

FOUNDATIONS OF INGROUP BIAS AND SIMILARITY BIAS IN 2-YEAR-OLDS

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## Abstract

The powerful influence of group membership and similarity on perceptions and behaviour is well established; however, questions remain about the developmental trajectory of these patterns and the extent to which similarity bias and ingroup bias are truly distinct. In this thesis, I examined the relative impact of group membership and similarity on matching and non-matching identification, expression of similarity, extension of preferences, transgression attribution, selective helping and resource allocation among 2.5- to 3-year-old children. These findings suggest that early in life, the responses to similarity and group membership are largely overlapping; however, children in the similarity condition were more likely to select the matching puppet in transgression attribution, non-matching identification, and resource allocation. This pattern suggests that children display a stronger approach bias in the similarity condition and that similarity bias shows developmental discontinuity between early and later childhood.

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## Chapter 1: Introduction

From early in our evolutionary history, humans have structured their lives around social groups (e.g., Kurzban, Tooby, & Cosmides, 2001). It is, thus, unsurprising that humans consider group affiliation to be an important and informative trait. Research in social psychology has provided numerous examples of how group-based cognition influences attitudes, perceptions and behaviour among adults (e.g., DeCremer & Leonardelli, 2003). Specifically, it is well-documented that adults see group membership as valuable information when evaluating others (e.g., Lieberman & Linke, 2007); this tendency is often referred to as 'ingroup bias' (e.g., St. Claire & Turner, 1982; Brewer & Silver, 1978; Brown, 2000). Adults even appear to prioritize group affiliation above and beyond similarity to the self (e.g., Billig & Tajfel, 1973).

More recently, the concept of ingroup bias has sparked the interest of developmental psychologists, raising questions about the foundations and development of this bias early in life. Our predisposition to attend to others in our social world can be seen from birth. Newborns display indiscriminate mimicry of facial expressions (Meltzoff & Moore, 1983), and 2-day-old neonates prefer to look at biological motion over non-biological motion when presented with point-light displays (Simion, Regolin, & Bulf, 2008). The remarkably early onset of these behaviour patterns suggests an evolved interest in other humans, who in turn influence our subsequent behaviour. As infants develop, they gradually become more attentive to the varying qualities of those around them. For example, 3-month-old infants reared in a relatively homogenous racial environment prefer to look at

faces from their own race over faces of individuals of a different race (Bar-Haim, Ziv, Lamy, & Hodes, 2006). Infants as young as 5 months appear to prefer a character who has acted prosocially over one who has acted antisocially (Hamlin & Wynn, 2011).

Thus, it would seem that as infants develop they come to focus on what are considered 'socially relevant' characteristics of those around them. It is still unclear, however, how young children come to use group membership to evaluate others. The present study will examine the manifestation of ingroup bias and similarity bias early in life, with the aim to evaluate the relative impact of these qualities on perceptions and behaviour among young children. Social psychology has identified a number of features of ingroup bias among adults and provides a framework for the present study. Adults are more likely to report positive associations with their ingroup (e.g., Smith & Tyler, 1997), as well as overestimate the self-similarity of ingroup members and the dissimilarity of outgroup members (e.g., Rothgerber, 1997; Rouhana, O'Dwyer, & Morrison-Vaso, 1997). They are more likely to attribute negative character traits to the outgroup (e.g., Franco & Maass, 1996), and engage in selective helping favoring the ingroup (e.g., Billig & Tajfel, 1973). These tendencies are described in greater detail below. For the purposes of this study, I created an age-appropriate task to examine these features of ingroup bias in 2-year-olds. The findings of this study will cast light on the relative impact of similarity and group membership on perceptions early in life, and help to identify the developmental trajectory of this important component of social cognition.

## 1.1 Ingroup Bias

Ingroup bias refers to the tendency for individuals to evaluate and treat members of their own group more favorably than those outside their group (e.g., Machunsky, Meiser, & Mummendey, 2009; Bigler & Liben, 2007; Billig & Tajfel, 1973; Dunham, Baron, & Banaji, 2008; Dunham, Baron, & Carey, 2011). This pattern is reliable and pervasive; it has been documented across ages (Dunham, Baron, & Banaji, 2008), cultures (Yamagishi, Jin, & Kiyonari, 1999), and even species (Mahajan, Martinez, Gutierrez, Diesendruck, Banaji, & Santos, 2011).

Ingroup bias, both explicit and implicit, is implicated in numerous social issues including selective hiring (e.g. Lewis & Sherman, 2003), ethnocentrism (e.g. Taylor & Moriarty, 1987), and gang violence (e.g. Dunbar, 2002). Social psychologists have examined this powerful influence on behaviour for decades. For example, Sherif and colleagues' (1961) examination of group norms in his classic "Robber's Cave" experiment demonstrated that healthy, typically developing boys at summer camp can engage in surprisingly strong forms of ingroup bias, even resorting to dangerous and malicious actions in the context of intergroup conflict.

In 1970, Tajfel provided a more carefully controlled examination of ingroup bias through 'minimal group' experiments. The minimal group paradigm involves the establishment of a group label with no other qualities of a group. Membership is anonymous, and the group is dissolved after the experiment. Using reward-allocation matrices, Tajfel demonstrated that mere categorization with a group label is sufficient to induce preferential treatment of ingroup members (Tajfel, 1970).

When a dimension of similarity rather than a group label is used, favoritism exists to

a much lesser extent (Billig & Tajfel, 1973). One common concern about minimal group studies is that results may be due to demand characteristics; however, follow-up studies have ruled out this possibility by varying the participants' knowledge of experimental hypotheses to determine that it is in fact ingroup bias responsible for this behaviour (St. Claire & Turner, 1982).

More recently, researchers have examined instances of ingroup bias in childhood. Patterson & Bigler (2006) demonstrated that preschool children sorted into classroom color groups display some components of ingroup bias after only 3 weeks. In some classrooms, the groups were emphasized and used in day-to-day activities (e.g., for 'circle time' the children were asked to sit red-blue-red-blue). In other classrooms, the children were sorted, but the groups were not emphasized or used in classroom organization. Children in classrooms where the groups were emphasized displayed more components of bias (e.g., peer ratings, novel person preference) compared to children in classrooms where the groups were not emphasized (Patterson & Bigler, 2006). This study demonstrates that children are sensitive to environmental messages about groups, and display ingroup bias from a very young age.

#### *Theoretical Accounts of Ingroup Bias*

A number of accounts for the origin of ingroup bias have been proposed, including those focusing on ultimate, adaptive mechanisms (e.g., Nowak & Sigmund, 2005), as well as proximate mechanisms such as protection against social exclusion (e.g., Bernstein, Sacco, Young, Hugenberg, & Cook, 2010), enhancement of perceived social status (e.g., Nesdale & Flessler, 2001), and increased likelihood of reciprocity

(e.g., Yamagishi, Jin, & Kiyonari, 1999). For example, Nowak & Sigmund (2005) have emphasized an evolutionary predisposition to favor group members; selective altruism benefits the group, resulting in an evolutionary advantage for members of groups employing this strategy. Evolutionary game theory states that successful helping strategies are spread within groups by heritability and/or imitation. Thus, strategies that encourage selective ingroup helping could be passed on between generations, giving the group a survival advantage (Nowak & Sigmund, 2005). Furthermore, Kurzban, Tooby, & Cosmides (2001) demonstrated that arbitrary cues to group affiliation can be encoded as strongly as race, suggesting our evolved “encoding machinery” is flexible enough to attend to whichever features serve as the most useful cues to group affiliation. Together, these studies provide a compelling case for an evolved predisposition for ingroup bias.

Studies of more proximate mechanisms suggest that ingroup bias may in part serve as a protective factor against social exclusion (Bernstein et al., 2010). The experience of social exclusion results in a salient, negative emotional reaction; even exclusion by a despised outgroup such as the Ku Klux Klan causes these effects (e.g., Gonsalkorale & Williams, 2007), but exclusion by ingroup members is even more painful (Bernstein et al., 2010). It is possible that this enhanced aversive reaction to social exclusion by the ingroup contributes to the measures we take to maintain ingroup bonds.

A second proximate explanation was suggested by Yamagishi, Jin, and Kiyonari (1999), who argued that ingroup bias is the product of an expectation of reciprocity via a generalized exchange system. They refer to this phenomenon as the

'bounded generalized reciprocity principle'; people have a tendency to believe that if they give group members preferential treatment, third-party ingroup members will reciprocate by treating them preferentially in the future, even if they were not involved in the initial interaction. This idea seems most practical for small groups, wherein individuals are aware of many interactions that take place between other group members. However, this pattern of thinking can also be seen on a much wider scale. For example, people tend to believe that if they stop to help someone with car trouble, some other person would be more likely to stop and help them in the future (Yamagishi, Jin, & Kiyonari, 1999). The widely held belief in "karma" may be one example of these expectations.

Another proximal account for ingroup bias is referred to as 'Social Identity Theory', which states that individuals' attitudes toward ingroup and outgroup members originate from their desire to identify with "superior" groups to enhance self-esteem (Tajfel & Turner, 1979, as cited in Nesdale & Flessner, 2001). Therefore, individuals perceive ingroup members positively to enhance the status of the ingroup, and their own status by extension. Outgroup members are evaluated less favorably to reduce the appeal of groups to which one does not belong. The manifestation of ingroup bias occurs as a by-product of self-protective cognitions. Under this account, the status of one's group interacts with ingroup bias; individuals in high-status groups show more bias and commitment, whereas individuals in low status groups may attempt to distance themselves from the group, excluding membership as part of their sense of identity (Brown, 2000).

Ingroup bias shapes human cognition to a remarkable degree; however, the extent to which it is distinct from *similarity* bias is somewhat controversial as these distinctions are made differently in the literature to date (e.g., Brewer & Gardner, 1996; Wilder & Simon, 1998). Is it possible that ingroup bias could simply recruit the mechanisms of similarity bias? Billig & Tajfel (1973) used the minimal group paradigm to demonstrate that when groups are labeled, ingroup bias is much stronger than bias induced by similarity. Is ingroup bias simply a stronger form of the same processes evoked by similarity, or does being part of a group inspire distinct set of cognitions? Research into the development of both these concepts will help us fully understand the nature of both of these tendencies.

## 1.2 Similarity Bias

When researchers examine the effects of similarity, the presence of a shared trait is introduced to the participant, and influences on cognition and behaviour are measured (e.g., Emswiller, Deaux, & Willits, 1971). The presence of a similarity can be sufficient to induce biased perceptions and preferential treatment between individuals. For example, individuals are more likely to agree to a request if they believe the requester has the same birthday or the same first name (Burger, Messian, Patel, del Prado, & Anderson, 2004), or a similar style of dress (Emswiller, Deaux, & Willits, 1971). This similarity effect is stronger when individuals believe themselves to be similar on a trait perceived to be uncommon, as evidenced by greater reported feelings of liking toward a confederate believed to be similar on a particularly rare trait (Burger et al., 2004). As with ingroup bias, both ultimate and proximate explanations for similarity bias have been proposed, but these

explanations differ somewhat in scope. Some explanations of ingroup bias tend to emphasize features such as shared fate perceptions and stable, ongoing relationships between members (e.g., Yamagishi, Jin & Kiyonari, 1999; Tajfel & Turner, 1979, as cited in Nesdale & Flesser, 2001). These unique features of a group do not apply as well to similarity bias, as trait similarities can be more superficial and transient. Other mechanisms, such as reciprocal liking and validation of beliefs could plausibly be implicated in both biases. It is possible that similarity bias and ingroup bias share certain features but are not entirely overlapping constructs.

As with ingroup bias, ultimate explanations speculating about the evolutionary advantages of similarity bias have been proposed. For instance, it has been suggested that trait similarity might provide a heuristic cue to kinship (Park & Schaller, 2005). Kin selection is a robust phenomenon, wherein individuals are more likely to positively evaluate and treat those who are genetically related to them (e.g., Holmes & Sherman, 1983; Laham, Gonalkorale, & von Hippel, 2005). Because genetic information is often unavailable, humans have evolved psychological mechanisms that use various cues to distinguish kin from non-kin, such as early cohabitation (e.g., Lieberman, Tooby, & Cosmides, 2003) and phenotype matching (e.g., Porter, 1987, as cited in Park & Schaller, 2005). Similarities on non-genetic dimensions such as first name may also trigger this mechanism, serving as a heuristic cue to kinship (e.g., Oates & Wilson, 2002) even though they do not reflect a true genetic relationship. According to this explanation, similarity bias may invoke our evolved tendency to assist others who share our genes, even if the dimension of similarity has no genetic basis. Evolutionary explanations tend to include groups in

their formulation, as social processes presumably evolved in the context of early social groups from hunter-gatherer days. Therefore, there is much overlap between constructs among the ultimate adaptive explanations for similarity bias and ingroup bias.

Proximal explanations for similarity bias range in scope from automatic, non-conscious, positive associations (e.g., Kitayama & Rarasawa, 1997) to cognitive mechanisms positively biasing our perceptions of those similar to us (e.g., Lynn & Snyder, 2002). Kitayama and Rarasawa (1997) have suggested that Greenwald & Banaji's (1995) proposed construct of implicit self-esteem may contribute to the development of similarity bias. Specifically, they demonstrate that positive associations with self-relevant stimuli (such as the numbers in your birth date or the letters in your name) are extended to other occurrences of those stimuli. For instance, a word containing letters from one's name may be viewed more positively than other words, even though the individual cannot report why this is the case (Kitayama & Rarasawa, 1997). Self-similar qualities of other individuals also appear to trigger these positive associations. This trend can be seen for both "important" dimensions such as congruent attitudes or interests, as well as arbitrary dimensions such as an assigned participant number (Jones, Pelham, Carvallo, & Mirenberg, 2004).

Various cognitive mechanisms underlying the manifestation of similarity bias have been proposed. For instance, it has been suggested that this trend occurs because encountering similar others can help to validate our beliefs, a positive emotional experience (Marks & Miller, 1987). The false consensus effect, the

tendency for individuals to overestimate the degree to which similar others agree with them on various attitudes and beliefs (Ross, Greene, & House, 1977), may be implicated in this relationship; if we overestimate the degree to which similar peers agree with us, and belief validation is a positive experience, this assumption may contribute to a positive perception of similar others (even if the perceived agreement is actually inaccurate). A second proposed underlying cognitive mechanism is the expectation of reciprocal liking among similar individuals (Condon & Crano, 1988). This expectation appears to reflect circular reasoning on the part of the individual: “people tend to like others who are similar to them, so I like similar others because they will probably like me”. Although proposed in the context of similarity bias, both these cognitive mechanisms could be implicated in ingroup bias as well. Indeed, the experience of belief validation or expectation of reciprocal liking as a result of similarity could inspire individuals form friendship relationships, resulting in a shift from similarity bias to ingroup bias.

A third account for similarity bias is based on the concept of the unit relationship. Individuals that are similar on some attribute tend to be ‘grouped’ or perceived as a unit. This idea dates back to the founders of gestalt psychology (e.g. Kohler, 1929). Heider (1958, as cited in Miller, Downs, & Prentice, 1998), whose research on social perception had origins in gestalt theory (Schönflug, 2008), proposed the idea of a unit relationship, referring to the feeling of increased liking and “belonging together” shared between individuals who are similar in some way. A variety of factors including similarity, common fate, proximity, and past experience can all be sufficient for the creation of a unit relationship (Heider, 1958,

as cited in Arkin & Burger, 1980). An important consideration regarding the unit relationship explanation is that it does not distinguish between similarity bias and ingroup bias; according to this explanation similarity bias manifests through recruitment of existing inclinations toward ingroup bias.

### 1.3 Distinguishing the concepts

One difficulty in examining ingroup bias and similarity bias is an unavoidable overlap between the concepts. If individuals are members of the same group, they are inevitably similar on that dimension. Therefore, one can arguably study similarity bias independently from group membership, but not vice-versa.

Various researchers have attempted to distinguish similarity bias from ingroup bias in different ways. For example, Brewer & Gardner (1996) discuss interpersonal and collective identities in which an 'interpersonal identity' refers to a personalized attachment bond between individuals such as friends or family members, whereas a 'collective identity' refers to an impersonal bond which arises from common identification with a group or category (e.g., increased feelings of liking upon discovering you share a political affiliation with a stranger). Under this framework, we are able to discuss 'naturalistic' groups (i.e., collections of individuals who are acquainted with each other, unique from artificial group-like contexts created in the lab) and similarities associated with social categories such as gender or ethnicity; however, similarities that are not seen as 'socially relevant' are not considered. For example, observed biases in response to shared birthday (e.g., Finch & Cialdini, 1989) are not accounted for under this distinction.

In contrast, Wilder & Simon (1998) have suggested a distinction between categorical and dynamic groups. Categories denote shared traits, and therefore membership is involuntary; if you possess the property defined as the grouping dimension you are a member of the group. Dynamic groups use interaction between members as the defining feature; membership is determined by the nature of an individual's relationship with other group members. Under this explanation, biased perceptions as a result of naturalistic groups and shared traits are acknowledged; however, the demonstrated effect of a label on biases (e.g. Billig & Tajfel, 1973) is not considered.

Empirically, the distinction between similarity bias and ingroup bias is sometimes not made at all. For example, Dunham, Baron, and Carey (2011) conducted a series of experiments to evaluate minimal group affiliation in children, but did not distinguish between labeled and unlabelled groups. Consistent with research with adults, they found stronger patterns of bias in groups that were labeled, but did not consider the relative impact of ingroup bias and similarity bias in their discussion of the results.

Throughout the literature, similarity bias and ingroup bias are sometimes thought of as wholly distinct (e.g., Billig & Tajfel, 1973), other times partially overlapping (e.g., Bernstein et al., 2010), and other times the terms are used interchangeably (e.g., Dunham, Baron & Carey, 2011). Without a clear and validated distinction between concepts, it is difficult to fully understand the nature of either one of these biases on social cognition. The present study aims to address these limitations in the literature by examining both ingroup bias and similarity bias early

in life. A different pattern of responding based on group membership versus similarity would emphasize the need to address these concepts separately in developmental studies. The same pattern of responding between conditions would suggest that early in life, similarity bias and ingroup bias may be the same construct, and do not diverge until later in life (if at all).

## Chapter Two: Methods and Results

### 2.1 Objectives

The objectives of this study are twofold: (1) Evaluate the extent to which group membership and similarity are distinct concepts in early life, and (2) Evaluate the extent to which both group membership and similarity influence perceptions of similarity judgments, are perceived as generalizable to other domains, influence value judgments, and provide the basis for selective helping behaviour and resource allocation.

### 2.2 Participants

Sixty-five young children were included in the study with an age range from 29 months, 0 days to 36 months, 6 days (2.5 to 3 years of age) and a mean age of 32.3 months. Twenty-five participants were not included in the final analyses due to refusal to wear the shirt (11), parental interference (5), refusal to respond to questions (5), experimenter error (2), or atypical language development as reported by the parent (2; one child was non-verbal and one did not know the names of colors due to a language delay). Participants were from the Kingston area and were contacted through the Developmental Psychology Participant Database at Queen's University. Families in the database were recruited through community events, birth announcements, and internet-based outreach. Families were awarded a small prize such as a book or a toy for their participation.

### 2.3 Materials

Children were presented with two identical dalmatian puppets. One was dressed in a blue shirt, the other a red shirt. They were positioned equidistant from the center of a stage, and moved in synchrony. Children were dressed in an oversized cotton t-shirt, either plain blue or plain red. The experimenter wore a similar shirt of the opposite color.

### 2.4 Procedure

Participants were randomly assigned to either the team or similarity condition and tested independently. Prior to the start of the experiment, parents were asked to indicate whether their child had a preference for red or blue. If a preference existed, the children were assigned the opposite shirt color to control for any effect of favorite color on responses. Information about the child's preferences (both a liked and a disliked food) was also gathered from parents prior to testing. If the parent was unable to identify food preferences, activity preferences were used. Children were invited to put on a t-shirt so they could see a puppet show. They were then introduced to two puppets. The experimenter emphasized the shirts by saying "look, this one is wearing a blue shirt, and you're wearing a blue shirt. And look, this one is wearing a red shirt, and I'm wearing a red shirt."

Participants in the team condition were asked “which one of these guys is on your team<sup>1</sup>?”, and after their response the experimenter stated “that’s right” or “actually”, and then emphasized the shirts again by saying “you have a blue shirt and he has a blue shirt so you guys are on the blue team. And I have a red shirt and he has a red shirt, so we are on the red team”. In the similarity condition, children were asked “which one of these guys is wearing the same shirt as you?”, and were told “that’s right/actually, you’re wearing a blue shirt and he is wearing a blue shirt because only his blue shirt was clean. And I’m wearing a red shirt and he’s wearing a red shirt because only his red shirt was clean.” An explanation was provided in the similarity condition to communicate that the matching shirt was merely coincidental.

Children were then asked the following series of questions in counterbalanced order, designed to assess various components of ingroup bias: “Which one is like you? Which one also likes cookies? Which one likes broccoli? Which one stole some food yesterday?” After the questions, the experimenter found a toy beneath the stage between the puppets and stated, “Oh, I found a toy, I’ll just leave it here.” At this point, both puppets reached down and wiggled their arms. If the child had not picked up the toy after a 10 second pause, the experimenter provided the following prompts: “Look, the puppies want the toy!” (pause) “Could you help one of them?” (pause) “Could you get the toy for one of the puppies?”. If the child still had not touched the toy 10 seconds after the third prompt the experimenter stated “Ok, I’ll get it”, held the toy between the puppets and asked

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<sup>1</sup> Pilot testing indicated that children of this age are more likely to understand the meaning of the word ‘team’ than the meaning of the word ‘group’.

“which one should get it?” As soon as either the participant or the experimenter retrieved the toy the puppets returned to their original position on the stage.

After the helping task, the experimenter took three stickers out of her pocket and told the child “I have 3 stickers here. You can keep some, you can give some away.” The experimenter pointed to the centre of the stage at the end of this statement, and gave the child the stickers. If the child made no attempt to share the stickers within 30 seconds, the experimenter moved on to the next question.

Once the child had divided the stickers to their satisfaction, participants in the team condition were asked, “Which one of these puppies is not on your team, which one is on a different team than you?” Participants in the similarity condition were asked, “Which one of these puppies is not wearing the same shirt, which one is wearing a different shirt than you?” After this question, the children were invited to wave goodbye to the puppets and the experiment terminated.

Not all children answered every question, and thus the sample size is not equal across questions (see Table 1 for sample sizes). For this reason, results are presented in terms of proportions in many instances. Inter-rater agreement between two coders was very high, and in the few cases of disagreement, agreement was ultimately achieved via discussion.

## 2.5 Results

Table 1 details ‘matching shirt’ selections for the team and similarity conditions. Similar response rates between “team” and “similarity” conditions were found, with the exception of transgression attribution (“which one of these puppies

stole some food yesterday?”), as well as non-matching identification (“which one of these puppies is not wearing the same shirt as you/is not on your team?”). Cochran’s test was used to evaluate differences in responding on these variables between the team and similarity conditions, and results indicated these differences approached statistical significance. No other significant differences between team and similarity condition were found for other targeted questions<sup>2</sup>.

*Table 1*

*Cochran’s Test: Number of participants choosing the puppet with matching or non-matching shirt*

	Team Condition			Similarity Condition			<i>p</i>
	Matching	Non-Matching	N	Matching	Non-Matching	N	
Identification	19	4	23	27	2	29	0.239
Like you	22	8	30	23	8	31	0.939
Fav. Food	19	11	30	17	11	28	0.837
Disliked Food	15	15	30	11	18	29	0.351
Stole Food	17	14	31	21	6	27	0.067 <sup>‡</sup>
Helping	23	9	32	22	8	30	0.898
Different Identification	8	7	15	22	7	29	0.053 <sup>‡</sup>

<sup>2</sup> Cochran’s test was selected as recommended by Zar (1984). Other texts (e.g., Howell, 2010) provide the Mantel-Haenszel statistic as an equivalent alternative to Cochran’s. Therefore, A Mantel-Haenszel statistic was also calculated, which yielded a p-value of 0.123 for transgression attribution and p=0.113 for different team identification. Due to the inconsistent nature of these test results, caution is needed in interpretation of these results.

A MANOVA was conducted to examine two non-frequency variables. An overall bias score was calculated for each participant by reverse coding the three non-matching target questions (i.e., disliked food, transgression attribution and non-matching identification), summing the responses, and dividing this number by the total number of responses given. Thus, we determined what proportion of responses were indicative of bias. For the sharing task (sticker allocation), a sticker bias score was calculated by subtracting the number of stickers given to the non-matching puppet from the number of stickers given to the matching puppet. Thus, the potential sticker bias score ranged from -3 (indicating that all stickers were given to the non-matching puppet) to +3 (indicating that all stickers were given to the matching puppet). No significant difference in overall bias was found,  $F(1,63)=0.092, p=0.763$ , however participants in the similarity condition showed significantly more bias in sticker allocation,  $F(1,63)=4.56, p=0.037$  ( $M_{\text{team}} = -0.24, M_{\text{similarity}} = 0.38$ ). It is important to note that although participants in the similarity condition showed greater bias in sticker allocation, this was likely not due to avoidance of the non-matching puppet. Some participants gave one or more stickers to the non-matching in both the team ( $n=19$ ) and similarity ( $n=5$ ) conditions.

Based on the results of MANOVA and Cochran's tests, the team and similarity conditions do not appear to differ significantly from each other, with the exception of measures of transgression attribution, outgroup/dissimilar identification, and resource allocation. To follow up, binomial tests were conducted to examine responses within each condition; results of binomial tests are found in Table 2.

Table 2

*Binomial Tests*

Question	Team Condition		Similarity Condition	
	Matching Selection	<i>p</i>	Matching Selection	<i>p</i>
Identification	19/23 (83%)	.003*	27/29 (93%)	<.001*
Like You	22/30 (73%)	.016*	23/31 (74%)	.011*
Fav. Food	19/30 (63%)	.200	17/28 (61%)	.345
Disliked Food	15/30 (50%)	1.00	11/29 (38%)	.265
Transgression	17/31 (55%)	.720	21/27 (78%)	.006*
Helping	23/32 (72%)	.020*	22/30 (73%)	.016*
Different	8/15 (47%)	1.00	22/29 (76%)	.008*

In the team condition, participants showed a tendency to select the matching puppet when asked to identify their teammate (“Which one of these puppies is on your team?”) and which one was like them (“Which one of these puppies is like you?”). A selective helping situation was created when the experimenter dropped a toy between the puppets, and children had the opportunity to retrieve it for one (but not both) of the puppies. All children in the team condition responded to the helping task. Previous research has demonstrated that 21-month old infants show helping behavior by retrieving a dropped toy approximately 75% of the time (Dunfield & Kuhlmeier, 2010). It is not surprising that the rates of helping observed in this experiment were higher because our participants were older, and because children who were unwilling to approach the puppets (e.g., due to shyness or

apprehension of dogs) were given the opportunity to instruct the experimenter to give the toy to a particular puppet. All other tasks resulted in chance-level responding: extension of preferences (“which one of these puppies also likes [child’s favorite food]?” and “which one of these puppies likes [child’s disliked food or activity]?”), transgression attribution (“which one of these puppies stole some food yesterday?”) and non-matching identification (“which one of these puppies is not on your team, which one is on a different team than you?”).

Participants in the similarity condition displayed similar responses to the team condition on most measures. Consistent with the team condition, participants in the similarity condition significantly selected the matching puppet for identification, which puppet was like them, selective helping, and non-matching identification (Table 2). Also consistent with the team condition, participants in the similarity condition showed chance-level responding for both extension of preferences questions. Participants in the similarity condition showed unexpected choices for two questions; they selected the matching puppet when asked about transgression attribution (“which one stole some food yesterday”) and non-matching identification (“which one of these puppies is not wearing the same shirt, which one is wearing a different shirt than you?”). Overall, results suggest that for most questions, children in the similarity condition were more likely to select the matching puppet, regardless of the content or valence of the question.

### Chapter Three: General Discussion

The present study suggests that early in life, ingroup bias and similarity bias show considerable overlap in their presentation. We observed similar rates of responding in

identification, expression of similarity, extension of preferences, and selective helping between the similarity and team conditions. In both conditions, responses to questions reflecting extension of positive and negative attitudes (e.g., “Which one of these puppies also likes [cookies]?” and “Which one of these puppies likes [celery]?”) were at chance levels. When asked questions involving matching identification (“Which one of these puppies is [on your team/wearing the same shirt as you]?”), expression of similarity (“which one of these puppies is like you?”) and selective helping (retrieval of a dropped toy for one of the puppets), participants in both conditions tended to select the matching puppet. However, a significant difference between the conditions in resource allocation was observed when participants were given 3 stickers to divide; only participants in the similarity condition allocated more stickers to the matching puppet. This finding is contrary to Billig and Tajfel (1973), who demonstrated that adolescent participants allocated significantly more money to their peers when a group label was used rather than a shared trait identified. This discrepancy may be indicative of a developmental trend in the manifestation of bias: not only are some elements of bias only evident later in childhood, but resource allocation may manifest qualitatively differently earlier in life.

Despite the consistency in responses across condition, two notable differences exist. Measures of transgression attribution and non-matching identification yielded differences between conditions that approached significance. For both these questions, participants in the similarity condition tended to select the matching puppet, while participants in the team condition responded at chance levels. These results are particularly interesting as it was predicted that children would select the non-matching puppet for these questions.

One possibility is that the observed pattern of responses is the by-product of question order and difficulty. After the puppets appeared on the stage, the shirt color similarity was pointed out to the child, immediately followed by the question, “Which one of these puppies is wearing the same shirt as you?”. The vast majority of participants responded correctly (93%), and those who did not were corrected by the experimenter. Subsequent questions occurred in counterbalanced order, but all were slightly more difficult in that they required an inference based on the similarity, rather than simply identifying the similarity. If the less straightforward nature of these questions made them too challenging for children at this age, regardless of the presence or absence of similarity bias, it is possible that participants merely perseverated on the correct response from the previous, easier question. Alternatively, an absence of similarity bias may itself have made the questions too difficult; if children lacked similarity bias, they would have had no logical grounds upon which to base their responses, also causing them to perseverate on the previously correct response. If children lack a similarity bias but not ingroup bias, this would account for the differences between conditions as children in the ‘team’ condition would not need to perseverate.

However, these subtly different explanations seem unlikely for three reasons. First, if the responses were due to the inherently more difficult nature of the questions, it is unclear why this perseverative strategy would be displayed by children in the similarity condition but not in the team condition because all children were of the same age range and subsequent questions were identical in phrasing. Second, these explanations do not account for the chance level responding to the questions about preferences. It is unclear why, given that questions were posed in counterbalanced order, children would use this

strategy for some inference-based questions but not others. Finally, both explanations would predict perseveration across all inference-based questions and the helping/sharing tasks, and very few children fully perseverated (i.e., selected the matching puppet for every question) in either the team (n=4) or the similarity (n=3) condition.

A second, more plausible explanation for the current findings would be that similarity evoked a more general approach tendency than group membership. This approach tendency is different from the perseveration explanation previously discussed in that it is the similar nature of the puppet that is driving the responses, rather than question difficulty and perseveration on a previously correct response. A generalized approach tendency in response to similarity among 2-year-olds would represent a developmental discontinuity in the manifestation of similarity bias. If adult-like similarity bias were present in this age group, a tendency to respond with the non-matching puppet should be obtained when asked about transgressions and dissimilarity. Or, if these components of similarity bias had not yet developed among 2-year-olds, chance-level responding should be obtained. As such, these findings raise the possibility that similarity bias is displayed in qualitatively different ways early in life, rather than either emerging later in childhood or developing slowly across this age range. Although extension of preferences remained at chance levels, participants in the similarity condition tended to select the matching puppet even when questions were negatively valenced (“which one stole some food yesterday”) or referred to the non-matching puppet (“which one is not wearing the same shirt, which one is wearing a different shirt than you?”). A generalized approach tendency could be a unique manifestation of similarity bias in early childhood.

This ‘generalized approach tendency’ explanation can account for the differences between conditions if children saw similarity information as more reliable than group information in decisions regarding whom to approach. This would imply that in toddlerhood, the concept of a group develops somewhat independently from the concept of a similarity. A generalized approach tendency is not seen in the team condition. If toddlers do have some understanding of the concept of a group, ‘team’ phrasing could invoke more protective cognitions than similarity phrasing. If this is the case, participants may have been more hesitant to respond with the ingroup puppet for questions that were negatively valenced or referred to the outgroup. Under this explanation, participants in the similarity condition displayed a generalized approach response strategy, while participants in the team condition exercised more caution. However, this explanation should be tempered by the observation that children in the team condition did not go so far as to consistently respond with the outgroup to these questions, they merely exhibited chance-level responding.

Although children displayed differences in non-matching identification, transgression attribution, and sticker allocation across condition, there were no notable differences on any other measure. Thus, these results indicate considerable overlap in responding to group membership and similarity early in life. This observation suggests that researchers should exercise significant caution when considering ingroup bias developmentally. As previously discussed, various researchers conceptualize the distinction between similarity and ingroup bias differently, but perhaps it is inappropriate to ‘draw a line in the sand’ between the concepts. As is often the case with complex social phenomena, these biases may not reflect a straightforward dichotomy. A third

category may be beneficial in understanding ingroup bias and similarity bias, one that acknowledges the impact of a labeled and emphasized category (e.g., the team condition), without forming a naturalistic group as defined by relationships among members. A three-tiered approach to conceptualizing ingroup bias and similarity bias would allow us to consider the unique influences of naturalistic groups with relationships among members (e.g., a group of friends or a family), superficial similarities (e.g., a shared birthday or style of dress), and similarities that are labeled and considered socially relevant (e.g., ethnicity or gender).

Support for a three-tiered approach can be found in Developmental Intergroup Theory, proposed by Bigler and Liben in 2007. Children rely heavily on stereotypes largely because they engage in essentialist thinking, the belief that members of a category share important and non-obvious qualities. Thus, individuals are most likely to develop ingroup bias along dimensions that are frequently used in society. For example, people rarely discriminate on the basis of eye color; however, gender is frequently emphasized in our daily lives, which may contribute to the development of sexist beliefs (Bigler & Liben, 2007). Essentialist thinking may be an important factor in the development of what is often referred to as ingroup bias (e.g., Taylor & Moriarty, 1987; Rudman, Feinberg, & Fairchild, 2002; Levin, van Laar, & Sidanius, 2003), but what may in fact be more accurately conceptualized as labeled similarities, or category-based discrimination. It seems unlikely that this model would apply to both naturalistic groups and social categories the same way, so a distinction between these types of bias would be beneficial in understanding social issues such as ethnocentrism or sexism, compared to other types of group-based cognition such as bias displayed by gang members or players on a sports

team (note that under this explanation, players on a sports team would constitute a naturalistic group, whereas a crowd of fans of the same sports team would constitute a category). At present, although a large body of research on ingroup bias exists, arbitrary distinctions and mislabeling of similarities, categories, and groups make it difficult to generalize across the findings of various studies, as researchers use the same terms to discuss very different constructs.

In sum, both group membership and similarity exert a powerful influence on human cognition. The fact that these biases often manifest without awareness on the part of the individual (e.g., Fazio, Jackson, Dunton & Williams, 1995) make them particularly pervasive. For example, a business-owner may truly believe that he does not discriminate when hiring employees, however subtle cues to shared category membership may cause him to unintentionally favor those applicants who share his ethnicity, gender, language, or interests, despite the fact that these traits have no bearing on the applicant's ability to perform the job. Nepotism (i.e. hiring one's family members or friends) is another manifestation of these social influences; in fact nepotism may be tolerated by society to some extent as individuals are often expected to be particularly helpful to their family or other ingroup members.

A comprehensive understanding of such subtle influences on our behavior is important for both policy making (e.g., affirmative action) and for an understanding of social cognition. These influences are life-long, and the results of this study suggest that similarity bias may even manifest differently in early childhood compared to later in life. Some research has examined the developmental origins of group influence and, to a lesser extent, similarity (e.g., Nesdale & Flessler, 2001, Patterson & Bigler, 2006);

however, it is difficult to draw conclusions across studies due to the inconsistent conceptualization of 'ingroup bias' and similarity. Examination of the relative impact of similarity, group membership, and shared category on cognition and behaviour across the lifespan would clarify the appropriate conceptualization of these effects. It is important to note that these dimensions are not mutually exclusive: a positivity bias for shared-category individuals may foster friendships, and similarities within a group of friends may help to shape group dynamics and group norms. It would be fruitful to longitudinally examine these traits among children entering kindergarten in relation to the naturally-forming friendship groups that manifest. Even a three-tiered approach to the development of ingroup bias, similarity bias, and category membership is somewhat complex as the constructs may co-occur and influence each other, however this approach may yield more valid and generalizable research.

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Appendix A

June 27, 2011



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**GREB ref. #: GPSYC-374-07**

**Title: "Cognitive Development in Infants and Young Children"**

Dear Dr. Kuhlmeier:

The General Research Ethics Board (GREB) has reviewed and approved your request for renewal of ethics clearance for the above-named study. This renewal is valid for one year from July 30, 2011. Prior to the next renewal date you will be sent a reminder memo and form to reapply.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB if applicable, of any adverse event(s) that occur during this one year period (details available at webpage <http://www.queensu.ca/ors/researchethics/GeneralREB/forms.html> - Adverse Event Report Form). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes in study procedures or implementations of new aspects into the study procedures on the Ethics Change Form that can be found at <http://www.queensu.ca/ors/researchethics/GeneralREB/forms.html> - Research Ethics Change Form. These changes must be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or [irvingg@queensu.ca](mailto:irvingg@queensu.ca) prior to implementation. Your request for protocol changes will be forwarded to the appropriate GREB reviewers and / or the GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

A handwritten signature in black ink that reads "Joan Stevenson".

Joan Stevenson, Ph.D.  
Professor and Chair  
General Research Ethics Board

c.c.: K. Dunfield, Lindsay Murphy, Amy O'Neill, Scott Robson, Co-investigators  
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JS/gi