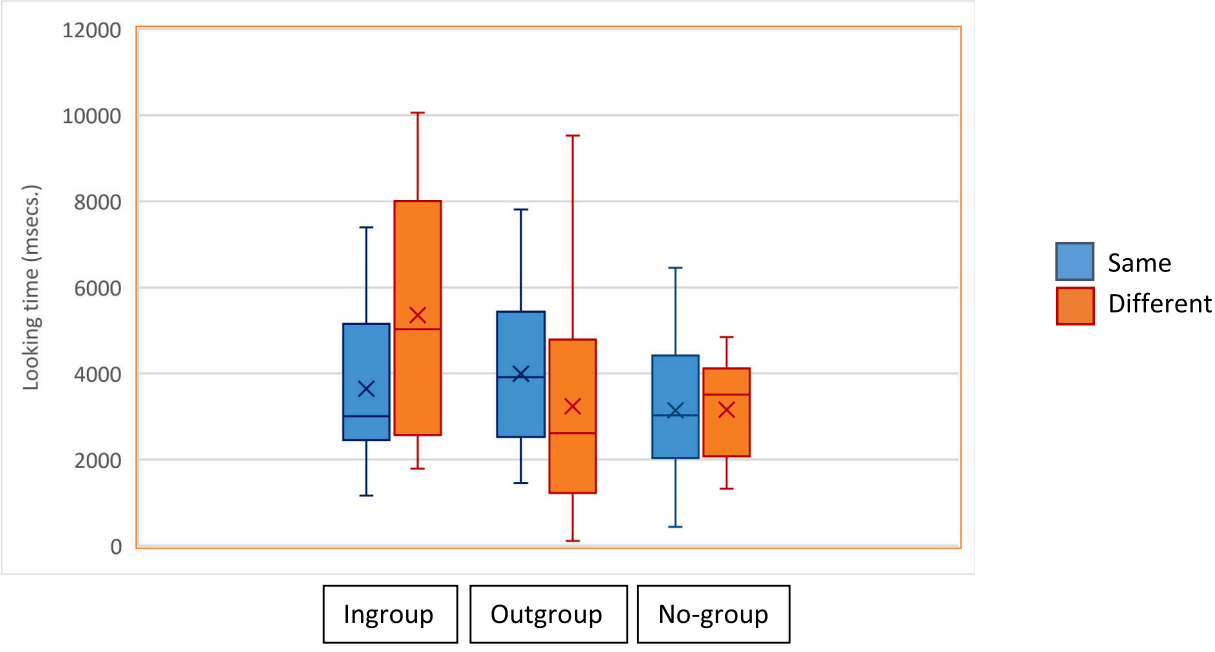

Fig. 2. Boxplot of infants' mean looking time at the screen AOI, in msecs. For easier interpretation, we present here the raw data (average over 2 trials), instead of the standardized scores used in the analyses presented in the text. "X-signs" indicate the mean-values.

only one woman. The main result of the study was that this numerically unexpected outcome was most surprising for infants who had been exposed to in-group women. We concluded that in that condition, infants were particularly attentive to the distinctive features of the women, and thus registered that there were indeed two numerically distinct individuals coming in and out from behind the curtain (see Stavans et al., 2019; Xu, 2007, for theoretical discussions of this conclusion). In other words, infants were more likely to individuate the women in the in-group than in the out-group or no-group conditions.

Previous studies had shown that around the first year of life, there are somewhat systematic changes in infants' capacity to individuate objects based on categorical vs. featural properties. The seeming consensus is that, in tasks similar to the one used here, up to 12-months of age infants have difficulty individuating objects from the same category (e.g., Stavans et al., 2019; Surian & Caldi, 2010). In fact, infants have difficulty even individuating between two human-like objects (e.g., doll faces; Bonatti et al., 2002). The present results are partially consistent with these findings. Namely, when exposed to two different women who either did not match the infants' preferences (Outgroup) or had preferences unrelated to the infants' (No-Group), 12-month-olds also failed to individuate them. Crucially, however, the present findings diverge from this consensus when infants were exposed to women who matched their preferences (Ingroup). There, 12-month-olds successfully individuated the very same women that infants in the other two conditions had failed to do.

In fact, the above pattern of differences between the Ingroup and the Outgroup and No-Group conditions – which in turn did not differ between them – suggests that infants' default construal of people is as category exemplars, and the extraordinary process of individuation is only engaged when in-group members are clearly recognized. This conclusion resonates with other proposals in social and developmental psychology. First, whereas social psychologists debate as to whether – in the social domain – the processes of categorization and individuation occur sequentially or in parallel (see Kawakami, Hugenberg, & Dunham, 2021, for a review), developmental psychologists argue that children may start-off with a "people-first" representation, eventually breaking it down into categories, largely guided by language cues (Bonatti et al., 2002; Waxman, 2010). Secondly, this result is consistent with the notion that the first type of group that stands out for infants is the *in*-group, not the *out*-group. For instance, a number of studies have found that both among infants (Pun et al., 2017) and children (Buttelmann & Bohm, 2014), in-group love predates out-group hate.

A question these findings raise, is why does "in-groupiness" foster individuation? In this regard, one interesting line of work to consider has to do with the early emergence of inter-group biases in infants' capacity to discriminate between members of different races (the "other-race effect"). In brief, by their first birthday, infants show greater discriminatory sensitivity of same-race compared to other-race faces (Kelly et al., 2007; Woo, Quinn, Méary, Lee, & Pascalis, 2020), and complementarily, increased readiness to lump other-race individuals into categories (Ferera, Pun, Baron, & Diesendruck, 2021; Quinn, Lee, Pascalis, & Tanaka, 2016). Crucially for the present discussion, however, this phenomenon in infants has been explained in terms of perceptual narrowing, whereby infants become expert analyzers of faces common in their natural environment, and lose their proficiency at analyzing faces less common in their environment (Kelly et al., 2007; Nelson, 2001). Clearly, then, this literature can*not* explain the present findings, given that infants here individuated women based solely on the fact that they were dressed like others who shared two preferences with the infant, but who were otherwise of the same race as the infants, and of the same race in all three group membership conditions.

A plausible answer comes from the adult social psychological literature, and discusses how motivational factors bias inter-group relationships (Hugenberg et al., 2010; Johnson & Fredrickson, 2005; Slone, Brigham, & Meissner, 2000). The argument is that in-group members are viewed as potential collaborators and interaction partners, and therefore individuation is necessary. Out-group members, in turn, are a priori discarded for such roles, and instead are construed as potential competitors or even threats, and thus are best conceived of by sheer recognition of their group membership. The present findings provide a proof of concept that some fundamental kernel of such motivations might already underlie infants' construal of in- and out-group members. Consistent with this possibility, recent studies revealed that biased attitudes towards members of different groups are already present in early infancy, both in terms of valenced associations (Pun et al., 2017; Xiao et al., 2018) and behavioral dispositions (Buttelmann et al., 2013; Ting et al., 2019). Even more directly pertinent, priming infants with collaborative or cooperative situations differentially affect their capacity to categorize races (Ferera, Baron, & Diesendruck, 2018), and training preschoolers in individuating faces of different races affects their attitudes towards the races (Xiao et al., 2015). In other words, infants' social individuation capacities may indeed be linked to their inter-group emotions and motivations (Lee, Quinn, & Pascalis, 2017).

In general, the present findings open – or reinforce – a number of questions for investigation. First, what exactly constitutes a "group", and relatedly an "in-group", for infants? Are certain cues (e.g., language or food) privileged markers of group boundaries (Kinzler et al., 2007; Liberman, Woodward, Sullivan, & Kinzler, 2016)? Second, previous studies have documented infants' unique visual scanning patterns (Liu et al., 2011), and brain responses (Begus, Gliga, & Southgate, 2016), when viewing in- vs. out-group faces. Are these signature patterns found vis-à-vis minimally defined in- and out-groups? Third, we purposefully tested infants from a wide age range, as there have been developmental changes documented within the range assessed here in infants' sensitivity to various cues when individuating *objects*. We found no effects of age in the present study, but it would be valuable to extend even more the age range to assess potential developmental changes. Fourth and finally, by age 5 years, children manifest more conceptual forms of intergroup representational biases (e.g., expect out-groups to be more homogeneous in their characteristics and preferences, Shilo, Weinsdoerfer, Rakoczy, & Diesendruck, 2019; see also Essa, Weinsdoerfer, Shilo, Diesendruck, & Rakoczy, 2021; Nasie, Ben-Yaakov, Nassir, & Diesendruck, 2022). Given that infants expect group members to behave similarly (Powell & Spelke, 2013), does this expectation vary by whether individuals belong to infants' in- or out-group?

Evidently this is one study, with one particular task, and thus firmer conclusions require both replications of the basic findings and converging evidence with additional methods and measures. This study also involved a long and multi-stage procedure, which led to a fairly high attrition rate. With these caveats in mind, the present study prima facie suggests that adults' biased representational construal of in- and out-group members is already present in 1-year-olds.

CRediT authorship contribution statement

Adi Zehavi Fogiel: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft. **Jonas Hermes:** Conceptualization, Formal analysis, Methodology. **Hannes Rakoczy:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Gil Diesendruck:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – original draft.

Declaration of Competing Interest

The authors have no conflicts of interests to declare.

Data availability

Data will be made available on request.

Acknowledgements

We would like to thank all infants who participated as well as their parents. We also like to thank Roni Tibon, Odelya Lifshits, Tamar Dolman, Elinor Sarfati, Moria Markovich, Yarden Elias, and Nurit Amar, for helping recruit and test the infants. This joint research project was financially supported by the State of Lower-Saxony, Hannover, Germany. The work of Adi Zehavi Fogiel was further supported by a Bar-Ilan University President's Fellowship. The funders were not involved in any substantive way in the project or the publication process.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2023.105561.

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