Infants possess an abstract expectation of ingroup support

Kyong-sun Jin[a,1] and Renée Baillargeon[b,1]

[a]Department of Psychology, Yonsei University, Seoul 03722, Korea; and [b]Department of Psychology, University of Illinois at Urbana–Champaign, Champaign, IL 61820

Contributed by Renée Baillargeon, June 15, 2017 (sent for review April 17, 2017; reviewed by Andrei Cimpian and Sandra R. Waxman)

One pervasive facet of human interactions is the tendency to favor ingroups over outgroups. Remarkably, this tendency has been observed even when individuals are assigned to minimal groups based on arbitrary markers. Why is mere categorization into a minimal group sufficient to elicit some degree of ingroup favoritism? We consider several accounts that have been proposed in answer to this question and then test one particular account, which holds that ingroup favoritism reflects in part an abstract and early-emerging sociomoral expectation of ingroup support. In violation-of-expectation experiments with 17-mo-old infants, unfamiliar women were first identified (using novel labels) as belonging to the same group, to different groups, or to unspecified groups. Next, one woman needed instrumental assistance to achieve her goal, and another woman either provided the necessary assistance (help event) or chose not to do so (ignore event). When the two women belonged to the same group, infants looked significantly longer if shown the ignore as opposed to the help event; when the two women belonged to different groups or to unspecified groups, however, infants looked equally at the two events. Together, these results indicate that infants view helping as expected among individuals from the same group, but as optional otherwise. As such, the results demonstrate that from an early age, an abstract expectation of ingroup support contributes to ingroup favoritism in human interactions.

infant cognition | sociomoral reasoning | ingroup support | ingroup favoritism | minimal groups

Ingroup favoritism (IGF) refers to the tendency to favor ingroup individuals over outgroup individuals in evaluations and actions. For example, adults and children age 4 y and older have been shown to generally prefer ingroup members, to evaluate ingroup members more positively, to favor ingroup members when allocating resources, and to be more willing to help ingroup members in need of assistance (1–6). Remarkably, similar results have been obtained even when adults and children are experimentally assigned to minimal groups (7–12). Minimal groups typically have three features: the basis for categorization into the groups is salient but random or arbitrary, no meaningful information is provided about the groups, and social interactions within and between the groups are limited to avoid generating meaningful information about the groups (8, 13). The well-established finding that mere categorization into a minimal group is sufficient to elicit some degree of IGF has attracted considerable attention from researchers across the social sciences. The rationale for this experimental scrutiny is that the better we understand why mere assignment to a minimal group is sufficient to trigger IGF, the more effectively we may intervene to address the negative consequences of IGF, such as discrimination and exclusion.

Prior Accounts of IGF in Minimal Groups

Broadly speaking, at least three types of accounts (each with two subtypes) have been proposed to explain IGF in minimal groups. Although these accounts often target different age groups or different manifestations of IGF, here we gloss over these differences to offer a general overview of possible (and very likely complementary) explanations for IGF.

According to one type of account, IGF is a motivational effect. In self-esteem accounts, IGF serves the need to enhance or maintain self-esteem. Thus, an individual assigned to a minimal group may strive to construct a favorable view of the group to achieve a positive social identity (13, 14). Alternatively, when assigned to a minimal group, an individual with positive self-esteem may be motivated to generalize this positive evaluation to the group so as to maintain a positive self-view (15). In empathy accounts, IGF stems from the fact that individuals typically empathize more with those they perceive to be more similar to themselves. Thus, an individual assigned to a minimal group may feel more empathic concern for the plights of ingroup members, and hence may be more motivated to help them (16–18).

According to another type of account, IGF is an acquired norm. For example, children learn that members of a social group generally treat each other positively, prosocially, and preferentially. In social accounts, researchers focus on the various socialization processes that enable children to detect, internalize, and adhere to IGF as a social norm (19, 20). In contrast, cognitive accounts focus on categorization, essentialism, and other cognitive processes that facilitate sorting individuals into social categories and learning about the properties and behaviors shared by members of the same category (8, 21). Some proponents of cognitive accounts have also suggested that conceptual structures for group cognition, such as a naive theory of sociology or a folk theory of groups (11, 22, 23), support children's ability to identify the groups in their social environments and to learn about patterns of interactions within and across groups.

According to yet another type of account, IGF is an evolved adaptation. In indirect-reciprocity accounts, IGF is an implicit default strategy used by an individual in a group to secure

Significance

We examined whether one mechanism contributing to ingroup favoritism might be an abstract and early-emerging sociomoral expectation of ingroup support. In violation-of-expectation experiments, 17-mo-old infants first watched third-party interactions among unfamiliar adults identified (using novel labels) as belonging to the same group, to different groups, or to unspecified groups. Next, one adult needed help, and another adult either did or did not provide it. Infants expected help to be provided when the two adults belonged to the same group, but held no expectation when the adults belonged to different groups or to unspecified groups. Infants thus already possess an abstract expectation of ingroup support, and this finding sheds light on one of the mechanisms underlying ingroup favoritism in human interactions.

Author contributions: K.J. and R.B. designed research; K.J. performed research; K.J. analyzed data; and K.J. and R.B. wrote the paper.

Reviewers: A.C., New York University; and S.R.W., Northwestern University.

The authors declare no conflict of interest.

[1]To whom correspondence may be addressed. Email: rbaillar@illinois.edu or kyongsun.jin@gmail.com.

This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1706286114/-/DCSupplemental.

personal benefits from the group. The preferential treatment of ingroup members serves to maintain the individual's reputation as a reliable collaborator and, as such, both increases the likelihood of future preferential treatment by the group and decreases the risk for exclusion from the group (1, 24). IGF may also serve to support ingroup members so that they remain available as potential collaborators (10). In sociomoral-expectation accounts, IGF reflects an abstract sociomoral expectation that members of a group have a duty or obligation to support the group. Several versions of this expectation have been proposed, including Shweder et al.'s ethic of community (25), Brewer's notion of ingroup obligatory interdependence (26), Cosmides and Tooby's cognitive adaptations for group cooperation (27), Rai and Fiske's unity motive in communal-sharing relationships (28), Graham et al.'s moral foundation of loyalty/betrayal (29), and Baillargeon et al.'s principle of ingroup support (30). Common assumptions among these accounts are that an expectation of ingroup support is part of the "first draft" (29) of human moral cognition and, as such, may already be present in infancy; that it "is a matter of relative favoritism toward the ingroup and the absence of equivalent favoritism toward outgroups" (26); and that different cultures implement, stress, and rank-order ingroup support and other sociomoral expectations differently, resulting in the diverse moral landscape that exists in the world today.

Present Research

The present experiments tested a key prediction from sociomoral-expectation accounts: If IGF in minimal groups reflects in part an abstract and early-emerging expectation of ingroup support, then infants in the second year of life might already demonstrate this expectation. As in recent experiments with young children (11, 21, 31, 32), infants themselves were not assigned to a minimal group; rather, they observed third-party interactions among unfamiliar individuals in the same minimal group. We recognized from the outset that positive evidence that infants expected these individuals to exhibit ingroup support would not invalidate other accounts of IGF; as the preceding section makes clear, multiple levels of analysis from psychological, social, and evolutionary perspectives are needed to fully explain the complex and pervasive phenomenon of IGF. Nevertheless, such positive evidence would strengthen the notion that an expectation of ingroup support is part of the "first draft" of human moral cognition and, from an early age, guides reasoning about interactions within groups.

In three violation-of-expectation experiments, 17-mo-olds saw live events in which a woman needed instrumental assistance to achieve her goal; another woman either provided the necessary assistance (help event) or chose not to do so (ignore event). Across experiments, we manipulated whether the two women belonged to the same minimal group, to different minimal groups, or to unspecified groups (i.e., no information was provided about their group affiliations). When marked, group affiliations were established via novel labels, as in prior studies with infants and young children (11, 21, 33, 34). We reasoned that if an abstract expectation of ingroup support is already present by 17 mo of age, then infants should detect a violation in the ignore event when the women belonged to the same group and hence were expected to help one another. Conversely, infants should look equally at the ignore and help events when the women belonged to different or unspecified groups and there was no particular basis for expecting helpful actions. Across experiments, we thus predicted that infants would detect a violation in the ignore event only when the women belonged to the same minimal group.

Three sets of prior developmental findings were consistent with the predicted results of our experiments. First, when given no evidence that individuals belong to the same group, infants do not expect these individuals to help one another. For example, in experiments by Hamlin et al. using nonhuman characters (e.g., different blocks with eyes), infants ages 4.5–19 mo saw help events, in which a helper made it possible for a protagonist to achieve its goal (e.g., helped the protagonist reach the top of a steep hill), and hinder events, in which a hinderer prevented the protagonist from achieving its goal (e.g., knocked the protagonist down to the bottom of the hill) (35–37). Across ages and scenarios, infants looked equally at the help and hinder events, suggesting they did not expect help for the protagonist. These negative results did not stem from infants' inability to understand the events presented: Infants preferred the helper over the hinderer and (beginning at about 10 mo) expected the protagonist to show the same affiliative preference.

Second, when given evidence that individuals belong to the same group, children as young as 3 y of age show some expectation of ingroup support (11, 32, 38, 39). In experiments by Rhodes (11), for example, children ages 3–10 y were introduced to two minimal groups of people identified by novel labels: "flurps" and "zazzes." Children were told stories in which an individual from one group (e.g., a flurp) performed either a harmful action (e.g., hit or stole a block) or a helpful action (e.g., hugged or shared a cookie), and then they were asked to predict whether the likely recipient of the action was an ingroup or an outgroup individual (e.g., whether the flurp hit another flurp or a zaz). For harmful actions, children age 3 y and older predicted outgroup recipients, suggesting they expected less harm in ingroup interactions; for helpful actions, however, children did not predict ingroup recipients until ages 6–7. One potential limitation of this last finding, however, was that the helpful scenarios, although positive, did not depict an individual in need of assistance, leaving open the possibility that even infants might expect help for an ingroup member who clearly required instrumental assistance.

Third, results from first-party tasks are generally consistent with those of the third-party tasks discussed here. In the second year of life, infants spontaneously produce simple helpful actions such as bringing closer an object that has fallen out of an adult's reach (40, 41). Although infants are more likely to help a parent than a stranger, they will help an unfamiliar adult who first directs affiliative behaviors toward them: for example, who engages in reciprocal play with them (42), mimics their actions (43), or bounces in synchrony with them (44). Infants will also help an unfamiliar adult after being mimicked by a different adult (43) or after being shown photographs depicting dolls facing each other in close proximity (45). These results support the suggestions that (*i*) from an early age, helpful actions may be viewed as expected with ingroup individuals, but as optional with outgroup individuals, and (*ii*) multiple factors, including exposure to priming experiences that induce an affiliative or ingroup mindset, may affect whether infants choose to help outgroup individuals.

Experiments

Experiment 1 examined whether infants would expect an unfamiliar adult to provide help to a member of the same minimal group, but would hold no expectation about the provision of help to a member of a different minimal group. Seventeen-month-old infants ($n = 32$) from English-speaking families were randomly assigned to an ingroup or an outgroup condition. Each infant received three labeling trials and one test trial.

In the ingroup condition, three English-speaking female experimenters sat at windows in the right wall (E1), back wall (E2), and left wall (E3) of a puppet-stage apparatus. The three women wore different shirts so that there were no perceptual cues predicting their group affiliations. In each (18-s) labeling trial (Fig. 1*A*), the Es labeled themselves in two rounds, using the novel group labels "bems" and "tigs." In the first round, E1 announced that she belonged to one group (e.g., "I'm a bem!"; counterbalanced), E2 announced that she belonged to the same group (e.g., "I'm a bem, too!"), and E3 announced that she belonged to the other group (e.g., "I'm a tig!"). In the second round, E1 and E2 announced their labels simultaneously (e.g., "We're bems! We're bems!"), to emphasize that they belonged to the same group, and E3 repeated what she had said before (e.g., "I'm a tig!"). The trial ended after the second round was

completed. Infants in the outgroup condition received identical labeling trials, except that E2 belonged to the same group as E3 instead of E1 (e.g., E1: "I'm a bem!"; E2: "I'm a tig!"; E3: "I'm a tig, too!").

Next, infants in both conditions received a single test trial in which they saw a help event or an ignore event involving a simple out-of-reach scenario (41). Each event had an initial phase and a final phase (Fig. 1*B*). At the start of the (32-s) initial phase in the help event, E3 was absent (her curtained window was closed); E3's main role was to help establish group affiliations in the labeling trials. As E2 watched, E1 selected four colorful discs of decreasing sizes from a clear box next to her window and stacked the discs, one by one, on a base. The final, smallest disc rested across the apparatus from E1, out of her reach (but within E2's reach). E1 tried in vain to reach the disc until a bell rang. At that point, E1 said, "Oh, I have to go, I'll be back," and then left, closing the curtain at her window. Next, E2 picked up the smallest disc from the apparatus floor, brought it to her midline, inspected it, and then placed it in E1's box so that she could complete her stack when she returned (E2 did not place the disc on the stack because this could be construed as a playful or imitative action, rather than a helpful action). E2 then looked down and paused. During the final phase of the event, infants watched this paused scene until the trial ended. The ignore event was identical except that after picking up the smallest disc, bringing it to her midline, and inspecting it, E2 returned it to the same position on the apparatus floor, out of E1's reach. E2's actions in the help and ignore events thus differed only in whether E2 deposited the smallest disc to her left (in the box) or to her right (on the apparatus floor), and hence were similar in terms of how much effort they involved.

Fig. 1. Schematic depiction of the labeling (*A*) and test (*B*) trials in experiments 1–3.

We reasoned that if infants (*i*) could use the novel labels they heard to determine the Es' group affiliations; (*ii*) expected E2 to help E1 when they belonged to the same group, in accordance with an abstract expectation of ingroup support; and (*iii*) held no particular expectation as to whether E2 would help E1 when they belonged to different groups, then infants in the ingroup condition should look significantly longer if shown the ignore as opposed to the help event, whereas infants in the outgroup condition should look about equally at the two events.

Infants in both conditions were highly attentive during each labeling trial and looked, on average, for 99% of the trial. Infants were also highly attentive during the initial phase of the test trial and looked, on average, for 100% of the initial phase. Looking times during the final phase of the test trial (Fig. 2) were analyzed using an analysis of variance (ANOVA) with condition (ingroup or outgroup) and event (ignore or help) as between-subject factors. The analysis yielded a significant main effect of condition, $F(1, 28) = 4.31$, $P = 0.047$, $\eta_p^2 = 0.13$; a nearly significant main effect of event, $F(1, 28) = 3.61$, $P = 0.068$, $\eta_p^2 = 0.11$; and crucially, a significant Condition × Event interaction, $F(1, 28) = 5.57$, $P = 0.025$, $\eta_p^2 = 0.17$. Planned comparisons revealed that infants in the ingroup condition looked significantly longer if shown the ignore event [mean (M) = 30.6, SD = 5.3] as opposed to the help event (M = 19.7, SD = 6.0), $F(1, 28) = 9.08$, $P = 0.005$, Cohen's $d = 1.93$, whereas infants in the outgroup condition looked about equally at the ignore (M = 19.2, SD = 6.9) and help (M = 20.4, SD = 9.9) events, $F(1, 28) < 1$, $d = -0.14$. Nonparametric Wilcoxon rank-sum tests (W) confirmed the results of the ingroup ($W = 42$, $P = 0.006$) and outgroup ($W = 66$, $P = 0.833$) conditions.

As predicted by sociomoral-expectation accounts of IGF, simple linguistic evidence that E1 and E2 belonged to the same minimal group was sufficient to elicit an abstract expectation of ingroup support. Infants in the ingroup condition expected E2 to give E1 the instrumental assistance she needed to achieve her goal, and they detected a violation when E2 chose not to do so, for no clear reason; after all, once E2 had picked up the smallest disc, putting it in E1's box required no more effort than putting it back in its original position on the apparatus floor. In contrast, infants in the outgroup condition viewed it as equally expected for E2 to help or ignore E1, in line with prior findings that IGF primarily involves the positive treatment of the ingroup, rather than the negative treatment of the outgroup (26, 46–48).

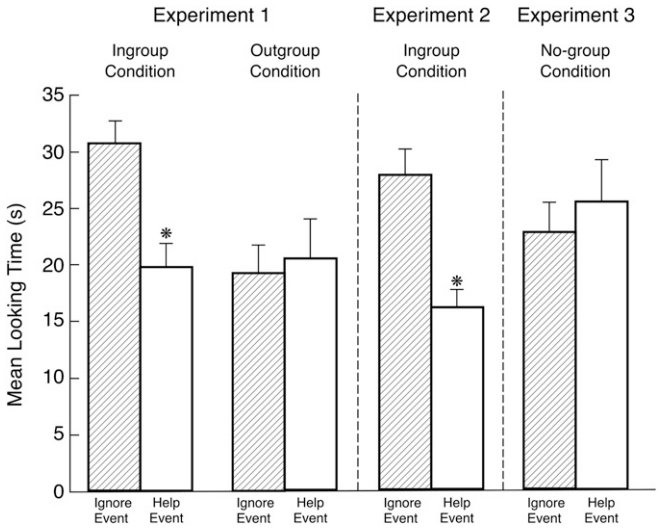

Fig. 2. Mean looking times at the test events in experiments 1–3. Error bars represent SEM and an asterisk denotes a significant difference between the two events within a condition ($P < 0.05$ or better).

Experiment 2 sought to confirm the results of the ingroup condition in experiment 1. A new set of 17-mo-olds ($n = 16$) was tested using the same procedure, with one exception: Infants no longer heard cospeech (e.g., "We're bems!") in the second round of each labeling trial. Both rounds were now identical, so infants had to rely solely on the labels the Es used to describe themselves (e.g., E1: "I'm a bem!"; E2: "I'm a bem, too!"; E3: "I'm a tig!") to determine group affiliations.

Infants were again highly attentive during each labeling trial (M = 99%) and during the initial phase of the test trial (M = 100%). Looking times during the final phase of the test trial were analyzed using an ANOVA with event (help or ignore) as a between-subject factor. The main effect of event was significant, $F(1, 14) = 18.64$, $P = 0.001$, $\eta_p^2 = 0.57$, indicating infants looked significantly longer if shown the ignore event (M = 27.7, SD = 6.4) as opposed to the help event (M = 16.0, SD = 4.2), $d = 2.16$. A Wilcoxon rank-sum test confirmed this result, $W = 41$, $P = 0.005$. Additional ANOVAS indicated that the ingroup condition in experiment 2 did not differ from the ingroup condition in experiment 1 [Condition × Event interaction: $F(1, 28) < 1$], but did differ from the outgroup condition in experiment 1 [Condition × Event interaction: $F(1, 28) = 6.48$, $P = 0.017$, $\eta_p^2 = 0.19$].

Thus, as in the ingroup condition of experiment 1, infants in the ingroup condition of experiment 2 (*i*) determined on the basis of the novel labels they heard that E1 and E2 belonged to the same group; (*ii*) expected E2 to provide E1 with the instrumental assistance she needed to achieve her goal, in accordance with an abstract expectation of ingroup support; and hence (*iii*) detected a violation when E2 returned the smallest disc to its original position on the apparatus floor, out of E1's reach.

Together, the results of experiments 1 and 2 suggested that by 17 mo of age, infants view helping as expected among ingroup individuals (infants detected a violation when E2 chose not to help ingroup E1), but as optional among outgroup individuals (infants looked equally whether E2 chose to help or not to help outgroup E1). There was, however, another possible interpretation of our results: Infants might generally view helping as expected unless individuals are identified as members of outgroups, in which case helping becomes optional. This interpretation seemed unlikely, given prior findings that IGF is better understood as the preferential treatment of ingroups, rather than the derogatory treatment of outgroups (26, 46–48). Nevertheless, to rule out this possibility, a new set of 17-mo-olds ($n = 16$) was tested in experiment 3 using a procedure identical to that of the ingroup condition in experiment 2, with one exception: No information was provided about the group affiliations of the three Es, who therefore remained uncategorized individuals in unspecified groups. During the three labeling trials, the Es now used "I saw an X!" phrases (e.g., E1: "I saw a bem!"; E2: "I saw a bem, too!"; E3: "I saw a tig!"); the trials were thus similar to those in experiment 2, but provided only incidental information about the Es (e.g., information about objects they had seen), rather than inherent information about the social categories to which they belonged.

We reasoned that if infants generally expect helpful actions unless individuals belong to different groups, then infants in the no-group condition of experiment 3 should respond similarly to those in the ingroup conditions of experiments 1 and 2: They should look significantly longer if shown the ignore as opposed to the help event. In contrast, if infants expect helpful actions when individuals belong to the same group, but hold no particular expectation about such actions otherwise, then infants in the no-group condition of experiment 3 should respond similarly to those in the outgroup condition of experiment 1: They should look about equally at the help and ignore events.

Beyond creating a no-group condition that was similar to the ingroup conditions of experiments 1 and 2, the "I saw an X!" manipulation of experiment 3 had another advantage: It allowed us to test a low-level similarity-based interpretation of the positive results of these ingroup conditions. It could be suggested that infants generally assume that people who say similar things wish to affiliate and hence are apt to engage in affiliative activities such as helpful actions. In this view, infants in the ingroup conditions might have expected E2 to help E1 simply because the two had made similar statements. Previous results suggested this interpretation was unlikely. For example, 9-mo-olds who heard two women make similar statements in alternation while eating from their respective bowls (e.g., "Ooh, I like that!"; "Ooh, I like that!") held no expectations about whether the women would subsequently engage in positive or negative interactions (49). The no-group condition in experiment 3 could provide additional evidence against a similarity-based interpretation because E1 and E2 again made similar statements (e.g., "I saw a bem!"; "I saw a bem, too!"). Finding that infants now looked equally at the ignore and help events would indicate that it was only when E1's and E2's statements signaled that they were members of the same social category (e.g., "I'm a bem!"; "I'm a bem, too!") that infants brought to bear their expectation of ingroup support and detected a violation when E2 chose not to help E1.

Infants were again highly attentive during each labeling trial (M = 99%) and during the initial phase of the test trial (M = 99%). Looking times during the final phase of the test trial were analyzed as in experiment 2. The main effect of event was not significant, $F(1, 14) < 1$, suggesting infants looked about equally at the ignore (M = 22.6, SD = 7.4 and help (M = 25.3, SD = 10.2) events, $d = -0.30$). A Wilcoxon rank-sum test confirmed this result, $W = 63.5$, $P = 0.634$. Additional ANOVAs indicated that the no-group condition in experiment 3 did not differ from the outgroup condition in experiment 1 [Condition × Event interaction: $F(1, 28) < 1$], but did differ from the ingroup conditions in experiment 1 [Condition × Event interaction: $F(1, 28) = 6.56$, $P = 0.016$, $\eta_p^2 = 0.19$] and experiment 2 [Condition × Event interaction: $F(1, 28) = 7.52$, $P = 0.011$, $\eta_p^2 = 0.21$].

Although the novel labels used in the no-group condition of experiment 3 were identical to those in the ingroup condition of experiment 2, these labels were now embedded in "I saw an X!" phrases, and infants no longer interpreted them as providing information about the Es' group affiliations. As a result, the three Es remained uncategorized individuals who might or might not belong to the same group, and infants held no expectation as to whether E2 would help E1. This negative result, together with that of the outgroup condition in experiment 1, echo prior findings that

adults in minimal groups tend to treat outgroup individuals and uncategorized individuals similarly (1, 47).

In a final ANOVA, we pooled the test data from the two ingroup conditions in experiments 1 and 2 (ingroup experiment, $n = 32$) and those of the outgroup condition in experiment 1 and the no-group condition in experiment 3 (noningroup experiment, $n = 32$) to compare infants' looking times at the ignore and help events. The analysis yielded a significant main effect of event, $F(1, 60) = 6.56$, $P = 0.013$, $\eta_p^2 = 0.10$, and a significant Experiment × Event interaction, $F(1, 60) = 12.97$, $P = 0.001$, $\eta_p^2 = 0.18$. In the ingroup experiment, infants looked significantly longer if shown the ignore event (M = 29.1, SD = 5.8) as opposed to the help event (M = 17.8, SD = 5.4), $F(1, 60) = 19.05$, $P < 0.0001$, $d = 2.02$. In contrast, infants in the noningroup experiment looked about equally at the ignore (M = 20.9, SD = 7.1) and help (M = 22.8, SD = 10.0) events, $F(1, 60) < 1$, $d = -0.22$]. Wilcoxon rank-sum tests confirmed the results of the ingroup ($W = 159$, $P < 0.0001$) and noningroup ($W = 258.5$, $P = 0.835$) experiments.

General Discussion

Infants received a test trial in which a woman required instrumental assistance to achieve a goal, and another woman either provided the necessary assistance (help event) or chose not to do so (ignore event). When given labeling trials indicating that the two women belonged to the same minimal group (ingroup conditions of experiments 1 and 2), infants looked significantly longer if shown the ignore as opposed to the help event. In contrast, when the labeling trials either indicated that the two women belonged to different minimal groups (outgroup condition of experiment 1) or provided no information about the women's group affiliations (no-group condition of experiment 3), infants looked equally at the ignore and help events.

Our results suggest that by 17 mo of age, an abstract expectation of ingroup support already guides infants' reasoning about how individuals will act toward others. When an individual needed help and another individual from the same minimal group was present, infants expected this second individual to support her ingroup member; no such expectation arose when the two individuals were not members of the same group. Together, these results provide evidence for sociomoral-expectation accounts of IGF, which hold that an abstract expectation of ingroup support is an integral part of the "first draft" of human moral cognition.

Could our results be explained by other accounts of IGF? Although there is considerable evidence that infants can attribute motivational and other mental states to others (50), it seems unlikely that 17-mo-old infants could attribute sophisticated concerns for self-esteem (e.g., she will help the other bem because she wants to maintain a positive social identity as a bem), empathy (e.g., she will help the other bem because she feels particular concern for her plight), or reputational management (e.g., helping the other bem will help her maintain a good reputation as a member of the bem group). Baumard, André, and Sperber (51) have argued that given the high cognitive costs associated with calculating risks and opportunities at every turn, "securing a good reputation as a cooperator is more efficiently achieved, at the level of psychological mechanisms, by a genuine moral sense." In the same vein, we would argue that infants' reasoning about interactions among unfamiliar individuals in minimal groups is more easily explained by a genuine expectation of ingroup support.

Could this expectation, instead of being a part of the "first draft" of human moral cognition, be gradually learned via rich social and cognitive mechanisms, as suggested by acquired-norm accounts of IGF? Our results do not rule out such a possibility, although they set constraints on potential learning mechanisms. Specifically, our results would indicate that by 17 mo of age, infants not only have detected that an ingroup-support norm prevails in their social environments but also have abstracted and generalized this norm to such an extent that mere categorization of two unfamiliar individuals into the same minimal group (but not into different minimal groups or unspecified groups) is sufficient to elicit this expectation.

Future research can explore this issue further in at least two ways. First, evidence that an expectation of ingroup support is also present in younger infants would add weight to sociomoral-expectation accounts. Second, broader exploration of infants' concern for ingroup support would also be helpful. We have suggested that the principle of ingroup support has two corollaries, ingroup care and ingroup loyalty, which each carry a wealth of social expectations (30). Although there have been few investigations of ingroup care to date (the present research falls under this heading), several prior investigations could be said to provide evidence for early sensitivity to ingroup loyalty. For example, when faced with a speaker of their native language and a foreign speaker, infants ages 10–12 mo preferred toys or snacks endorsed by the native speaker (52, 53). Similarly, when faced with two groups of nonhuman characters, infants ages 7–12 mo expected members of each group to endorse conventional actions performed by the group (54). Although familiarity and generalization effects could contribute to these findings, they also are consistent with ingroup loyalty interpretations; ongoing experiments are exploring this possibility. The broader is the evidence for an early-emerging expectation of ingroup support, the more compelling will be the claim that this expectation constitutes an integral part of the basic structure of human moral cognition.

Finally, our results also support the assumption of sociomoral-expectation accounts that IGF is primarily about the preferential treatment of ingroups and the absence of preferential treatment for outgroups. Infants did not expect an individual in need of assistance to be ignored by noningroup members; rather, they held no particular expectation as to whether the individual would be helped or ignored. As Brewer (26) wrote, IGF is compatible with a wide range of attitudes toward outgroups, and additional mechanisms must be invoked to explain which specific attitudes develop.

Methods

Participants. Participants were 64 healthy infants (33 male; M = 16 mo, 29 d; range = 16 mo, 5 d to 17 mo, 27 d) from English-speaking families. Another 3 infants were excluded because they were fussy (1) or had a test looking time more than 2.5 SDs from the condition mean (one in the ingroup condition of experiment 1 and one in the ingroup condition of experiment 2).

Apparatus and Stimuli. The apparatus consisted of a brightly lit display booth (201 cm high × 102 cm wide × 78 cm deep) with a large opening (51 cm × 95 cm) in its front wall; between trials, a supervisor lowered a curtain in front of this opening. Inside the apparatus, the walls were painted white, and the floor was covered with a pastel adhesive paper. E1 wore a blue shirt and knelt at a window (51 cm × 38 cm) in the right wall, and E3 wore a gray shirt and knelt at a window (51 cm × 38 cm) in the left wall; each window had a curtain that could be drawn aside. E2 wore a green shirt and sat on a chair centered behind a window (78 cm × 102 cm) in the back wall. Behind the three Es, white curtains surrounded the apparatus and hid the testing room from the infant's view. During the testing session, the Es never made eye contact with the infant: As the events unfolded, they looked at each other or at the objects they acted on but otherwise kept their eyes on a neutral point on the apparatus floor. In the test trial, a clear box (7 cm × 27 cm × 16 cm) rested to the right of E1's window; the box contained four discs of different colors and sizes (1.5 cm × 6—9 cm in diameter). In front of E1 was a wooden base (1.5 cm × 10 cm in diameter) upon which the discs could be stacked. The fifth and smallest disc (1.5 cm × 5 cm in diameter) rested on the apparatus floor 75 cm from E1, out of her reach (but within E2's easy reach). To muffle sounds when E2 put down the smallest disc (and thus keep observers naive about which test event was being shown), the bottom of the disc was covered with felt. During each testing session, one camera captured an image of the events, and another camera captured an image of the infant. The two images were combined, projected onto a computer screen located behind the apparatus, and monitored by the supervisor to confirm that the trials followed the prescribed scripts. Recorded sessions were also checked off-line for observer and experimenter accuracy.

Procedure. Infants sat on a parent's lap centered in front of the apparatus; parents were instructed to remain silent and to close their eyes during the test trial. Two observers hidden on either side of the apparatus monitored each infant's looking behavior during the test trial; the observers were naive about which test event was shown in the trial. Looking times during the initial and final phases of the trial were computed separately, using the primary observer's responses. During the labeling trials, the primary observer was absent from the testing room and thus was also naive about the infant's experiment and condition. Interobserver agreement in the test trial was calculated by dividing the number of 100-ms intervals in which the two observers agreed by the total number of intervals in the trial. Agreement across experiments averaged 95% per infant. Each trial began with a paused pretrial that ended when the infant had cumulated 2 s of looking, to allow the infant to orient to the apparatus before the trial proper began. Each labeling trial was computer-controlled, lasted 18 s, and ended after the second round of labeling. The initial phase of the test trial was computer-controlled, lasted 32 s, and ended after E2 put down the smallest disc and paused. The final phase of the test trial was infant-controlled and ended when infants either looked away for 1.5 consecutive seconds after having looked for at least 10 cumulative seconds or looked for a maximum of 35 cumulative seconds. The 10-s minimum value allowed infants to process E2's actions before the trial could end. Preliminary analyses of infants' looking times during the final phase of the test trial in the ingroup and not-ingroup experiments (see final ANOVA in *Experiments*) revealed no interactions of experiment and event with either infant's sex or E1's label (bem or tig), both $Fs(1,56) < 1$; the data were thus collapsed across the latter two factors in subsequent analyses. See Dataset S1 for the data from all experiments.

ACKNOWLEDGMENTS. We thank the two reviewers, Melody Buyukozer Dawkins, Cynthia Fisher, Dan Hyde, and Fransisca Ting for helpful suggestions, as well as the families who participated in the experiments. The research was supported by a grant from the John Templeton Foundation (to R.B.) and a postdoctoral fellowship (NRF-2015S1A3A2046711) from the Korean National Research Foundation (to K.J.).

1. Balliet D, Wu J, De Dreu CKW (2014) Ingroup favoritism in cooperation: A meta-analysis. *Psychol Bull* 140:1556–1581.
2. Fehr E, Bernhard H, Rockenbach B (2008) Egalitarianism in young children. *Nature* 454:1079–1083.
3. Hewstone M, Rubin M, Willis H (2002) Intergroup bias. *Annu Rev Psychol* 53:575–604.
4. Killen M, Turiel E (1998) Adolescents' and young adults' evaluations of helping and sacrificing for others. *J Res Adolesc* 8:355–375.
5. Levine M, Prosser A, Evans D, Reicher S (2005) Identity and emergency intervention: How social group membership and inclusiveness of group boundaries shape helping behavior. *Pers Soc Psychol Bull* 31:443–453.
6. Renno MP, Shutts K (2015) Children's social category-based giving and its correlates: Expectations and preferences. *Dev Psychol* 51:533–543.
7. Brewer MB (1979) In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychol Bull* 86:307–324.
8. Dunham Y, Baron AS, Carey S (2011) Consequences of "minimal" group affiliations in children. *Child Dev* 82:793–811.
9. Patterson MM, Bigler RS (2006) Preschool children's attention to environmental messages about groups: Social categorization and the origins of intergroup bias. *Child Dev* 77:847–860.
10. Plötner M, Over H, Carpenter M, Tomasello M (2015) The effects of collaboration and minimal-group membership on children's prosocial behavior, liking, affiliation, and trust. *J Exp Child Psychol* 139:161–173.
11. Rhodes M (2012) Naïve theories of social groups. *Child Dev* 83:1900–1916.
12. Tajfel H, Billig MG, Bundy RP, Flament C (1971) Social categorization and intergroup behaviour. *Eur J Soc Psychol* 1:149–178.
13. Tajfel H, Turner JC (2004) The social identity theory of intergroup behavior. *Political Psychology: Key Readings, Key Readings in Social Psychology*, ed Jost JT, Sidanius J (Psychology Press, New York, NY), pp 276–293.
14. Hogg MA (2003) Social identity. *Handbook of Self and Identity*, ed Leary MR, Tangney JP (Guilford Press, New York, NY), pp 462–479.
15. Gramzow RH, Gaertner L (2005) Self-esteem and favoritism toward novel in-groups: The self as an evaluative base. *J Pers Soc Psychol* 88:801–815.
16. Cikara M, Bruneau EG, Saxe RR (2011) Us and them intergroup failures of empathy. *Curr Dir Psychol Sci* 20:149–153.
17. Dovidio JF, et al. (2010) Empathy and intergroup relations. *Prosocial Motives, Emotions, and Behavior*, ed Mikulincer M, Shaver PR (American Psychological Association, Washington, DC), pp 393–408.
18. Molenberghs P (2013) The neuroscience of in-group bias. *Neurosci Biobehav Rev* 37: 1530–1536.
19. Killen M, Cooley S (2014) Morality, exclusion, and prejudice. *Handbook of Moral Development*, ed Killen M, Smetana JG (Psychology Press, New York, NY), 2nd Ed, pp 340–360.
20. Killen M, Rutland A, Abrams D, Mulvey KL, Hitti A (2013) Development of intra- and intergroup judgments in the context of moral and social-conventional norms. *Child Dev* 84:1063–1080.
21. Rhodes M, Leslie S-J, Saunders K, Dunham Y, Cimpian (February 22, 2017) How does social essentialism affect the development of inter-group relations? *Dev Sci*, 10.1111/desc.12509.
22. Hirschfeld L (2001) On a folk theory of society: Children, evolution, and mental representations of social groups. *Pers Soc Psychol Rev* 5:107–117.
23. Plötner M, Over H, Carpenter M, Tomasello M (2016) What is a group? Young children's perceptions of different types of groups and group entitativity. *PLoS One* 11:e0152001.
24. Yamagishi T, Mifune N (2009) Social exchange and solidarity: In-group love or out-group hate? *Evol Hum Behav* 30:229–237.
25. Shweder RA, Much NC, Mahapatra M, Park L (1997) The "big three" of morality (autonomy, community, and divinity) and the "big three" explanations of suffering. *Morality and Health*, ed Brandt A, Rozin P (Routledge, New York, NY), pp 119–169.
26. Brewer MB (1999) The psychology of prejudice: Ingroup love and outgroup hate? *J Soc Issues* 55:429–444.
27. Cosmides L, Tooby J (2013) Evolutionary psychology: New perspectives on cognition and motivation. *Annu Rev Psychol* 64:201–229.
28. Rai TS, Fiske AP (2011) Moral psychology is relationship regulation: Moral motives for unity, hierarchy, equality, and proportionality. *Psychol Rev* 118:57–75.
29. Graham J, et al. (2013) Moral foundations theory: The pragmatic validity of moral pluralism. *Adv Exp Soc Psychol* 47:55–130.
30. Baillargeon R, et al. (2015) Psychological and sociomoral reasoning in infancy. *APA Handbook of Personality and Social Psychology, Volume 1: Attitudes and Social Cognition*, ed Borgida E, Bargh J (American Psychological Association, Washington, DC), pp 79–150.
31. Misch A, Over H, Carpenter M (2014) Stick with your group: Young children's attitudes about group loyalty. *J Exp Child Psychol* 126:19–36.
32. Rhodes M, Chalik L (2013) Social categories as markers of intrinsic interpersonal obligations. *Psychol Sci* 24:999–1006.
33. Diesendruck G, Deblinger-Tangi R (2014) The linguistic construction of social categories in toddlers. *Child Dev* 85:114–123.
34. Waxman SR (2010) Names will never hurt me? Naming and the development of racial and gender categories in preschool-aged children. *Eur J Soc Psychol Eur* 40:593–610.
35. Hamlin JK (2014) Context-dependent social evaluation in 4.5-month-old human infants: The role of domain-general versus domain-specific processes in the development of social evaluation. *Front Psychol* 5:614.
36. Hamlin JK, Wynn K, Bloom P (2007) Social evaluation by preverbal infants. *Nature* 450:557–559.
37. Hamlin JK, Wynn K, Bloom P, Mahajan N (2011) How infants and toddlers react to antisocial others. *Proc Natl Acad Sci USA* 108:19931–19936.
38. Olson KR, Spelke ES (2008) Foundations of cooperation in young children. *Cognition* 108:222–231.
39. Richter N, Over H, Dunham Y (2016) The effects of minimal group membership on young preschoolers' social preferences, estimates of similarity, and behavioral attribution. *Collabra* 2:1–8.
40. Rheingold HL (1982) Little children's participation in the work of adults, a nascent prosocial behavior. *Child Dev* 53:114–125.
41. Warneken F, Tomasello M (2006) Altruistic helping in human infants and young chimpanzees. *Science* 311:1301–1303.
42. Cortes Barragan RC, Dweck CS (2014) Rethinking natural altruism: Simple reciprocal interactions trigger children's benevolence. *Proc Natl Acad Sci USA* 111:17071–17074.
43. Carpenter M, Uebel J, Tomasello M (2013) Being mimicked increases prosocial behavior in 18-month-old infants. *Child Dev* 84:1511–1518.
44. Cirelli LK, Einarson KM, Trainor LJ (2014) Interpersonal synchrony increases prosocial behavior in infants. *Dev Sci* 17:1003–1011.
45. Over H, Carpenter M (2009) Eighteen-month-old infants show increased helping following priming with affiliation. *Psychol Sci* 20:1189–1193.
46. Buttelmann D, Böhm R (2014) The ontogeny of the motivation that underlies in-group bias. *Psychol Sci* 25:921–927.
47. De Dreu CKW, et al. (2010) The neuropeptide oxytocin regulates parochial altruism in intergroup conflict among humans. *Science* 328:1408–1411.
48. Halevy N, Bornstein G, Sagiv L (2008) "In-group love" and "out-group hate" as motives for individual participation in intergroup conflict: A new game paradigm. *Psychol Sci* 19:405–411.
49. Liberman Z, Kinzler KD, Woodward AL (2014) Friends or foes: Infants use shared evaluations to infer others' social relationships. *J Exp Psychol Gen* 143:966–971.
50. Baillargeon R, Scott RM, Bian L (2016) Psychological reasoning in infancy. *Annu Rev Psychol* 67:159–186.
51. Baumard N, André J-B, Sperber D (2013) A mutualistic approach to morality: The evolution of fairness by partner choice. *Behav Brain Sci* 36:59–78.
52. Kinzler KD, Dupoux E, Spelke ES (2012) "Native" objects and collaborators: Infants' object choices and acts of giving reflect favor for native over foreign speakers. *J Cogn Dev* 13:67–81.
53. Shutts K, Kinzler KD, McKee CB, Spelke ES (2009) Social information guides infants' selection of foods. *J Cogn Dev* 10:1–17.
54. Powell LJ, Spelke ES (2013) Preverbal infants expect members of social groups to act alike. *Proc Natl Acad Sci USA* 110:E3965–E3972.