

This is a repository copy of *What Is a Group? : Young Children's Perceptions of Different Types of Groups and Group Entitativity*.

White Rose Research Online URL for this paper:
<https://eprints.whiterose.ac.uk/96278/>

Version: Published Version

Article:

Ploetner, Maria, Over, Harriet orcid.org/0000-0001-9461-043X, Carpenter, Malinda et al. (1 more author) (2016) *What Is a Group? : Young Children's Perceptions of Different Types of Groups and Group Entitativity*. PLoS ONE. ISSN 1932-6203

<https://doi.org/10.1371/journal.pone.0152001>

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

What Is a Group?

Young Children's Perceptions of Different Types of Groups and Group Entitativity

Maria Plötner¹, Harriet Over², Malinda Carpenter^{1,3}, and Michael Tomasello¹

¹Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

²University of York, York, UK

³University of St Andrews, St Andrews, UK

Corresponding author:

Maria Plötner
Department of Developmental and Comparative Psychology
Max Planck Institute for Evolutionary Anthropology
Leipzig
Germany
04103
Email: maria_ploetner@eva.mpg.de
Tel: +49 341 3550 467
Fax: +49 341 3550 444

23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39

Abstract

To date, developmental research on groups has focused mainly on in-group biases and intergroup relations. However, little is known about children's general understanding of social groups and their perceptions of different forms of group. In this study, 5- to 6-year-old children were asked to evaluate prototypes of four key types of groups: an intimacy group (friends), a task group (people who are collaborating), a social category (people who look alike), and a loose association (people who coincidentally meet at a tram stop). In line with previous work with adults, the vast majority of children perceived the intimacy group, task group, and social category, but not the loose association, to possess entitativity, that is, to be a 'real group.' In addition, children evaluated group member properties, social relations, and social obligations differently in each type of group, demonstrating that young children are able to distinguish between different types of in-group relations. The origins of the general group typology used by adults thus appear early in development. These findings contribute to our knowledge about children's intuitive understanding of groups and group members' behavior.

keywords: group cognition, entitativity, social essentialism, social obligations, social relations

40 **What Is a Group? Young Children's Perceptions of Different Types of Groups and Group**
41 **Entitativity**

42 Young children grow up in a complex social world in which they are constantly flooded
43 with social information. Our social world is composed not only of individuals but of an array of
44 different relationships and social groupings. One challenge for children is to decipher which of
45 these social groupings are meaningful. People can appear to be a group from the outside, for
46 example simply because they are in close proximity to each other, but they can be connected
47 with each other at different levels: they can be kin or friends, be on the same sports or work
48 team, be part of the same national or language group, or they can be associated with each other
49 only briefly and loosely when, for instance, they take the same bus to get to the airport, or line up
50 at a counter at the same time. Determining the type of group to which an association of people
51 belongs is not only crucial for being able to understand individual group members' behavior but
52 can also be a short-cut to predicting how group members will relate to each other. For example,
53 one can expect kin or friends to be loyal to each other, but one might not expect this about people
54 who happen to be lining up at a counter at the same time. Another important form of predictions
55 that can be drawn from social groupings, but which has been understudied in previous research
56 (see also 1), regards the grouping as a whole. For example, a friendship is supposed to be a
57 longer-lasting, more coherent entity than a gathering in front of a counter.

58 When it comes to the perception of social groupings, Lickel and colleagues (2) have
59 argued that adults apply a folk typology, in which they intuitively distinguish between four
60 qualitatively different types of groups. In support of this idea, Lickel et al. (3) investigated how
61 adult participants sorted 40 examples of real-life groups, and how they rated each of these groups
62 on a set of eight group characteristics such as shared goals, similarity of group members,

63 interaction among group members, and group size. They found that participants distinguished
64 four basic types of groups: *intimacy groups* (such as families and friends), *task groups* (such as
65 work or sports teams), *social categories* (such as women or U.S. citizens), and *loose associations*
66 (such as people waiting in line at a counter). Participants associated different group
67 characteristics with each group type, for example a long duration and high levels of interaction
68 for *intimacy groups*, common goals and interaction in *task groups*, large size and member
69 similarity for *social categories*, and short duration and low levels of similarity and common
70 goals for *loose associations* (for an overview, see 2). Related research has shown that adults treat
71 some social groupings as entities (4-6). The extent to which a group appears to be a coherent
72 entity and therefore possesses a quality of “groupness” has been referred to as “entitativity” (2-5,
73 7). Lickel and colleagues showed that the four types of groups were perceived by adults to have
74 different levels of entitativity, with the highest level for *intimacy groups*, followed by *task*
75 *groups*, *social categories*, and *loose associations*.

76 This group typology has received further support and validation from work in
77 anthropology (8, 9). Interdisciplinary work has linked these different types of groups to different
78 relational models that are more or less prominent within each group type (10). For example,
79 communal sharing, a relationship in which I see “what is mine as yours” is more pronounced in
80 *intimacy groups* than in other types of groups. It has been argued that children do not develop a
81 fully-fledged concept of these different relational models before nine or ten years of age (8, 9).

82 Despite the theoretical importance of this group typology, very little research has
83 investigated its origins in childhood. Instead, developmental research on group cognition in
84 young children has focused mainly on children’s in-group biases, that is, their preference for
85 members of their own group over members of other groups. Research in this tradition has shown

86 that children prefer members of their own group on a variety of implicit and explicit measures
87 (11-14). Another line of research focuses on the inferences children draw about individuals based
88 on their group membership. For example, 4- to 6-year-old children predict what a person will do,
89 like, or intend on the basis of that person's gender, race, or ethnicity (15-17). Children also use
90 information about group membership to make inferences about social interactions: Knowing that
91 two individuals are either from the same or from two different groups influences their prediction
92 about whether those individuals will harm each other (around 4 years; 18), help each other (from
93 6 years; 18), or be friends with each other (from 7 years; 19).

94 However, this body of research leaves at least three significant gaps in our knowledge
95 about children's understanding of groups. First, previous research has focused primarily on just
96 one type of group: the one Lickel and colleagues refer to as *social categories*, thus limiting what
97 we can conclude about children's understanding of group relations more generally (although see,
98 e.g., 7, 20, 21, for work on preferential behavior towards intimacy and task group members).
99 Second, the main focus of this previous research has been on children's attitudes and
100 expectations about in-group as compared with out-group members. However, as illustrated in our
101 introductory examples, relationships among members of an in-group may differ in systematic
102 ways depending on the type of in-group to which they belong. Finally, previous work has
103 focused mainly on children's perceptions of and expectations about individual group members
104 rather than on their perceptions of and expectations about the group as a whole. It is thus
105 important for our understanding of the development of group psychology to ask whether children
106 distinguish different types of social groups and whether they expect relationships within and
107 characteristics of these types of groups to differ from each other.

108 One exception to this general trend is a study conducted by Svirydzenka and colleagues
109 (7). They found that 10-year-old children intuitively distinguish the same four main types of
110 groups as adults: *intimacy groups*, *task groups*, *social categories*, and *loose associations*. They
111 also judged the level of entitativity of different group types in similar ways as adults, but their
112 assessments seemed to rely on group characteristics that were more perceptually salient (for
113 example the level of interaction) than adults, who focused on more abstract features such as the
114 importance of the group for its members (22).

115 Inspired by this study and Lickel and colleagues' work (3), we investigated whether the
116 origins of this folk theory of groups could be seen even in children as young as 5 to 6 years of
117 age. This is an important age in the development of group cognition as 5 to 6 years appears to be
118 just at the border of explicit group understanding. It is at this age that children first show a more
119 general preference for in-group members, even in more abstract and novel groups (in the
120 minimal group paradigm; 21, 23). Furthermore, it is also at this age that children first become
121 able to predict intergroup relations in third party contexts at least for social categories (e.g., 16,
122 18)..

123 Thus our objective was to investigate whether, in addition to these preferences and
124 expectations, children of this age also have a more general understanding of groups and different
125 types of group – in other words, an early folk typology of groups. Several prominent theoretical
126 accounts of the origins of intergroup psychology postulate substantial development between the
127 age group in our study and the youngest age, so far, at which a group typology has been found,
128 10 years (24-26). However, given their relatively sophisticated abilities in other areas of group
129 cognition, we predicted that already by 5 to 6 years of age, children would be able to make subtle

130 distinctions between different types of groups and use this understanding in order to make
131 inferences about group members' behaviors within different group types.

132 As a first step, we measured children's spontaneous definition of a group. We did this to
133 investigate children's naïve, spontaneous ideas about groups, before presenting them with
134 different group types. We predicted that children would be able to give some appropriate
135 examples of groups and were especially interested in whether they would focus on one particular
136 example or definition when thinking about groups (e.g., mention just one group type), or whether
137 they would be able to give a more abstract definition (covering all group types, such as "a
138 collection of people"). Second, because recent work has shown that 5-year-old children have
139 comparable preferences for two types of group members – task group members and social
140 category members (21) – we investigated which of these two examples (operationalized as
141 people who work together vs. people who are similar to each other) children thought was most
142 representative of a group. Third, we investigated whether preschool children would see an
143 *intimacy group*, a *task group*, a *social category*, and a *loose association* as qualitatively different.

144 It was impossible, given the young age of our participants, to adopt the exact methods of
145 previous studies, which used complex tasks such as sorting of examples of groups and rating
146 multiple group characteristics for each example. To simplify the procedure so that young
147 children would understand it, we thus created a prototype for each of the four types of groups
148 and asked children to judge these prototypes on entitativity and 12 other group characteristics.
149 These group characteristics were generally inspired by the characteristics Lickel et al. (3) and
150 Svirydzenka et al. (7) chose. However, in addition, we asked about several further characteristics
151 that are important topics in recent work on the developmental origins of group psychology (e.g.,
152 20, 27, 28, 29) and anthropology (8, 9). There were four main sets of group characteristics. The

153 first three involved judgments and predictions about individual group members and group
154 member relationships (see, e.g., 27). The first set involved judgments about social obligations
155 and prosocial behaviors among group members (helping, sharing, and loyalty; e.g., 18, 20, 28,
156 30). The second involved the quality of group members' social relationships (liking, familiarity,
157 interdependence, and joint goals; 7, 31). The third involved properties marking fundamental
158 similarities among group members (group member similarity, shared preferences, and common
159 knowledge; 29, 32, 33). The fourth set, in contrast, involved traits of the group itself, concerning
160 characteristics that apply to the group as a whole, rather than to individual members
161 (permeability, continuance, and enitativity; 3). We predicted generally that children's
162 perceptions of and expectations about groups would be contingent upon the type of group they
163 were presented with and that they would recognize that a loose association was not a real group.

164 **Method**

165 **Ethics statement**

166 The present study strictly adhered to the legal requirements of the country in which it was
167 conducted, and a detailed procedure was approved in advance by the Ethics Committee of the
168 department in which it was conducted. In addition, parents of all children who participated in the
169 study gave informed written consent.

170 **Participants**

171 Participants were 48 5- to 6-year-olds (*mean* = 6 years, 0 months, 5 days; *range* = 5
172 years, 0 months, 3 days to 6 years, 10 months, 8 days) from a medium-sized city in Germany.
173 Half of the participants were female. Children were tested in their kindergarten. One additional
174 boy was tested but excluded from analyses due to extended interruption of his test session
175 because of the distraction caused by the noise level outside the testing room.

176 **Study Materials**

177 Children were presented with drawings (12.5 x 9.5 cm each) of four groups attached to a
178 30 x 21 cm piece of cardboard. Pictures were arranged in two rows; their positions were
179 counterbalanced, using 12 different arrangements (see Figure 1 for one version). Friends were
180 chosen as the prototype for *intimacy groups*, people who are building a house for *task groups*,
181 people who look alike for *social categories*, and people who are waiting at a tram stop for *loose*
182 *associations*. Each picture showed five individuals, three females and two males, casually
183 arranged in two rows and facing toward the front right. The position of males and females and
184 their hair styles (straight vs. curly for the males; short, long, or ponytail for the females) were
185 counterbalanced across pictures.

186 An initial pilot phase with 17 additional children confirmed that 5- to 6-year-olds
187 understood the verbal questions and the pictorial stimuli.

188

189 *Figure 1.* Study materials. Pictures for prototypes of (a) an *intimacy group*, (b) a *task group*, (c) a
190 *social category*, and (d) a *loose association*.

191

192 **Design and Procedure**

193 Children were tested in a quiet room in their kindergarten. After a brief conversation,
194 which served as a warm-up phase, the child and the experimenter sat at a table.

195 Before presenting any pictures, participants were asked about their spontaneous
196 definition of a group. The experimenter asked two open questions: (1) “What is a group?” and,
197 since piloting had revealed that most children understood the word “group” only as kindergarten

198 group (i.e., class), the experimenter always asked (2) “And besides kindergarten groups, do you
199 know any other groups?”

200 Following this, still without any pictures present, children were asked, “What is a better
201 example of a group: people who work together or people who are similar to each other?” The
202 order of the two examples was counterbalanced.

203 The four pictures were then brought out and introduced by the experimenter as follows
204 (in the order in which they were displayed on the piece of cardboard):

205 (a) Intimacy group (friends): “These people here are friends. Look, they’re all just about to
206 eat lunch.”

207 (b) Task group (people building a house): “These people here are building a house. Look,
208 they’re all just about to go on working on it.”

209 (c) Social category (people who look alike): “These people here look alike. Look, they’re all
210 wearing the same outfits.”

211 (d) People at the tram stop: “These people here are each waiting for a different tram. Look,
212 they all happen to be waiting at the same tram stop.”

213 Children then were asked to point at the pictures which showed a real group (“Which ones are
214 real groups?”; group entitativity, trial 1).

215 The experimenter then asked questions about 12 group characteristics, asking children to
216 point out the group that was most likely to have a particular feature. Children were asked about
217 helping (“In which picture do people help each other most?”), sharing (“In which picture do
218 people share their things with each other?”), loyalty (“In which picture should people not leave
219 each other?”), liking (“In which picture do people like each other most?”), familiarity (“In which
220 picture do people know each other best?”), interdependence (“In which picture do people need

221 each other the most?”), joint goals (“In which picture do people want to do something all
222 together?”), similarity (“In which picture are people most similar to each other?”), shared
223 preferences (“In which picture do people like the same things?”), common knowledge (“In which
224 picture do people know the same things?”), the groups’ low permeability (“In which picture
225 can’t one join easily?”), and lack of continuance (“In which picture will the people not meet
226 again?”). After each question, children were asked why they chose that group. Children were
227 asked the 12 questions in counterbalanced order, using a 12 x 12 Latin square design; that is,
228 there were 12 different order sets, with each question in each position exactly once. The 12
229 picture arrangements were randomly assigned to the 12 question order sets. Each combination
230 was tested both with a male and a female participant.

231 At the very end, children were again asked to point at the pictures which show a real
232 group (group entitativity, trial 2) to investigate whether the evaluation of the 12 group
233 characteristics would influence participants’ entitativity ratings.

234 **Coding and Reliability**

235 Children’s responses were coded from videotape. Children’s combined answers to the
236 first two questions about their definition of a group (i.e., “What is a group?” and “Besides
237 kindergarten groups, do you know any other groups?”) were coded in one of three hierarchical
238 categories from most abstract to most specific. The most abstract category was coded when
239 children gave a general, overarching definition of a group as a social collective, that is, if they
240 defined a group as a collection of people, (e.g., “People who belong together”). A middle
241 category between the most abstract and specific definitions was coded when children defined a
242 group as a collection of specific individuals, that is, as a collection of children, (e.g., “Many
243 children”). Participants never gave definitions of a group as a collection of specific individuals

244 other than children. The most specific category was coded if children gave one concrete example
245 of a group (e.g., a kindergarten class label). If children gave no answer or answers that fell in
246 none of these categories (e.g., “Where one can play”) they were coded as the fourth category
247 “other.” If children gave more than one answer, they were given credit for their most abstract
248 definition.

249 For the questions “Which ones are real groups?” (group entitativity, trial 1+2), it was
250 coded first which picture(s) were chosen. For a follow-up analysis, scores were then given for
251 the order in which children chose the pictures they thought were groups. For each child, the
252 picture that was chosen first was scored with the value 4, the second choice was scored with 3,
253 the third with 2, and the fourth with 1. If a picture was not chosen by a child, it was scored zero.

254 For the 12 group characteristics questions, it was coded which picture children chose. If
255 children did not choose any picture, or said “I don’t know,” this choice was coded as blank
256 (resulting in some N’s < 48).

257 Twenty-five percent of the data (12 children) were randomly chosen to be independently
258 coded by a second rater who was unaware of the aims of the study. Agreement between the two
259 coders was excellent (all Cohen’s κ ’s > .994).

260 **Results**

261 For all analyses, an equal split of the sample into a subset of 5- and a subset of 6-year-
262 olds, as well as into boys and girls, revealed a similar pattern of results, with no significant
263 differences between the age and gender groups except for a significant gender difference for the
264 group characteristic question on interdependence. There, girls ($n=8/24$) were more likely than
265 boys ($n=2/24$) to say that friends are interdependent. However, they did not do so significantly

266 above 25% chance level, thus we consider this a minor difference. We thus collapsed across the
267 factors gender and age for the analyses reported below.

268 **Definition of a “Group”**

269 First, children’s combined answers to the open questions (1) “What is a group?” and (2)
270 “Besides kindergarten groups, do you know any other groups?” were investigated (see Table 1).
271 The main finding was that very few children (only 8.3%) gave an answer indicative of a more
272 abstract definition of a group as a collection of people. If a collection of children is added to this,
273 the number rises to 52.1%. Thirty-seven percent of participants gave very specific, concrete
274 examples of groups to define what a group was, and all of the examples children gave were
275 kindergarten groups. Despite the fact that we specifically asked them to give examples of groups
276 besides kindergarten groups, no child, including those whose first description met the most
277 abstract category, could give a concrete example of a group besides kindergarten groups. Thus,
278 although almost half of the participants could give a more or less abstract definition of a group,
279 all examples they could think of spontaneously were limited to kindergarten groups.

280

281 *Table 1.* Percentage of children who gave each type of answer to the questions “What is a
 282 group?” and “Can you think of any other group besides kindergarten groups?” coded in
 283 hierarchical categories from most abstract to most specific.

% (N=48)	Coding categories from most abstract to most specific	Examples of children’s responses
8.3%	A collection of people	“Many people,” “People who belong together,” “Made up of people”
43.8%	A collection of children	“A lot of children,” “Children who are together,” “Many babies, or preschoolers”
37.5%	Concrete example(s) of groups	All examples were kindergarten groups, i.e., group labels from their kindergarten (e.g., “The butterflies,” “The flowers”) or “In a kindergarten”
10.4%	Other/ No answer	“Where one can play,” “A room,” “Where one has to get dressed”

284
 285 Next, we analyzed which of the two examples given children chose as the better example
 286 of a group. Most children (80.9%) chose “people who work together” as the better example of a
 287 group; the remaining 19.2% chose “people who are similar to each other.” This difference was
 288 significant (binomial test, $p < .01$; all reported p values are two-tailed).

289 **Group characteristics**

290 **Group entitativity.** In the first entitativity trial we investigated which of the four pictures
 291 children perceived as depicting a “real group.” As predicted, most of the children perceived
 292 friends (85.4%), people building a house (81.3%), and people who look alike (85.4%) as real
 293 groups. In contrast, only 33.3% of children perceived people at the tram stop as a real group.
 294 This difference was significant, $\chi^2(3, N = 137) = 13.04, p < .01$. The second trial at the end of the

295 session revealed almost identical results (friends: 89.6%, people building a house: 85.4%, people
296 who look alike: 89.6%, people at the tram stop: 35.4%; $\chi^2(3, N = 144) = 13.44, p < .01$). Thus
297 young children are able to accurately distinguish groups from mere collections of people.

298 In order to investigate whether children perceived any of the examples as more typical of
299 a group than others, in a follow-up analysis we investigated the order in which children chose the
300 pictures in the first trial. We reasoned that, if children view one type of group as a particularly
301 good example of a ‘real’ group, then they should choose it first. A Friedman test revealed a
302 significant difference between the four pictures’ scores ($\chi^2 = 31.54, df = 3, p < 0.01$). A post-hoc
303 analysis using the R-package “pgirmess” (34) revealed that this effect was driven by a lower
304 order score of the picture “people at the tram stop” (M score= 0.88, $SD = 1.38$) compared to each
305 of the other three pictures. That is, “people at the tram stop” was least often chosen to be a real
306 group or else was chosen later in the sequence. There were no pairwise differences between the
307 pictures “friends” ($M = 2.58, SD = 1.35$), “people building a house” ($M = 2.10, SD = 1.31$), or
308 “people who look alike” ($M = 2.85, SD = 1.44$), showing that children did not choose any of
309 these pictures more often, or earlier in the sequence, than the others. This suggests that children
310 see these three categories as equally representative of a real group. Again, the same pattern of
311 results was replicated for the second trial ($\chi^2 = 36.78, df = 3, p < 0.01$; with “people at the tram
312 stop” differing from the other three pictures in pairwise post hoc analyses).

313 **Group characteristics questions.** Finally, children’s answers to the questions about the
314 12 remaining group characteristics were analyzed. Since the justifications children gave for their
315 answers were often circular (e.g., “Friends share with each other because they are friends,” or
316 “People who look alike like the same things because they look alike”) or otherwise unhelpful, we
317 focused on children’s choices. To avoid problems associated with multiple testing, we performed

318 a downward analysis of the data before approaching the actual research question statistically
319 (35). As a first step, to see if the pattern of children's choices differed significantly from random
320 choices, a permutation test was computed (36, 37). For that, random choices were simulated by
321 permuting the original choices within each participant¹ over all questions 1000 times. After this,
322 chi-square tests across all responses were conducted for all these permutations as well as the set
323 of original data. To get an estimate of a p value as an indicator of whether the original choices
324 were significantly different from chance, the proportion of permutations that revealed a chi-
325 square test statistic at least as large as that of the original data ($\chi^2=304.36$) was estimated,
326 revealing $p = .001$. The distribution of children's choices in the original data thus differed
327 significantly from a random distribution.

328

329

¹ Permuting the choices within each participant controls for a participant's potential preferences for a particular picture and controls for non-independence of data (i.e., that participants provided multiple choices across all questions).

330 *Table 2.* The percentage of children who chose each picture for each group characteristics
 331 question. Since all children who made a choice (indicated by the *n*) chose just one picture for
 332 each question, rows add up to 100%. Choices that were made significantly above chance (25%)
 333 are in bold (binomial tests, all *p*'s < 0.01).

	Intimacy group (Friends)	Task group (People building a house)	Social category (People who look alike)	Loose association (People at the tram stop)	<i>n</i>
Obligations and prosocial behaviors					
Helping	20.8%	68.8%	6.3%	4.2%	48
Sharing	64.6%	14.6%	14.6%	6.3%	48
Loyalty	43.5%	26.1%	23.9%	6.5%	46
Nature of relationships					
Liking	43.8%	27.1%	16.7%	12.5%	48
Familiarity	36.2%	17.0%	42.6%	4.3%	47
Interdependence	20.8%	54.2%	18.7%	6.3%	48
Joint goals	31.4%	35.4%	27.1%	6.3%	48
Similarities between group members					
Similarity	4.3%	10.6%	59.6%	25.5%	47
Shared preferences	11.1%	33.3%	51.1%	4.4%	45
Common knowledge	22.7%	9.1%	56.8%	11.4%	44
Characteristics of the group as a whole					
No continuance	12.8%	6.4%	17.0%	63.8%	47
Low permeability	10.9%	26.1%	15.2%	47.8%	46

358 There were several interesting findings in this study. First, we found that when asked
359 “What is a group,” only a small minority of children (8.3%) were able to define a group
360 abstractly and generally as a collection of people. The vast majority of children defined a group
361 as a collection of children or by giving an example of a kindergarten group. None of them could
362 think of any concrete examples for a group beyond kindergarten groups. Thus, children do have
363 some understanding of what a group is; however their understanding is limited in that other types
364 of groups do not spontaneously come to mind for children as readily as they might for adults.

365 Second, when asked to choose which is the better of two given examples of a group, a
366 large majority of children chose people who work together over people who look similar. That is,
367 although children generally assume group members to be similar to each other in third-party
368 contexts (29, 32), when forced to choose between the two types of groups, groups based on
369 collaboration may be seen as stronger examples of groups than groups based on similarity for
370 young children. This is an interesting finding because previous accounts have usually stressed
371 perceptual salience, such as group markers, in children’s concepts of groups (e.g., 38). However,
372 a recent theoretical account from evolutionary anthropology suggests that social connections
373 based on collaborative activities are more deeply rooted than those based on group markers
374 indicating similarity (39). Thus it would be useful for future studies to further investigate
375 children’s understanding of and expectations about social groups that have collaborative roots.

376 Third, children’s judgments and expectations about four different types of groups and
377 their group members were examined. We found that a large majority of children judged an
378 *intimacy group*, a *task group*, and a *social category* to be real groups. The entitativity judgments
379 for each of these groups were almost identical, that is, children thought that each of these three
380 types of groups forms a coherent unit to the same degree. Only the *loose association* was judged

381 as being significantly lower in entitativity, and thus as qualifying less as a real group. Adults and
382 10-year-olds in previous studies (2, 7) judged the entitativity of *loose associations* to be lowest
383 as well, but in contrast differentiated the entitativity levels of the first three group types: They
384 rated entitativity highest for *intimacy groups*, followed by *task groups*, and *social categories*.
385 This finding thus reveals an interesting developmental pattern suggesting that, compared to
386 adults and older children, young children show a less fine-grained perception of group
387 entitativity.

388 However, a fourth set of findings showed that children did have a relatively sophisticated
389 understanding of the unique pattern of group characteristics associated with each group type.
390 This is an important contribution to the literature, as it shows that children distinguish different
391 types of in-group relations from each other. Children perceived the *intimacy group*, *task group*,
392 and *social category* as well as the *loose association* to have different patterns of group traits and
393 they judged that group members of these different types of groups would have different kinds of
394 characteristics, relationships, and obligations to one another. For example, children judged the
395 *intimacy* and *task group* members to have social obligations and to behave prosocially towards
396 one another. In particular, friends were judged to like, share with, and be loyal to each other, and
397 people building a house together were perceived to be interdependent and help each other.
398 Children's judgments thus correspond well with adult intuitions about the members of these two
399 types of groups, in that *intimacy groups* typically involve positive, long-lasting, reciprocal
400 relationships (40) with a focus on communal sharing (10), and *task groups* possess basic
401 qualities of cooperative interactions: interdependence and mutual help (39, 41). In addition these
402 findings suggest that children's judgments about different types of groups correspond well to the
403 way they behave toward members of these groups themselves. For example, preschoolers share

404 and direct others to share more with *intimacy group* members (20, 42), and they readily and
405 preferentially help their *task group* members (21, 43) and are sensitive to their interdependence
406 with them (44, 45). Children judged the *social category* members to be familiar with each other
407 and to possess properties marking fundamental similarities. In particular, people who look alike
408 were perceived as being similar more generally. Interestingly, they were also thought to share
409 similar preferences and common knowledge, indicating that children inferred similarities in
410 various mental states from observing similarity in the way people look. These findings thus
411 extend previous work showing that children perceive members of their *own* social categories as
412 similar to themselves and expect them to share the same preferences (46, 47) by demonstrating
413 that they make similar judgments about third-party social categories more generally.

414 Children judged the *loose association* to stand out with regard to its characteristics of a
415 group as a whole. That is, people who happen to stand at the same tram stop were perceived to
416 have a lack of continuance (i.e., they were unlikely to meet again). In addition, they were
417 expected to have low permeability, meaning children thought this group would be particularly
418 difficult to join. At first glance this is somewhat surprising, as, according to Lickel and
419 colleagues (3), such a transient group should theoretically be one that people can easily join and
420 leave, a judgment commonly made in adults. Interestingly, children frequently justified their
421 assessment by saying that one could not join these people at the tram stop because they were not
422 an actual group (e.g., "...because they don't belong together" or "...because they are strangers"),
423 echoing their evaluation in the entitativity trials (see above).

424 These results suggest that children as young as 5 years of age show the origins of an
425 intuitive group typology that is similar to that of adults. The set of group characteristics we chose
426 to ask about was based broadly on previous studies with adults and 10-year-olds (3, 7), with

427 additions that were relevant for the literature on young children. Given these and other
428 differences in the procedures across studies (such as the use of a simplified forced-choice task in
429 the current study instead of complex sorting and rating measures), a direct comparison of the
430 judgments of the young children in this study and those of adults and older children in previous
431 studies is not possible. However, some general parallels besides the evaluation of entitativity
432 discussed above can be drawn. As Bennett (22) notes, adults' evaluations of groups are based on
433 more underlying and abstract features than are those of children, who tend to focus on
434 characteristics that are easier to observe from outside (see also 48, 49). For example, adults
435 describe members of *intimacy groups* as being interdependent with and similar to each other.
436 Both the younger children in this study as well as the older children studied by Svirydzhenka and
437 colleagues (7) seemed not to share this conception, presumably because the interdependent
438 relationship and similarities of friends, for example, are not as straightforward and easy to
439 observe as the interdependence of a *task group*, or the similarity between members of a *social*
440 *category* (who often share observable markers such as similar clothing, skin color, or language).

441 In this study, we presented children with four types of groups, but it is possible that
442 preschoolers might distinguish even more than these four basic types, or might have a more fine-
443 grained perception of subtypes within these basic types. This needs to be examined in further
444 studies. One limitation of this study is that for practical reasons we only asked about one
445 prototype of each type of group. However, we would expect very similar findings on many of the
446 group characteristics questions for other prototypes. For example, Olson and Spelke (20) have
447 shown that children direct others to share equally with both friends and kin (two different
448 examples of *intimacy groups*), and the studies finding enhanced helping of and sensitivity to the
449 interdependence of *task group* members used various examples of task group contexts (21, 43,

450 50, 51). It is less clear at the moment whether children would expect different examples of *social*
451 *category* members (e.g., race, language, gender, minimal groups) to be as similar to each other as
452 in the current study. Previous studies show that children respond differently to different
453 examples of social categories (13, 52), so their expectations about different examples of social
454 category group members might well vary. This needs to be investigated in future research.

455 In summary, for 5- to 6-year-olds, not all groups are the same. By this age, children are
456 beginning to distinguish the same four key types of groups as adults: They judge them to be
457 different in nature, and associate different patterns of characteristics with each group type. This
458 study thus demonstrates how deeply rooted our folk group typology is. Holding different
459 intuitive theories about different types of groups likely influences not only how children perceive
460 groups, but also how they behave within groups, and how they understand and predict both intra-
461 and inter-group interactions. This study therefore casts new light on children's intuitive
462 understanding of groups and group members' relationships and has implications for theoretical
463 accounts of the origins of group psychology and thus the nature of the mature social mind.

464

465 **S1 Data.** Full anonymized dataset.

466

Acknowledgments

467

We thank the ESRC for supporting H. Over (grant number ES/K006702/1) and Roger

468

Mundry for help with statistical analyzes.

469

470

References

- 471 1. Hirschfeld LA. On a folk theory of society: Children, evolution, and mental
472 representations of social groups. *Personality and Social Psychology Review*. 2001;5(2):107-17.
- 473 2. Lickel B, Hamilton DL, Sherman SJ. Elements of a lay theory of groups: Types of
474 groups, relational styles, and the perception of group entitativity. *Personality and Social
475 Psychology Review*. 2001;5(2):129-40.
- 476 3. Lickel B, Hamilton DL, Wierzchowska G, Lewis A, Sherman SJ, Uhles AN. Varieties
477 of groups and the perception of group entitativity. *Journal of Personality and Social Psychology*.
478 2000;78:223–46.
- 479 4. Campbell DT. Common fate, similarity, and other indexes of the status of aggregates of
480 persons as social entities. *Behavioral Science*. 1958;3(1):14-25.
- 481 5. Brewer MB, Harasty AS. Seeing groups as entities: The role of perceiver motivation. In:
482 Sorrentino RM, Higgins ET, editors. *Handbook of motivation and cognition, Vol 3: The
483 interpersonal context*. 3. New York, NY: Guilford Press; 1996. p. 347-70.
- 484 6. Hamilton DL, Sherman SJ, Lickel B. Perceiving social groups: The importance of the
485 entitativity continuum. In: Sedikides C, Schopler J, Insko CA, editors. *Intergroup cognition and
486 intergroup behavior*. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; 1998. p. 47-
487 74.
- 488 7. Svirydzenka N, Sani F, Bennett M. Group entitativity and its perceptual antecedents in
489 varieties of groups: A developmental perspective. *European Journal of Social Psychology*.
490 2010;40:611–24.
- 491 8. Fiske AP. The 4 elementary forms of sociality - Framework for a unified theory of social-
492 relations. *Psychological Review*. 1992;99(4):689-723.

- 493 9. Fiske AP. Structures of social life: The four elementary forms of human relations:
494 Communal sharing, authority ranking, equality matching, market pricing. New York: Free Press;
495 1991.
- 496 10. Lickel B, Rutchick AM, Hamilton DL, Sherman SJ. Intuitive theories of group types and
497 relational principles. *Journal of Experimental Social Psychology*. 2006;42(1):28-39.
- 498 11. Kinzler KD, Dupoux E, Spelke ES. The native language of social cognition. *Proceedings*
499 *of the National Academy of Sciences of the United States of America*. 2007;104(30):12577-80.
- 500 12. Kinzler KD, Spelke ES. Do infants show social preferences for people differing in race?
501 *Cognition*. 2011;119(1):1-9.
- 502 13. Dunham Y, Baron AS, Carey S. Consequences of "minimal" group affiliations in
503 children. *Child Development*. 2011;82(3):793-811.
- 504 14. Patterson MM, Bigler RS. Preschool children's attention to environmental messages
505 about groups: Social categorization and the origins of intergroup bias. *Child Development*.
506 2006;77(4):847-60.
- 507 15. Waxman SR. Names will never hurt me? Naming and the development of racial and
508 gender categories in preschool-aged children. *European Journal of Social Psychology*.
509 2010;40(4):593-610.
- 510 16. Diesendruck G, haLevi H. The role of language, appearance, and culture in children's
511 social category-based induction. *Child Development*. 2006;77(3):539-53.
- 512 17. McGlothlin H, Killen M. Intergroup attitudes of European American children attending
513 ethnically homogeneous schools. *Child Development*. 2006;77(5):1375-86.
- 514 18. Rhodes M. Naïve theories of social groups. *Child Development*. 2012;83(6):1900-16.

- 515 19. McGlothlin H, Killen M, Edmonds C. European-American children's intergroup attitudes
516 about peer relationships. *British Journal of Developmental Psychology*. 2005;23:227-49.
- 517 20. Olson KR, Spelke ES. Foundations of cooperation in young children. *Cognition*.
518 2008;108(1):222-31.
- 519 21. Plötner M, Over H, Carpenter M, Tomasello M. The effects of collaboration and
520 minimal-group membership on children's prosocial behavior, liking, affiliation, and trust.
521 *Journal of Experimental Child Psychology*. 2015;139:161-73.
- 522 22. Bennett M. Children's social identities. *Infant and Child Development*. 2011;20(4):201-
523 22.
- 524 23. Dunham Y, Emory J. Of affect and ambiguity: The emergence of preference for arbitrary
525 ingroups. *Journal of Social Issues*. 2014;70(1):81-98.
- 526 24. Aboud FE. *Children and prejudice*. New York, NY: Basil Blackwell; 1988.
- 527 25. Nesdale D. The development of ethnic prejudice in early childhood: Theories and
528 research. In: Saracho ON, Spodek B, editors. *Contemporary perspectives on socialization and*
529 *social development in early childhood education*. Charlotte, NC: IAP Information Age
530 Publishing; US; 2007. p. 213-40.
- 531 26. Dunham Y, Baron AS, Banaji MR. The development of implicit intergroup cognition.
532 *Trends in Cognitive Science*. 2008;12(7):248-53.
- 533 27. Rhodes M. How two intuitive theories shape the development of social categorization.
534 *Child Development Perspectives*. 2013;7(1):12-6.
- 535 28. Kalish CW, Lawson CA. Development of social category representations: Early
536 appreciation of roles and deontic relations. *Child Development*. 2008;79(3):577-93.

- 537 29. Diesendruck G, Eldror E. What children infer from social categories. *Cognitive*
538 *Development*. 2011;26(2):118-26.
- 539 30. Misch A, Over H, Carpenter M. Stick with your group: Young children's attitudes about
540 group loyalty. *Journal of Experimental Child Psychology*. 2014;126:19-36.
- 541 31. Shutts K, Roben CKP, Spelke ES. Children's use of social categories in thinking about
542 people and social relationships. *Journal of Cognition and Development*. 2013;14(1):35-62.
- 543 32. Gelman SA. Psychological essentialism in children. *Trends in Cognitive Sciences*.
544 2004;8(9):404-9.
- 545 33. Diesendruck G, Markson L. Children's assumption of the conventionality of culture.
546 *Child Development Perspectives*. 2011;5(3):189-95.
- 547 34. Giraudoux P. *pgirmess: Data analysis in ecology*. [R package version 1.5.7.] 2013.
- 548 35. Zar JH. *Biostatistical analysis*. 4th ed. New Jersey: Prentice Hall; 1999.
- 549 36. Manly BFJ. *Randomization, bootstrap and Monte Carlo methods in biology*. New York:
550 Chapman & Hall; 1997.
- 551 37. Adams DC, Anthony CD. Using randomization techniques to analyse behavioural data.
552 *Animal Behaviour*. 1996;51:733-8.
- 553 38. Bigler RS, Liben LS. A developmental intergroup theory of social stereotypes and
554 prejudice. In: Kail RV, editor. *Advances in child development and behavior*. 34. San Diego, CA:
555 Elsevier Academic Press; US; 2006. p. 39-89.
- 556 39. Tomasello M, Melis AP, Tennie C, Wyman E, Herrmann E. Two key steps in the
557 evolution of human cooperation. *Current Anthropology*. 2012;53(6):673-92.
- 558 40. Trivers RL. Evolution of reciprocal altruism. *Quarterly Review of Biology*.
559 1971;46(1):35-57.

- 560 41. Bratman ME. Shared cooperative activity. *The Philosophical Review*. 1992;101:327-41.
- 561 42. Moore C. Fairness in children's resource allocation depends on the recipient.
562 *Psychological Science*. 2009;20(8):944-8.
- 563 43. Hamann K, Warneken F, Tomasello M. Children's developing commitments to joint
564 goals. *Child Development*. 2012;83(1):137-45.
- 565 44. Hamann K, Warneken F, Greenberg JR, Tomasello M. Collaboration encourages equal
566 sharing in children but not in chimpanzees. *Nature*. 2011;476(7360):328-31.
- 567 45. Warneken F, Chen F, Tomasello M. Cooperative activities in young children and
568 chimpanzees. *Child Development*. 2006;77(3):640-63.
- 569 46. Bennett M, Sani F. Children's subjective identification with social groups: A self-
570 stereotyping approach. *Developmental Science*. 2008;11(1):69-75.
- 571 47. McGraw KO, Durm MW, Durnam MR. The relative salience of sex, race, age, and
572 glasses in children's social perception. Sep 1989. *The Journal of Genetic Psychology: Research*
573 *and Theory on Human Development*. 1989;150(3):251-67.
- 574 48. Quintana SM. Children's developmental understanding of ethnicity and race. *Applied &*
575 *Preventive Psychology*. 1998;7(1):27-45.
- 576 49. Livesley WJ, Bromley DB. *Person perception in childhood and adolescence*. Oxford,
577 England: John Wiley & Sons; 1973.
- 578 50. Gräfenhain M, Behne T, Carpenter M, Tomasello M. Young children's understanding of
579 joint commitments. *Developmental Psychology*. 2009;45(5):1430-43.
- 580 51. Gräfenhain M, Carpenter M, Tomasello M. Three-year-olds' understanding of the
581 consequences of joint commitments. *Plos One*. 2013;8(9):e73039.

582 52. Kinzler KD, Shutts K, Dejesus J, Spelke ES. Accent trumps race in guiding children's
583 social preferences. *Social Cognition*. 2009;27(4):623–34.

584