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Children's prediction of others' behavior based on group vs. individual properties

Reut Shilo [a,*], Anika Weinsdörfer [b], Hannes Rakoczy [b], Gil Diesendruck [a]

[a] Department of Psychology and Gonda Brain Research Center of Bar-Ilan University, Israel
[b] Department of Psychology, University of Göttingen, Germany

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ABSTRACT

Predicting others' behavior is critical for everyday social interactions. Research indicates a development in the cues children rely on in making such predictions. The present studies investigated whether 5- and 8-year-olds from Germany and Israel (N = 136) rely on group preferences for predicting others' behavior, and whether their reliance on group preferences vary for in- and outgroups. Children were asked to predict the behavior of in- and outgroup members, while presented with conflicting information about a group's and an individual's preference. The main finding was that in both Germany and Israel, children – especially 8-year-olds – systematically predicted that novel group members would follow a group preference, but that an individual would maintain his/her own preference. Moreover, in neither country were children affected by the group membership of the target individuals. These studies reveal the protracted development of children's capacity to negotiate multiple sources of information for predicting people's behaviors.

1. Introduction

Predicting the way others will behave is an essential part of our everyday social functioning. Imagine you are invited to a dinner at a colleague's house, and as etiquette requires, you try to decide on a gift to bring. What kind of information do you recur to in order to make such a decision? The person's taste (if you know them…), what is considered a conventional gift (if the person is conventional…), information about what might be useful for that 'kind' of person (if you really know what 'kind' they are…)? In fact, these types of decisions are critical not only for special occasions, but in general for our everyday social interactions: how do you salute people, when is it OK to call people on the phone, how do you respond to people's questions? The capacity to predict what others like and the choices they prefer is crucial for functioning effectively in society. As such, an interesting question is how does this capacity develop in children, in particular, how do children learn to balance between different sources of information to predict others' behaviors. The present studies address this question by focusing on one key cue: information about a group's preferences.

Developmental studies reveal that children are capable of relying on various cues for making predictions about others' behaviors, such as information about the frequency of a particular behavior (Boseovski & Lee, 2006), a person's current goal (Gergely & Csibra, 2003), stereotypes about a person (Berndt & Heller, 1986), and a person's manifest preference (Fawcett & Markson, 2010). In a sense, the focus of most of these studies has been on assessing the type of information children might rely on to determine that an observed behavior is indicative of a more permanent *disposition* of the individual (Miller & Aloise-Young, 2018). For instance, if I see a friend

* Corresponding author at: Department of Psychology, Bar-Ilan University, Ramat-Gan, 52900, Israel.
E-mail address: reutshilo@gmail.com (R. Shilo).

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choosing red over white wine at a restaurant, can I infer that this choice manifests a general preference of that friend? Interestingly, this dispositionalist tendency seems to undergo substantial development between early to middle childhood (Rholes & Ruble, 1984; Yuill, 1993).

In one important experimental demonstration of this developmental transition, Kalish (2002) asked 5- and 7-year-olds to predict the behavior of a character after receiving information about the character's past behavior (e.g., preference for flowers of a certain color). Kalish found that although 7-year-olds in many circumstances predicted characters would show consistency in their future behaviors, 5-year-olds did not, often even predicting an opposite choice (see also, Liu, Gelman, & Wellman, 2007; though see Kalish, 2012). Kalish (2002) suggested that as children mature, they develop an understanding of abstract personal dispositions – traits – which serve as integrated cohesive constructs for explaining and predicting people's behaviors and mental lives more generally (see also Cain, Heyman, & Walker, 1997; Kalish & Shiverick, 2004).

Interestingly, this reluctance by young children to rely on a single piece of evidence in order to infer a general pattern, is not obtained when the evidence refers to a social group (Lawson & Kalish, 2006). In general, young children (Birnbaum, Deeb, Segall, Ben-Eliyahu, & Diesendruck, 2010), and even infants (Powell & Spelke, 2013), expect members of the same social group to have similar preferences and behave in similar ways. In fact, 5-year-olds give more weight to information about social category membership than personality traits, when inferring people's preferences (Diesendruck & HaLevi, 2006). This early emerging conceptualization of social categories – as stable and causally explanatory constructs affecting people's preferences and mental states more broadly (Rhodes, 2012) – also guides children's predictions of others' behaviors. For instance, it suffices for children to hear that boys have a particular preference, for them to generalize the preference to all other boys (Berndt & Heller, 1986; Taylor, 1996). Rhodes and Gelman (2008) elegantly demonstrated that whereas when characters were presented as individuals, 5-year-olds did not expect behavioral consistency (as found in Kalish, 2002, and others noted above), highlighting the gender membership of characters reversed this pattern. Kalish (2012) also found that although 5-year-olds did not predict within-*individual* consistency in abidance to behavioral norms, they did predict within-*category* consistency.

The general point is that from a young age, children seem to see social categories as binding, expecting members of a group to conform to the group's habits (Chalik & Rhodes, 2014; Foster-Hanson & Rhodes, 2019; Roberts, Gelman, & Ho, 2017). From a complementary perspective, already by age 3, children treat even arbitrary actions agreed upon by group members, as normative for the group (Kenward, 2012; Schmidt, Rakoczy, Mietzsch, & Tomasello, 2016). To the most part, these studies have addressed actions that have interpersonal or instrumental functions. A further interesting test are cases in which group actions manifest sheer preferences.

This brief review reveals that from a young age, children can rely on information about an individual to make predictions about his/her future behavior, and can do similarly based on information about a group. There seems to be nonetheless, a developmental difference, such that whereas dispositionalism with regard to personal traits emerges around school-entry, normativity regarding group characteristics is manifest already in preschool. Crucially, moreover, in all the cases reviewed above, children had primarily one source of information to determine their decision. One of the central goals of the present studies was to assess how children make such decisions when these two types of information conflict. In particular, in predicting future behavior, how much weight do children give to information about non-binding group preferences in general, and in cases where it conflicts with information about individuals' preferences in particular?

In order to address this goal, the studies adopted a similar methodology to the one used by previous studies (e.g., Chalik, Rivera, & Rhodes, 2014; Kalish, 2012; Kalish & Shiverick, 2004), with several important modifications. First, differently from the studies by Kalish and colleagues, in the present studies "group preferences" were always pitted against an alternative (e.g., "individual preferences"). For instance, children were told that a group has a preference for a certain kind of flower, and that an individual member of that group has a preference for a different kind of flower. Children were asked to predict what kind of flower that same individual – or another one – would choose in the future. This modification thus allowed assessing the relative weight of different cues, in children's prediction. Second, differently from Chalik et al. (2014), the predictions were about preferences and behaviors of a neutral non-social content (e.g., flower preference) as opposed to negatively valenced inter-personal content (e.g., who should one harm). In this sense, the present studies did not involve emotional or attitudinal biases, but rather sheer beliefs about the generalizability of different sources of information. Third, and for the same reason just described, unlike Rhodes and Gelman (2008), we did not present group preferences that would be strongly associated with familiar stereotypes (as in their use of gender), but rather groups and preferences that were unrelated. Finally, we presented the category information not as rules, and unrelated to any social or instrumental functions, but instead as not explicitly binding group preferences. This allowed us to assess whether, and at what age, children treat even such preferences normatively.

A second goal of the studies was to assess whether the relative weight of group information in children's predictions about a person's behavior varied as a function of the person's group membership – namely, whether the group was the child's in- or outgroup. In recent years, research has accumulated that from early on in development, children manifest inter-group biases. Children reliably prefer ingroups over outgroups, more readily associate their ingroups with positive attributes, and do so even in cases where group membership is established on arbitrary grounds, such as the color of clothing (Aboud, 2003; Benozio & Diesendruck, 2015; Bigler & Liben, 2007; for an overview see Dunham, 2018).

Among adults, it has been argued that these biases reflect different conceptualizations of in- and outgroups, such that whereas ingroup members are represented as individuals, outgroup members are construed as mere category exemplars (see Fiske & Neuberg, 1990; Hugenberg, Young, Bernstein, & Sacco, 2010; Judd & Park, 1988; Macrae & Bodenhausen, 2000). Developmental research indicates that such differential construals may be present already by age 5 (Birnbaum et al., 2010; Guinote, Mouro, Pereira, & Monteiro, 2007; McGlothlin, Killen, & Edmonds, 2005). In particular, two recent studies found that 5- and 8-year-olds believed

outgroup members to be biologically more homogeneous than ingroup members (Shilo, Weinsdorfer, Rakoczy, & Diesendruck, 2018), and were more likely to explain an outgroup member's behavior, as opposed to an ingroup member's, in reference to the group as opposed to the individual (Essa, Weinsdorfer, Shilo, Rakoczy, & Diesendruck, 2020). Importantly, both among adults and children, the above bias has been found primarily among members of majority groups, with members of minority groups showing weaker or even the opposite bias (see for instance, Birnbaum et al., 2010; Kinzler & Dautel, 2012). Given this potential effect of group status, as a first attempt at establishing the phenomenon, we focused here on children of majority groups.

Thus a second goal of the present work was to examine whether a similar inter-group construal bias is manifest in children's predictions of others' behaviors. We hypothesized that if indeed children tend to view outgroup members more qua tokens of a homogenous type than ingroup members, then they should tend to favor different schemas of prediction of behavior as a function of the agent's group-membership. Namely, they should tend to predict the behavior of outgroup members by reference to generic group properties (such as adherence to group norms) but predict the behavior of ingroup members by reference to individual properties. We focused on majority children in Germany and Israel, as previous studies with similar populations had evinced different construls of groups based on national/ethnic categories salient in these countries (Essa, Weinsdörfer, Shilo, Rakoczy, & Diesendruck, 2020; Shilo, Weinsdörfer, Rakoczy, & Diesendruck, 2018).

Two studies were conducted in order to address the above two goals. In Study 1, children received information about the preferences of a group (either the participants' in- or outgroup) and of an individual. In different trials, children were asked to predict either that same individual's future preference, or a different individual's – from the same group – preference. Study 2 used a slightly different method to try to capture potential effects of group membership. Both studies were conducted with 5- and 8-year-olds, as these age groups mark interesting developmental transitions in terms of the potential weight of individual vs. group information in children's prediction of future behavior (Kalish, 2002), as well as in children's construal of in- and outgroups (Diesendruck & HaLevi, 2006; Shilo et al., 2018).

Importantly, we conducted the studies cross-culturally, such that Study 1 was conducted in Germany, and Study 2 in Israel. Both countries encompass a majority that associates itself with secular values, and a salient Muslim minority (Germans with Turkish origins in Germany, and Muslim Palestinian Arabs in Israel). At the same time, whereas in Israel the groups' interrelation is shaped by a protracted violent conflict, resulting in a heightened salience of intergroup boundaries (Bar-Tal & Teichman, 2009), in Germany, the relation between the investigated groups is less delineated, their salience accordingly lower. The results of the two studies could thus illuminate the weight of social group information in children's predictions of future behaviors, across two different cultural contexts.

2. Study 1

2.1. Method

2.1.1. Participants

Our sample comprised 32 5-year-old (58 % female; M_{age} = 5.13, range = 4.25–5.92) and 40 8-year-old German children (50 % female; M_{age} = 7.94, range = 7.00–9.00). All children were recruited in Göttingen, a city with 1.2 % residents with Turkish migrant background (Department for Statistics and Elections of the City of Göttingen (GÖSIS) (2016)), allowing us to study children's intuitive ideas about the chosen outgroup. Children came from mixed socio-economic backgrounds and were recruited via urban kindergartens and a local database. To ensure as much as possible that children categorized themselves as "German", we only recruited monolingual German native speakers. Five-year-olds were tested in their kindergartens, whereas 8-year-olds were tested at the lab of the University of Göttingen. Children received a small reward in gratitude for their participation. All parents had given written consent before their children were tested. Data were collected between March 2017 and July 2017.

2.1.2. Design

In eight trials, children were asked to predict the behavior of an individual in- or outgroup member. *Group membership* ("Germans" as ingroup/"Turks" as outgroup) varied between trials. Further, we included *target of generalization* (different/same) as a second within-subjects factor. The crossing of these two within-subjects factors resulted in four questions about the ingroup, and four about the outgroup, half of each kind about the same target and half a different target (i.e., 2 questions regarding each combination of group membership and target of generalization). *Age group* (5-year-olds/8-year-olds) served as a between-subjects factor.

2.1.3. Procedure

2.1.3.1. Introduction of groups. The experimenter provided each child with a definition of both the in- and the outgroup. To this end, the experimenter first presented children with two PowerPoint Presentation slides on each group – the first slide always depicting an individual group member, the second slide a group of people. The individual characters introduced themselves via a recorded audio in either German or Turkish (order of groups was counterbalanced). Thus, ingroup and outgroup members were presented as differing in terms of language (a crucial marker of social categories; DeJesus, Hwang, Dautel, & Kinzler, 2018; Hirschfeld & Gelman, 1997; Kinzler & Dautel, 2012). Additionally, we defined group membership by different countries of origin (i.e., Germany or Turkey). To keep in- and outgroup membership salient during the experiment, we took several steps. First, we marked group membership by shirt color (either blue or red; counterbalanced between groups). Second, we introduced the individual characters in each trial by using prototypical names (German names for ingroup, and Turkish names for outgroup characters). And finally, the experimenter explicitly

referred to group membership in every trial – except for in the test-questions.

2.1.3.2. Prediction task. After the introduction, children were presented with 8 trials asking them to predict the behavior of an individual group member. The gender of the target individual matched the gender of the participant. Specifically, children were asked to predict which of three objects an individual in- or outgroup member would choose. Before each question, the experimenter presented children with slides depicting either a group or an individual, and while pointing to representative objects depicted on the slide, taught children which object the group as a whole liked most (e.g., "Germans particularly like a kind of flower called Papaver."; see Fig. 1), as well as which object a specific member of that group would prefer (e.g., "This is Anna, she is German, and particularly likes a flower called Tulipa"). Information about the group as a whole and information about the specific group member always conflicted. The order of the information was counterbalanced across participants, such that each participant was presented with trials in which group information was presented first and trials in which individual information was presented first. Prediction questions ensued, according to the particular trial type: (1) In the different target trials, children were asked to predict the behavior of a *novel* member of the same group (e.g., "This is Rose, another German girl. Which flower will she pick? Papaver [i.e., the group norm], Tulipa [i.e., the individual preference], or Pellegrini [i.e., a novel – idiosyncratic – option]?" – the experimenter pointed to each option as she named them).; (2) In the same target trials, children were asked to predict the future behavior of the *same* group member about whom they had been told a preference (e.g., "Anna"). The order of the trials type was counterbalanced across participants. Group-membership alternated across trials. The dependent variables were the number of times children chose the "group-norm" objects, the number of times they chose the "individual-preference" objects, and the number of times they chose the "novel" objects, in each group membership by target of generalization trial (maximum = 2). "Novel" objects were included so as to allow children an idiosyncratic object choice, i.e., giving children the option to choose neither the "group object" nor a different group-member's object, but rather an entirely "untagged" new object.

2.2. Results and discussion

We conducted a Repeated-Measures ANOVA, with *age group* (5-year-olds/8-year-olds) as a between-subjects variable, and *group membership* (ingroup/outgroup), *target of generalization* (different /same), and *object type* (group-norm object / individual-preference object / novel object) as within-subjects variables. The mean number of choices of objects of each type were entered as dependent-variables. The analysis revealed a significant effect of *object type*, F (2, 140) = 16.07, $p < 0.001$, $\eta^2 = 0.187$, a significant interaction between *object type* and *target of generalization*, F (2, 140) = 34.83, $p < 0.001$, $\eta^2 = 0.332$, and a three-way interaction between *object type*, *target of generalization,* and *age group*, F (2, 140) = 7.27, $p = 0.001$, $\eta^2 = 0.094$. Interestingly, the analysis did not reveal any effects involving *group membership* (all *ps* >.5).

In order to understand the source of the three-way interaction, we conducted two separate Repeated-Measures ANOVAs, one for each age group, with *target of generalization* (different /same) and *object type* (group-norm / individual-preference / novel) as within-subjects variables. The mean number of choices of objects of each type were entered as dependent-variables.

2.2.1. year-olds

We found a significant interaction between *target of generalization* and *object type*, F (2, 62) = 7.98, $p = .002$, $\eta^2 = 0.2$. Breaking this interaction according to generalization target revealed that, in the *different target* trials, there was a significant effect of *object type*, F (2, 62) = 4.77, $p = .024$, $\eta^2 = 0.133$. Bonferroni post hoc tests revealed that 5-year-olds chose significantly more the group-object (M = 1.87, SD = 1.29) than the individual-object (M = 0.9, SD = 0.64), $p = 0.01$, but neither differed from the frequency of choices of the novel object (M = 1.21, SD = 1.01), *ps* > .2. Comparisons against chance performance (chance = 1.33) revealed that 5-year-olds chose the group object more often than would be expected by chance, $t(31) = 2.37$, $p = 0.024$, and the individual object less often than would be expected by chance, $t(31)$=-3.77, $p = 0.001$. Their frequency of choices of the novel object did not differ significantly from chance, t

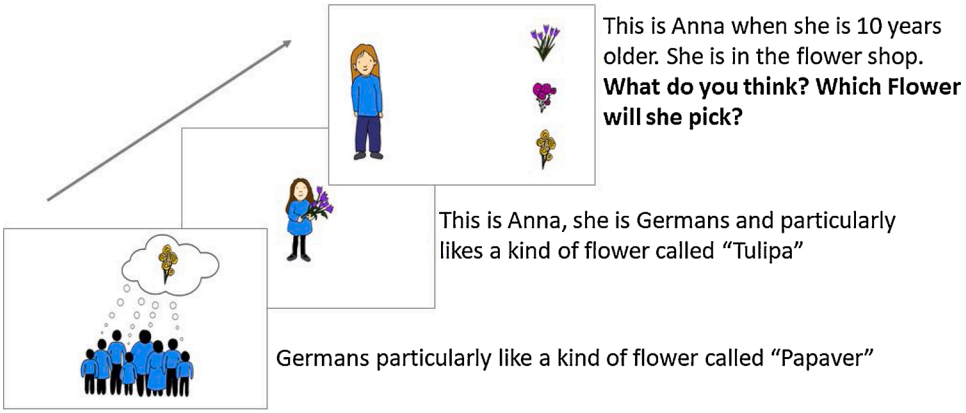


Fig. 1. Example of same-target trial in Study 1.

(31)=-0.59, $p = 0.56$ (see Fig. 2).

In the *same target* trials, again there was a significant effect of *object type* $F(2, 62) = 8.49$, $p = 0.002$, $\eta^2 = 0.215$. Bonferroni post hoc tests revealed that 5-year-olds chose significantly less the novel object ($M = 0.65$, $SD = 0.7$) than the group object ($M = 1.4$, $SD = 1.01$), $p = 0.004$, and the individual object ($M = 1.9$, $SD = 1.26$), $p = 0.001$. There was no significant difference between the latter two object types, $p = 0.536$. We again compared 5-year-olds' frequency of object choice to chance (chance = 1.33), and found that 5-year-olds chose the individual object more often than would be expected by chance, $t(31) = 2.69$ $p = 0.011$, and the novel object less often than would be expected by chance, $t(31)$=-5.47, $p < 0.001$. Their frequency of choices of the group object was not significantly different from chance, $t(31) = 0.48$, $p = 0.68$ (see Fig. 2).

2.2.2. year-olds

Also among 8-year-olds there was a significant interaction between *target of generalization* and *object type*, $F(2, 78) = 36.42$, $p < .001$, $\eta^2 = 0.48$. Breaking this interaction according to generalization target revealed that, in the *different target* trials, there was a significant effect of *object type*, $F(2, 78) = 27.11$, $p < 0.001$, $\eta^2 = 0.41$. Unlike the 5-year-olds, Bonferroni post hoc tests showed that 8-year-olds significantly preferred the group-object ($M = 2.6$, $SD = 1.29$) over the individual-object ($M = 0.87$, $SD = 1.13$), $p < 0.01$, and the novel object ($M = 0.5$, $SD = 0.82$), $p < 0.01$. There was no significant difference in children's choices between the individual and the novel objects, $p = 0.44$. Here too, we compared 8-year-olds' tendency to choose each object to chance performance (chance = 1.33). We found that 8-year-olds chose the group object more often than would be expected by chance, $t(39) = 6.17$, $p < 0.001$, and the individual object, $t(39)$=-2.55, $p = 0.015$, and the novel object, $t(39)$=-6.26, $p < 0.001$, less often than would be expected by chance (see Fig. 2).

In the *same target* trials, again a Repeated Measures ANOVA revealed a significant effect of *object type*, $F(2, 78) = 18.35$, $p < 0.001$, $\eta^2 = 0.32$. And here too, unlike the 5-year-olds, Bonferroni post hoc tests showed that 8-year-olds significantly preferred the individual-object ($M = 2.62$, $SD = 1.6$) over the group-object ($M = 0.77$, $SD = 1.27$), $p < 0.01$, and the novel object ($M = 0.6$, $SD = 1.12$), $p < 0.01$. There was no significant difference in children's choices between the group and the novel objects, $p = 1$. Comparisons against chance revealed that 8-year-olds chose the individual object more often than would be expected by chance, $t(39) = 5.06$, $p < 0.001$, and the group object, $t(39)$=-2.77, $p = 0.008$, and the novel object, $t(39)$=-4.11, $p < 0.001$, less often than would be expected by chance (see Fig. 2).

The results of Study 1 indicate that when young German children were introduced to a group preference, they predicted that people would follow that preference, even if it was not binding, and they witnessed a group-member who did not act in accordance to that preference. This pattern was stronger among 8-year-olds than among 5-year-olds. In particular, whereas the former predicted that a character would conform to a group preference above any other alternative preference, the latter did not systematically differentiate between a group preference and a completely novel preference. We will return to this developmental difference in the General Discussion.

Analogously, when introduced to a group preference and an individual's preference, German children predicted the individual would follow his/her preference in the future, and not the group's. Here too, 8-year-olds were more systematic than 5-year-olds. For instance, whereas the former predicted that the character would follow his/her preference more than any other alternative, the latter predicted that the individual and the group preference would be equally probable.

As for our second goal – the possible effect of group membership – we found no evidence in its support. Namely, the patterns described above occurred in very similar ways in trials where the characters belonged to the participants' ingroup as in trials where characters belonged to the outgroup. In order to further assess this possible effect, we conducted a second study in which: a) we incorporated several methodological changes in the hopes of making the task more sensitive to this particular factor, and b) tested children in Israel, a cultural context in which certain social groups are more salient than those assessed in Germany.

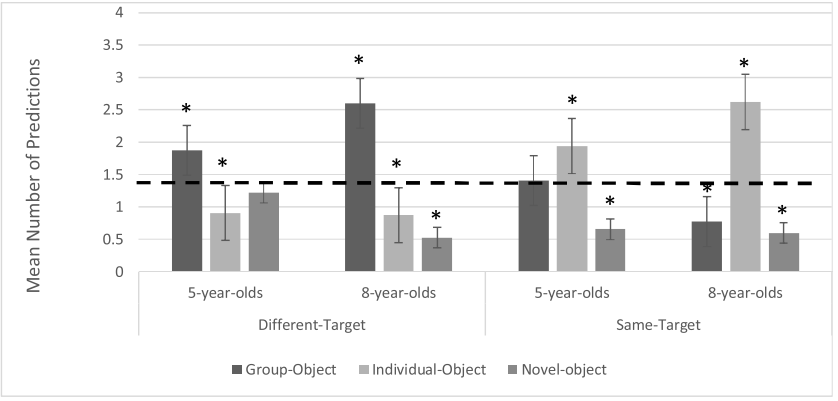


Fig. 2. Results of Study 1.
Note. Error bars indicate standard errors. The dashed line marks chance level. Asterisks mark a significant difference from chance-level.

3. Study 2

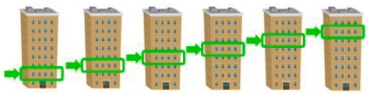
The goal of Study 2 was to assess the potential effect of group membership on children's predictions with a more sensitive measure and in a different population – namely, Israeli Jewish children. Regarding the major methodological changes, given our interest in re-assessing the effect of group membership, in Study 2 we only included *different target* trials. The results of Study 1 indicated that it was in these trials that children showed reliance on group information, and thus we reasoned that these were the trials in which potential differences between responses to in- and outgroups were most likely to appear. Secondly, instead of assessing *how many times* children determined a prediction based on a particular dimension, in Study 2 we assessed *the extent* – on a 6-point scale – to which children determined based on a particular dimension – with the "*group preference*" at one pole, and the "*individual prefe*rence" at the other. Thirdly, in order to even more saliently distinguish between an individual's and a group's preference, in Study 2 we explicitly described the individual's preference as contradicting the group's. Finally, evidently we replaced the identity of the target groups, here using "Jews" as ingroup and "Arabs" as outgroup. These are familiar terms for Jewish Israeli 5-year-olds, who also essentialize (Diesendruck, 2013) and hold intergroup attitudinal biases (Bar-Tal & Teichman, 2009), in their respect.

3.1. Method

3.1.1. Participants

32 5-year-old (60 % female; M_{age} = 5.1, range = 3.8–6.4) and 32 8-year-old Israeli children (57 % female; M_{age} = 7.9, range = 7.1–8.6) participated in the study. As in Germany, we focused on children of a majority population with only limited contact with the respective minority outgroup. Israeli children were recruited in the suburbs of Tel Aviv, where Jews constitute the majority (99.9 %; The Israeli Central Bureau of Statistics, 2015). Children had a middle-class, secular Jewish background, and were tested in Israeli kindergartens and schools. Only children with parental signed permission participated. Children received a small reward in gratitude for their participation. Data were collected between January and May, 2018.

Table 1
List of items used in Study 2.

Group / individual preference (counterbalanced)	Group / individual preference (counterbalanced)	Scale
Like stars	Don't like stars	Which scarf will he buy? 
Like low floors	Like high floors	Where would she like to live? 
Like thin things	Like thick things	Which pen will he use? 
Like yellow things	Like green things	Which car will she buy? 
Like being around a few people	Like being around many people	With whom would he like to go on a walk? 
Like small things	Like big things	Which tree will she prefer? 

3.1.2. Design

In six trials, children were asked to predict the behavior of an individual in- or outgroup member. Group membership ("Jews" as ingroup/"Arabs" as outgroup) varied between trials, resulting in three questions about the ingroup, and three about the outgroup. The order of group-membership alternated for each child, and was counterbalanced across participants. Age group (5-year-olds/8-year-olds) served as a between-subjects factor.

3.1.3. Procedure

3.1.3.1. Introduction of groups. The group introduction was almost identical to the one in Study 1. The ingroups were presented as "Jews" or "Jewish", outgroup as "Arabs" or "Arabic". The one difference from Study 1 was that given the nature of the groups used in Israel, the "country of origin" was not mentioned.

3.1.3.2. Prediction task. After the introduction, children were presented with 6 trials asking them to predict the behavior of an individual group member. Specifically, children were asked to predict which of 6 objects/activities, presented in a 6-point-scale – with the "group preference" at one pole, and the "individual preference" at the other pole – an individual in- or outgroup member would choose (see Table 1 for a full list of items).

Before each question, the experimenter presented children with a slide depicting a group, and while pointing to representative objects depicted on the slide, taught children which object the group as a whole liked most (e.g., "Jews like yellow things."; see Fig. 3). Next, the experimenter presented a slide depicting a specific member of that group, and while pointing to representative objects depicted on the slide, taught children which object this individual would prefer, in contradiction to the group preference (e.g., "This is Yahav. Yahav is Jewish. She doesn't like yellow things, she likes green things, like these."). Information about the group as a whole and information about the specific group member always conflicted, and information about the group preference was always presented first. In the test questions, children were asked to point at the object/activity another in/outgroup member would prefer ("This is another Jewish girl. Her name is Noa. Which car do you think she will buy?"). Between the six questions and between children, we counterbalanced whether the group's or the individual's preference was represented by the left or by the right pole. For coding, we defined the group's pole as a score of 6, and the individual's pole as a score of 1.

3.2. Results and discussion

First, we conducted a Repeated-Measures ANOVA, with *age group* (5-year-olds/8-year-olds) as a between-subjects variable, and *group membership* (ingroup/outgroup) as a within-subjects variable, using children's preference score (1–6) as dependent-variables. This analysis revealed no main effect, F (1, 62) = 0.33, p = 0.56, η^2 = 0.005, or interaction, F (1, 62) = 0.004, p = 0.953, η^2< 0.001, involving group membership. The analysis did reveal a main effect of age, F (1, 62) = 13.7, $p < 0.001$, $\eta^2 = 0.18$, such that 8-years old made predictions based on group preference ($M = 4.5$, $SD = 1.02$) more often than 5-year-olds ($M = 3.6$, $SD = 1.02$). We next assessed whether children's answers were biased towards either end of the scale, by comparing each age group's pattern to the mid-point of the scale (3.5). One-sample t-tests revealed that whereas 5-year-olds' predictions did not differ from the mid-point (for ingroup: $t(31) = 0.12$, $p = 0.91$, for outgroup: $t(31) = 0.762$, $p = 0.45$), 8-year-olds consistently predicted that the target would act according to the group preference (for ingroup: $t(31) = 4.1$, $p < 0.001$, for outgroup: $t(31) = 4.1$, $p < 0.001$) (see Fig. 4).

Finally, we assessed whether there was a difference between ages in the distribution of children's responses. To that end, we counted the number of extreme (1 or 6) or intermediate (2–5) responses children of the different ages gave. A chi-square analysis comparing the distributions of responses between ages came out not significant, χ^2 (1, $N = 392$) = 0.49, $p = .49$. Nevertheless, as can be

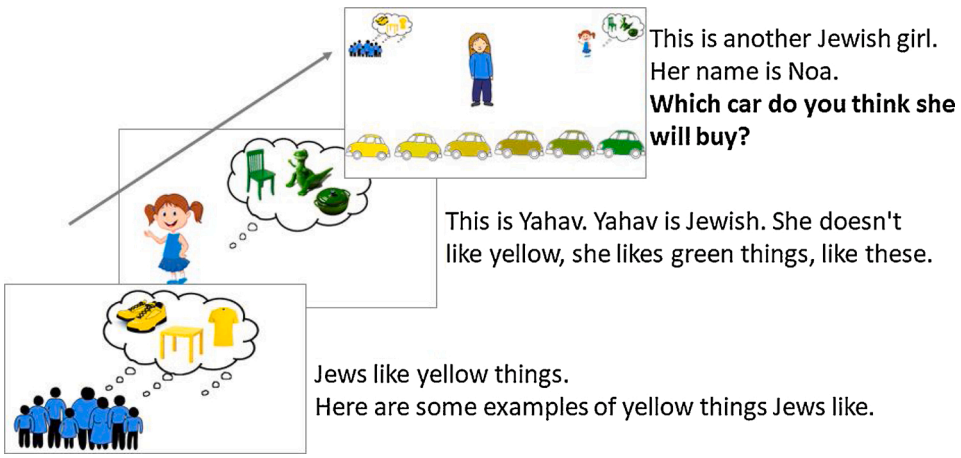


Fig. 3. Trial example in Study 2.

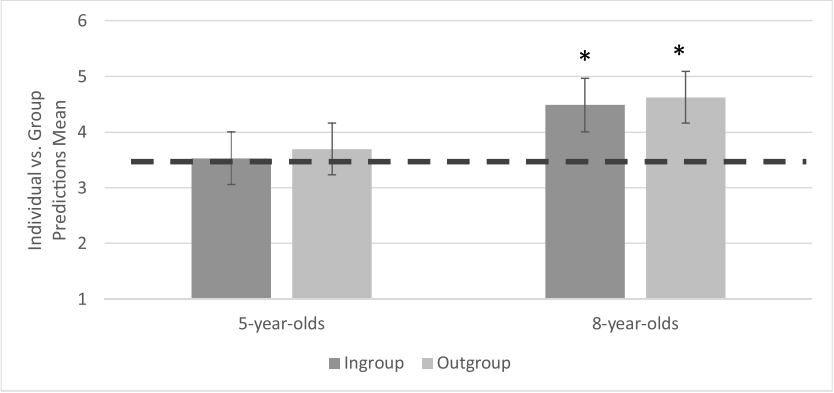


Fig. 4. Mean scores in Study 2.
Note. The y-axis represents children's mean-prediction choices, ranging from: 1="*individual-preference*" to 6 = "*group-preference*". The dashed line marks the mid-point of the scale. Asterisks mark a significant difference from the mid-point of the scale.

seen in Fig. 5, whereas 5-year-olds' responses were distributed fairly equally between the two extreme ends, most of 8-year-olds' responses leaned towards the high-end (i.e., the group-preference end) of the scale.

The findings from Study 2 replicated those from Study 1, insofar as group-membership did not affect children's predictions. This was so despite the adoption of a different measure that would have allowed for more variance in children's responses, and testing children living in a society with a very salient in- and outgroup distinction. Study 2 did reveal in clearer fashion the developmental differences hinted at in Study 1. Namely, in Study 2, whereas 8-year-olds systematically relied on group norms when predicting others' behaviors, 5-year-olds did not.

One arguable explanation for this difference is that 5-year-olds may have had more difficulty than 8-year-olds with the new measure. This kind of measure required children to engage in somewhat more sophisticated reasoning, namely, that not only will the target choose in accordance to the group preference, but that in addition, the target will choose the closest item to the group preference. It is possible that 5-year-olds had difficulty making this additional inference. It is apparent that 5-year-olds did not use the full range of the scale, and tended to choose the poles of the scale (doing so on 75 % of the trials). Yet, 8-year-olds did not use the full range either, choosing the poles to a similar extent as 5-year-olds (72 % of the trials). It is thus unlikely that the new measure can account for the age difference we found. Rather, the age difference may indeed result from developmental changes in children's reliance on different sources of information – a point to which we return in the General Discussion.

4. General discussion

The present studies aimed to assess two main questions regarding children's ability to predict others' behavior: a) to what extent children predict that others will behave in accordance with a group's arbitrary preferences, and b) whether children manifest an intergroup bias in behavior prediction, i.e. whether children rely on group preferences more strongly for outgroup than for ingroup others. We addressed these questions in two studies, conducted with 5- and 8-year-olds in two different national contexts: Germany

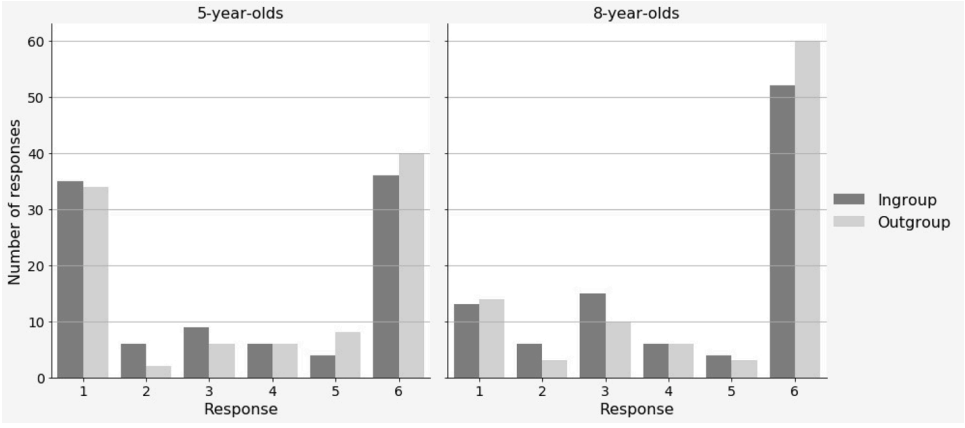


Fig. 5. Distribution of scores in Study 2, among 5- (left panel) and 8-year-olds (right panel).
Note. The response scale ran from 1= "*individual preference*", to 6 = "*group preference*".

and Israel.

Regarding our first question, we found developmental changes in children's tendency to rely on group – and individual – preferences as cues for predicting others' behaviors. First, replicating previous findings (e.g., Kalish, 2002; Rhodes & Gelman, 2008), we found that 8-year-olds were more likely than 5-year-olds to predict that a person's preference would remain consistent across time. This was particularly evident in Study 1, in which, when provided with information about both, a group's preference and an individual's preference opposite to the group's, 8-year-olds reliably answered that the individual would more likely act according to his/her individual preference in the future than the group's. Five-year-olds in these cases, did not reliably distinguish between these two possibilities.

Second, we found that the weight of group preferences as a cue for predicting others' future behavior, also undergoes developmental changes. In particular, in both Studies 1 and 2, when presented with information about a group preference and the contrasting preference of a group member, 8-year-olds reliably expected a new member of the group to share the same preference as the group. In turn, 5-year-olds in Study 1 also manifested this expectation – though not as selectively as did 8-year-olds, and in Study 2 they did not reliably predict conformity to the group preference.

A number of factors may account for these developmental differences. First, as others have argued, an understanding of stable traits seems to congeal only around age 7- or 8-years, once explicit theory of mind abilities have sufficiently matured (Cain et al., 1997; Chalik et al., 2014; Kalish & Shiverick, 2004; Rholes & Ruble, 1984; Yuill, 1992). Thus, in the present tasks, 5-year-olds may have been less inclined to believe an individual would maintain his/her preference through time. Second and related, this may have been especially challenging in trials where a group-preference contradicted an individual's. As previous studies have shown, information about groups constitute a powerful pull in children's inferences (e.g., Kalish, 2012; Rhodes & Gelman, 2008). Somewhat countering this latter possibility, notice that in Study1, 5-year-olds did not prefer the group object over the novel one, and even in Study 2, where group preferences were explicitly described as contradicting an individual's preference, 5-year-olds followed the group preferences only at chance-level. Regarding the attractiveness of the novel object, this is consistent with previous studies showing that at a young age, children do not generalize object preferences from one individual to the other (Diesendruck, Salzer, Kushnir, & Xu, 2015; Kushnir, Gopnik, Chernyak, Seiver, & Wellman, 2015). As for the chance-level performance in Study 2, it is possible that 5-year-olds might have been especially confused as whether to make a prediction based on the preference of the ethnic group or the gender-match individual – gender being arguably a salient social category already at this young age (Shutts, 2015). Although we cannot rule out this possibility, previous studies with Israeli children have shown that ethnicity does trump gender in driving 5-year-olds' inferences about individuals' psychological characteristics (Birnbaum et al., 2010). In sum, there seem to be a number of possible explanations for this developmental trend. Nevertheless, by 8-years of age, children are quite adept at balancing these different sources of information to predict others' behaviors.

The above findings are consistent with the notion that from an early age, children treat social categories as sources of commitments (Lawson & Kalish, 2006; Rhodes, 2012). Even infants expect groups members to behave in similar ways (Powell & Spelke, 2013), a tendency maintained by children as they develop (Birnbaum et al., 2010; Foster-Hanson & Rhodes, 2019; Roberts et al., 2017). And although previous studies had shown that in some circumstances children also predict others' behaviors based on group membership (Chalik et al., 2014; Kalish & Shiverick, 2004; Kalish, 2012; Rhodes & Gelman, 2008), the present studies clarify this tendency in important way. In particular, the present studies reveal that children expected novel group members to conform to a group's preference even when: a) the group preferences were presented merely as such, in other words, not as binding rules, b) the preferences regarded fairly tame issues, detached from group stereotypes, social relations, and affective attitudes, and c) a legitimate alternative was manifested by another member of the same group.

These particularities of the present studies reinforce the notion that one of the corollaries of having rich representations of social groups, is the expectation that group behaviors are normative (Chudek & Henrich, 2011; Diesendruck, 2020; Schmidt et al., 2016), and that people should be driven to conform to group preferences and behaviors (Cialdini & Goldstein, 2004; Claidière & Whiten, 2012; Haun & Tomasello, 2011; Schillaci & Kelemen, 2014). An optimistic observation regarding this conclusion is that *what* is considered normative may be revisable. In particular, a recent study found that exposing children to counter-stereotypic preferences (vis-a-vis gender), led to a revision in children's predictions of other group members' behaviors (King, Scott, Renno, & Shutts, 2020). Nevertheless, the present findings suggest that the manifestations of this naïve theory of social groups undergoes development. In particular, generating theory-based predictions may be harder than, for instance, generating theory-based explanations.

On the one hand, this developmental gap seems counterintuitive, since explaining an event requires better conceptualization of it, and better verbal abilities, than predicting an event. On the other, this pattern is similar to one previously found in other domains, in particular, the development of a naïve psychology (Bartsch, 1998) and a naïve biology (Legare, Wellman, & Gelman, 2009). A few explanations have been offered for this gap, pointing to the interaction between cognitive factors and person judgments. Following Kuhn (2012) conceptualization, in early childhood, the process of constructing and revising mental models of people's behaviors in the face of new experience may occur at an implicit level. As children gain more explicit understanding within the specific domain, it allows them to generate predictions based on the causal factors operating in that domain. Wellman and Liu (2007) argue that explanation has the advantage of knowing the outcome, and that when engaging in an explanation, a child needs to use an easier "reverse engineering", which narrows the possibilities compared to a forward causal chain (prediction), with its large number of possible outcomes. A major function of person judgments is to allow reliable predictions of others' behavior. Here we show that children's reliance on group norms and membership for predictions is developmentally protracted.

The second main question assessed in the present studies had to do with whether the weight of group preferences as a cue for predicting others' behaviors vary depending on the group-membership of targets. Given the early emergence of inter-group biases in children's attitudes (e.g., Aboud, 2003; Benozio & Diesendruck, 2015; Bigler & Liben, 2007; Dunham, 2018), and construals (e.g.,

Shilo et al., 2018), we hypothesized that children would predict behaviors of outgroups and ingroups differently, referring to group membership more often in predicting an outgroup ("Arabs"/ "Turks") than an ingroup member's ("Jews"/ "Germans") behavior. To our surprise, this hypothesis was not confirmed, with children generating similar predictions regarding the behavior of ingroup and outgroup members. Furthermore, this null finding was fairly robust, being manifest across ages, measures, and cultures. The latter is especially revealing given the important differences in inter-group relations and overall group salience between Germany and Israel.

One could argue that the reason we did not find an effect of group-membership had to do with methodological issues. Although we cannot rule out this line of explanation, several aspects of our paradigm caution against it. First and foremost, our findings reveal that children understood the task; they just did not differentiate between targets' group membership. In particular, in both studies we found that children predicted that people would follow a group preference, and in Study 1 we found that this was constrained to a situation when they were not given any information about a person's preference. In other words, children – definitely the 8-year-olds – understood what the group preferences entailed. Second, the pattern was found using two somewhat different prediction tasks: one relying on a forced-choice between options, and the other on a gradient measure. And third, the introduction of the groups was made in a way similar to that done in previous studies, which had very similar populations of participants (e.g., Essa et al., 2020; Shilo et al., 2018). Thus, it is unlikely that the present participants were unfamiliar or somehow oblivious to the group membership of the characters.

Another explanation for these null findings is that perhaps competing motivations canceled each other out. Namely, although outgroups are commonly seen as more homogeneous than ingroups, there are cases in which the reverse is the case – especially cases in which ingroup cohesion is pursued. Although this line of explanation is plausible, we believe it to be less likely. Previous studies conducted with the same majority populations have shown that even if children do value group-cohesion, their inter-group biases are more powerful, and could be detected in different measures using similar operationalizations of group membership (Essa et al., 2020; Shilo et al., 2018). Moreover, the alluded reversed bias is more typically encountered among minority members (e.g., Birnbaum et al., 2010; Kinzler & Dautel, 2012), arguably resulting from an interest in reinforcing one's threatened group identity (see Diesendruck, 2020, for a discussion). In fact, it would be interested to examine this issue with minority populations.

A final plausible explanation for this null finding has to do with the notion alluded to before regarding the difficulty children may find with relying on their domain theories to generate predictions. It may be the case that also regarding their naïve sociology, children are capable of recurring to group membership to make property generalizations (Shilo et al., 2018) and explain behavior (Essa et al., 2020), at an earlier age than for predicting others' behavior. It would be interesting in this regard to assess slightly older children. In general, further studies, with different groups and methodologies, may help elucidate this issue.

In conclusion, our findings reveal that from an early age children take group preferences as important cues for predicting group members' future behavior. By age 8, nonetheless, information about an individual's preference overtakes the weight of group preferences in children's predictions. Even by age 8, however, the group membership of targets still does not affect children's expectations. These findings portray the protracted development of the capacity to negotiate multiple sources of information for predicting people's behavior, a crucial road for children to become adept social partners.

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