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The development of stereotype content: The use of warmth and competence in assessing social groups

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ABSTRACT

Past research suggests that warmth and competence are primary dimensions of social perception used by adults to understand social groups. The current study investigated whether children use these two dimensions to structure their representations of familiar groups. Results indicated that adult warmth and competence judgments were independent from one another and placed groups in warmth by competence space in ways consistent with past work. However, children showed some sensitivity to both dimensions but did not treat them as independent. Children's judgments of competence were closely aligned with adult judgments, but their judgments of warmth were influenced by factors that solely influenced adult judgments of competence. These data suggest that children develop an understanding of competence as an independent dimension prior to developing an understanding of warmth as an independent dimension and that their judgments of warmth may reflect a more general summing of all available evaluative information. Implications for children's developing understanding of the broader intergroup landscape are discussed.

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Introduction

Although there are many ways to describe an individual's or group's characteristics, two social dimensions have emerged as central means to understanding them: *warmth* and *competence* (Fiske, Cuddy, & Glick, 2007). Work in evolutionary psychology (MacDonald, 1992), person perception (Wojciszke & Klusek, 1996), and intergroup cognition (Fiske, Cuddy, Glick, & Xu, 2002) has found that warmth and competence independently structure emotional and behavioral responses to others. Furthermore, the specific stereotype content associated with familiar social groups can be effectively reduced to variation in these two dimensions, providing a framework for thinking about how representations of social groups are structured.

The stereotype content model (SCM; Fiske et al., 2002) builds on this perspective by describing how independent variation in warmth and competence delineates a two-dimensional space creating four broad types of groups. Groups high in both warmth and competence (usually the in-group) are admired and treated positively. Groups high in warmth but low in competence (such as the elderly) are pitied; members are assisted in some cases but neglected in others. Groups low in warmth but high in competence (e.g., "model minorities") are envied and so may be respected but treated adversarially. Lastly, groups low in both warmth and competence (such as the poor) are actively disliked, eliciting neglect as well as more direct harms (Cuddy, Fiske, & Glick, 2007). As these examples suggest, variation in warmth has been linked to perceived competition, whereas variation in competence has been linked to social status. Thus, the placement of groups in this space can be conceived of as an implicit map of the intergroup social order, identifying friends and foes as well as the advantaged and disadvantaged.

But how does this particular structure develop? Are children's emerging representations of groups characterized by this same warmth by competence structure? An affirmative answer would provide insight into how children construct an understanding of the exceedingly complex intergroup landscape and would offer a unifying framework for thinking about the acquisition of stereotypes. The current study represents a first step toward answering these questions and evaluating the SCM as a framework theory for conceptualizing stereotype development.

The claim that children make use of the dimensions of warmth and competence to understand groups requires establishing that children are sensitive to them in the first place. Past research provides strong reason for optimism. With respect to warmth, for example, Hamlin, Wynn, and Bloom (2007) found that infants can distinguish between malevolent and benevolent actions performed by individuals. By 2 years of age, children begin to label people as "nice" or "mean" based on their behavior (Bretherton & Beeghly, 1982), and similar judgments of groups such as gender and race appear soon thereafter (Aboud, 1988; Martin, Wood, & Little, 1990). Young children can also rapidly extract cues to both warmth and competence from faces, making adult-like judgments of static facial displays by 3 years of age (Cogsdill, Todorov, Spelke, & Banaji, 2014).

There is also intriguing evidence that young children are sensitive to competence. For example, infants more often follow cues given by previously reliable versus previously unreliable informants, suggesting an early sensitivity to individual-level competence (Tummeltshammer, Wu, Sobel, & Kirkham, 2014). Work with preschoolers also shows that children are more likely to trust the testimony of individuals who are labeled as "smart" versus "not smart" (Lane, Wellman, & Gelman, 2013) and will preferentially learn from individuals who were previously shown to be reliable versus unreliable (Pasquini, Corriveau, Koenig, & Harris, 2007). Although little work has focused on social groups per se, one study (Sigelman, 2012) found that 6-year-old children categorize socioeconomic groups in terms of competence, judging the rich as more competent than the poor. Thus, the cognitive capacities underlying both warmth and competence judgments appear to be in place by the preschool years.

Less clear is whether children will treat warmth and competence as distinct dimensions and, in particular, whether they will conceive of some groups as high in one dimension but low in the other given that doing so requires holding an ambivalent view, that is, that a group is positive in one dimension and negative in another. More precisely, although warmth and competence judgments are uncorrelated in adult judgments (Fiske, 1998), there would be reason to suspect that this independence

might not be present early in development and, in particular, that the two dimensions would be positively correlated due to their common valence. Some researchers have also posited that warmth is the primary dimension of social evaluation, mapping onto basic approach/avoid responses present across species and across the lifespan (Fiske et al., 2007), motivating the prediction that warmth judgments could emerge earlier than competence judgments, which might rely on more sophisticated appraisals of ability or effectiveness.

The current study, therefore, investigated how children use the dimensions of warmth and competence to judge familiar social groups, comparing their responses with adult judgments. Specifically, we were interested in discovering whether children, like adults, use the two dimensions independently (the *independence* hypothesis). Three alternative possibilities also suggested themselves.

First, children might be sensitive to variation in both warmth and competence but sum them into a single dimension corresponding to valence (*primacy of valence* hypothesis). This possibility can be considered a version of the more general claim that during development individuals' behavior, personalities, and perceptions proceed from the more general to the more differentiated (e.g., Werner, 1957). On this view, children start out interpreting individuals as globally bad or good and do not differentiate more fine-grained characteristics (e.g., warmth, competence) until later in development. Indeed, past work shows that 5- to 7-year-old children use simpler and more global terms to describe others than do older children (Peevers & Secord, 1973; Scarlett, Press, & Crockett, 1971).

Furthermore, some past work suggests that children may conflate warmth and competence, for example, by indicating that sharing toys (an indicator of warmth-related traits such as kindness and generosity) is particularly characteristic of smart children (Stipek & Tannatt, 1984). Thus, younger children may see warmth and competence as being two aspects of the same general evaluative dimension. On this account, children would tend to rate the same groups as high in both warmth and competence even if adults see them as differing along one or both of these dimensions.

A second possibility is that children are relatively insensitive to variation in perceived competence, not reliably distinguishing groups along this dimension, but do reliably distinguish groups that vary in warmth (*primacy of warmth* hypothesis). This prediction stems from theoretical work by Fiske and colleagues (2007), which argues that warmth is the most salient dimension used to characterize others, likely due to the central importance of perceiving whether someone intends to help or harm (MacDonald, 1992). Supporting this, adults extract warmth cues more rapidly and accurately than competence cues (Willis & Todorov, 2006), and adult judgments of warmth are more predictive of approach and avoidance tendencies than are judgments of competence (Peeters, 2002). The primacy of warmth in social perception raises the possibility that it will also be developmentally primary, such that warmth information is understood and applied earlier than competence information. On this account, children would distinguish groups that are high and low in warmth but would not distinguish groups on the basis of high versus low competence.

A final possibility is that children show an earlier sensitivity to competence than to warmth (*primacy of competence* hypothesis). Although perhaps less intuitively plausible than some of the views just reviewed, there are some recent findings that could be taken to support it. Most notably, a number of studies show that infants as young as 8 months assess others' competence levels and choose to trust the judgment of the more competent individual (Koenig & Echols, 2003; Tummeltshammer et al., 2014). Moreover, preschoolers use competence information to decide which novel informant is most trustworthy and to judge which is most helpful (Stephens & Koenig, 2015) and, in fact, rely more on competence information than on warmth information to do so (Lane et al., 2013). On a strong version of this account, children would distinguish groups that are high and low in competence but would not distinguish groups on the basis of high versus low warmth.

In the current study, we examined the validity of each of these three hypotheses. Although there is less evidence for the primacy of competence hypothesis compared with the primacy of warmth and primacy of valence hypotheses, we elected to include it because of recent findings suggesting surprising sensitivities to competence (e.g., Stephens & Koenig, 2015). To test these hypotheses, we presented eight social groups (based on groups used in Fiske et al., 2002, adapted for familiarity to children) to 5- and 6-year-old children, 9- and 10-year-old children, and adults. We elicited independent warmth and competence judgments of each group as well as comparative judgments of the relative warmth and competence of each pair of groups. This allowed us to determine whether and when children

begin to make adult-like judgments of social groups in warmth by competence space. Thus, we provide the first developmental test of the emergence of adult-like stereotype content in children.

Method

Participants

Child participants were recruited over the phone and at local festivals. Study procedures were carried out in the lab, at museums, and at nearby festivals. In total, 33 5- and 6-year-olds (M_{age} = 74 months, 20 girls) and 39 9- and 10-year-olds (M_{age} = 119 months, 14 girls) participated (hereafter referred to as 6-year-olds and 10-year-olds, respectively); one additional child identified as developmentally disabled was removed from the dataset prior to analysis. Due to our sampling method, we did not collect demographics information for the child participants. In general, the participants were White, middle to upper middle class, and from suburban areas in southern New England in the northeastern United States. Adults were recruited online via Mechanical Turk. In total, 100 self-identified U.S. citizens over 18 years of age were paid $0.60 total for their participation in the study. Of these, 12 adults failed standard attention check items and were dropped prior to analysis. Although we did not collect demographics information from the adult sample, past work on Mechanical Turk participants indicates that Mechanical Turk workers are approximately 65% female and 82% White, with mean ages and income levels slightly lower than average and mean educational levels slightly higher than average (Ipeirotis, 2010).

Materials

Target groups

We generated a set of groups that we anticipated children in our age range would be familiar with (drawing from Fiske et al., 2002, and supplemented with additional groups that we generated). A small-scale pilot study confirmed that our groups were familiar to children in our age range (n = 29). These were *American* and *teacher* (warm, competent), *rich people* and *scientist* (cold, competent), *old people* and *blind people* (warm, incompetent), and *poor people* and *homeless people* (cold, incompetent). The following groups were taken directly from Fiske and colleagues (2002): rich people, old people, blind people, poor people, and homeless people. The remaining groups were chosen as replacements for Fiske and colleagues' groups that we deemed not suitable for children. *American* and *teacher* were meant to replace in-groups such as White and middle class. *Scientist* was chosen to replace groups such as Jews, Asians, and British people.

Group images

For the child sample, participants were provided with a visual depiction of an individual from a group. Custom images were designed for the study (Fig. 1), depicting an individual with several cues indicating group membership (e.g., sunglasses and cane for the blind person, lab coat and beaker for

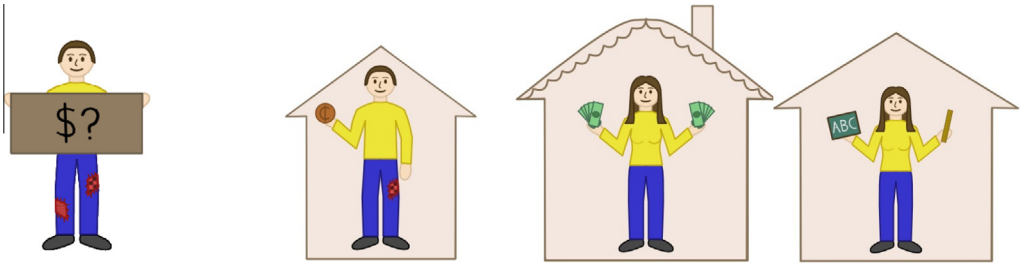

Fig. 1. Example images (left to right): homeless man, poor man, rich woman, and teacher woman.

the scientist). Each image was matched to participant gender. An additional 12 distracter images depicted groups not used in the study (e.g., doctor, singer) and were used to assess whether children could identify the target group from a larger collection of groups.

Measures

Group identification

To confirm children's basic understanding of the groups, children were asked to identify a member of the target group by selecting that image from a set including three randomly selected distracters, with the images randomized to four screen positions. Participants were asked to point to a named individual (e.g., "Can you point to the poor person?"). If participants selected an incorrect picture or indicated that they did not understand, the experimenter provided a brief group definition designed to be as neutral as possible (e.g., "Poor people are people who have very little money and so can only buy a few things") and again asked children to point to the target individual. If participants again failed to identify the target group, the experimenter pointed out the correct picture and proceeded to the next trial. Recognition was coded as "first try," "second try," or "failure," but correct identification on either try was considered as successful recognition.

Measuring warmth and competence

Our prior research suggested a positivity bias in children, such that asking how nice (as an index of warmth) or smart (as an index of competence) someone was elicited predominantly very positive judgments, limiting variability. Therefore, we employed a hypothetical scenario as a means of eliciting judgments, asking children to predict group members' behavior without requiring them to ascribe negative traits to them. To measure warmth, we asked, "Let's say the [target group member] baked some cookies and they want to give some to you. How many cookies do you think the [target group member] would give you? You can say zero, one, two, three, or four. You can use the pictures to show me how many." Children responded on a 5-point visual Likert-type scale depicting plates with zero to four cookies. To measure competence, we asked, "Let's say the [target group member] took a really hard test that measures how smart you are. There are four questions on the test. How many questions do you think the [target group member] would get right? You can say zero, one, two, three, or four. You can use these pictures to show me how many." Children again responded on a 5-point visual Likert-type scale depicting test papers with varying proportions of green (correct) and red (incorrect) responses. Participants saw one warmth scenario and one competence scenario for each target group, with order randomized at the participant level.

Direct warmth and competence comparisons

We also asked participants to directly compare pairs of groups in terms of warmth and competence; this direct comparison could reveal greater sensitivity in cases where individuals judged most groups as very nice or very smart in the ratings task and also offered a potentially convergent source of data. Participants were shown two target group members side by side and were asked who was "nicer" and who was "smarter." Participants saw all possible pairs of the target groups in random order.

Procedure

Child sample

After verbal assent was secured, children were told that they would play a game in which they would look at pictures and talk about the people in those pictures and that there were no right or wrong answers. To reduce the length of the study, children were randomly assigned four of the eight target groups. The identification, warmth/competence judgments, and dichotomous comparisons were conducted in that order, always involving the same groups. Responses involving a group that children failed to identify in the identification task were dropped from the dataset prior to analysis (but other data from those children were retained).

Adult sample

Participants were recruited to an online study titled "Spend 10 minutes or less answering some questions about your social attitudes." After consenting, participants were told that the exercises they were about to complete were created for a study investigating children's social attitudes but that the researchers were interested in how adults would respond to the same items; participants were encouraged to respond instinctively. In contrast to the child sample, pictures of the groups were not used and the identification phase was omitted; in addition, the adult version included all eight target groups. Participants responded to the warmth/competence items and then to the comparison items in that order.

Results

We conducted two preliminary analyses to ensure that subsequent results would be interpretable. First, we examined whether the groups we selected occupied the expected quadrants of stereotype content model space. If they did not, there would be no reason to anticipate children placing the groups into those quadrants. Second, we confirmed that children were familiar with the groups we selected. If not, their judgments would be uninterpretable. Therefore, we examined the results of the identification measure to ensure that the groups were familiar across our age range.

Following these preliminaries, we examined warmth and competence judgments, their relationship to one another, and potential differences by age group. Our standard analysis was conducted in a linear mixed model, which was preferable to repeated measures analysis of variance (ANOVA) because of uneven cell sizes, including differing trial numbers across participants. For purposes of clarity, when explaining analyses, *warmth* and *competence* refer to the mean response given by participants for the "how many cookies" and "how many test questions" items, our primary dependent measures. *SCM warmth* and *SCM competence* are dummy variables indicating the placement of each of the eight groups in the warmth by competence space (high or low) as indicated by the SCM and as confirmed by adult judgments below.

Adult positioning of the target groups

To determine whether the groups we selected were positioned as intended in warmth by competence space, we conducted a preliminary analysis of adult judgments on the direct comparison task. For each group, we examined trials in which that group was compared with groups expected to differ from it in warmth or competence, calculated the proportions of trials in which that group was rated as nicer or smarter, and compared those proportions with chance responding (e.g., comparisons between a given high-competence group and all low-competence groups). As can be seen in the left column of Table 1, all groups that were expected to be high in competence were judged as smarter than the low-competence groups with which they were compared, and all groups that were expected to be high in warmth were judged as nicer than the low-warmth groups with which they were compared (all $ps < .001$). Adult positioning of the target groups can also be seen by examining the relationship between standardized mean warmth and standardized mean competence discussed below (see Fig. 2C). The placement of these target groups, although not breaking perfectly into four clear quadrants, is generally similar to group placements found in previous work on the SCM (e.g., Cuddy et al., 2007). These results allow us to interpret any age-related change as movement toward a clear adult consensus.

Identification

"First-try" recognition rates for the target groups were very high, indicating that children were able to correctly pick out the target image after being told the target group name. All but one group was recognized at more than 90% at first try and at more than 94% at second try. *Poor* was recognized 74% of the time at first try, but successful recognition reached 97% at second try (Table 2). Thus, the groups we employed were sufficiently familiar to justify exploring children's views of them.

Table 1
Proportions of times a group was seen as "nicer" or "smarter" when compared with a group different in SCM warmth or SCM competence, broken down by age.

			Adults (n = 83)	10-year-olds (n = 39)	6-year-olds (n = 33)
Nicer	High	American	.68***	.88***	.65
		Teacher	.84***	.75***	.68°
		Blind	.77***	.77**	.56
		Old	.77***	.77**	.60
	Low	Rich	.11***	.15***	.19**
		Scientist	.29***	.17***	.36°
		Poor	.33***	.15***	.50
		Homeless	.22***	.35°	.45
Smarter	High	American	.67***	.85***	.88***
		Teacher	.89***	.94***	.86**
		Rich	.73***	.65°	.57
		Scientist	.97***	.97***	1.00***
	Low	Blind	.22***	.13***	.11***
		Old	.35***	.33*	.36
		Poor	.09***	.03***	.00***
		Homeless	.08***	.09***	.20*

Note. All p-values reflect comparisons with chance responding (.50).
° $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

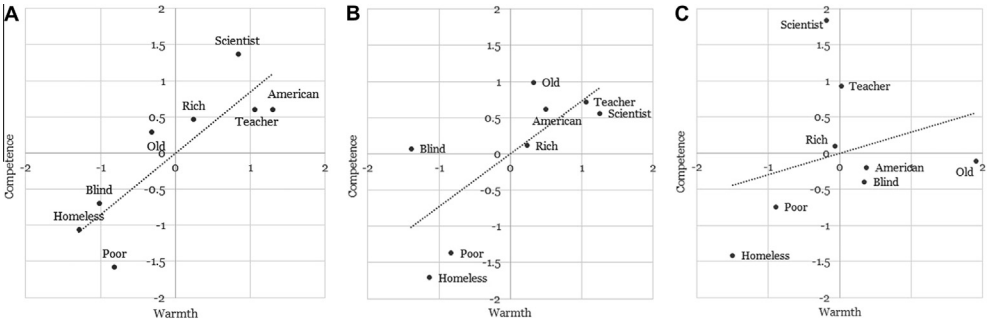

Fig. 2. Standardized warmth and competence scores with linear trend line overlaid: (A) 5- and 6-year-olds; (B) 9- and 10-year-olds; (C) adults.

Table 2
First try, second try, and overall recognition rates (%) of target groups among child participants (collapsed across age).

Target group	First try	Second try	Overall
American	100	0	100
Teacher	97	0	97
Rich	100	0	100
Scientist	93	7	100
Blind	92	8	100
Old	100	0	100
Poor	74	23	97
Homeless	91	3	94

Note. Each group was seen by approximately 50% of the sample.

Relationship between warmth and competence ratings

Warmth and competence ratings were near the midpoint of the scale for all age groups. We begin with an analysis focusing on mean ratings for each group by each participant age group. Fig. 2A–C depict the relationship between mean warmth and competence judgments, with scores standardized within each age group. See Table 3 for the unstandardized mean warmth and competence judgments for each age group. Among the 6-year-olds, warmth ratings ($M = 2.50$, $SE = 0.19$) were significantly correlated with competence ratings ($M = 2.48$, $SE = 0.27$), $r = .85$, $p = .008$. The 10-year-olds showed a similar pattern; warmth ($M = 2.21$, $SE = 0.24$) correlated significantly with competence ($M = 2.39$, $SE = 0.35$), $r = .73$, $p = .041$. Thus, for both groups of children, the large majority of target groups fell into the high-warmth/high-competence or low-warmth/low-competence quadrants, revealing a lack of ambivalent groups and presenting initial evidence against the independence hypothesis. In contrast, replicating past work, warmth ($M = 2.24$, $SE = 0.12$) and competence ($M = 2.36$, $SE = 0.19$) judgments were not correlated in the adult sample, $r = .22$, $p = .602$, and a number of ambivalent groups are clearly visible in the scatterplot.

Sensitivity to SCM warmth and competence

The preceding section suggested that children might not be treating warmth and competence as independent dimensions. To explore this possibility in more detail, we adopted a regression approach by independently regressing warmth and competence on age group and two dummy variables coding for each group's position in SCM space (i.e., high or low in warmth and high or low in competence) as well as the interaction between age and each of these SCM indicators. To account for repeated observations for each participant, we included a random intercept for each participant.

Beginning with warmth ratings, main effects of SCM warmth, $F(1, 874.10) = 27.58$, $p < .001$, and SCM competence, $F(1, 881.18) = 37.32$, $p < .001$, were qualified by interactions with age (Age $\times$ SCM Warmth: $F(2, 870.40) = 3.09$, $p = .046$; Age $\times$ SCM Competence: $F(2, 872.62) = 13.56$, $p < .001$). To unpack these interactions, we fit the model separately for each age group. Beginning with 6-year-olds, SCM warmth did not predict warmth ratings, $F(1, 120) = 0.61$ $p = .435$, but SCM competence did, $F(1, 120) = 11.39$, $p = .001$. For 10-year-olds, the effects of both SCM warmth, $F(1, 152) = 16.21$, $p < .001$, and SCM competence, $F(1, 152) = 13.67$, $p \leqslant .001$, were significant. For adults, SCM warmth was significant, $F(1, 579) = 47.02$, $p < .001$, but SCM competence was not, $F(1, 579) = 0.13$, $p = .715$.

Table 3
Mean warmth and competence ratings for each target group, broken down by age and including the number of participants who saw each group.

			Adults ($n = 83$)		10-year-olds ($n = 39$)		6-year-olds ($n = 33$)	
			Mean (*SD*)	*n*	Mean (*SD*)	*n*	Mean (*SD*)	*n*
Warmth	High	American	2.37 (0.91)	83	2.63 (0.83)	19	2.82 (1.13)	17
		Teacher	2.25 (0.91)	83	2.70 (1.03)	20	2.82 (1.24)	17
		Blind	2.36 (1.02)	83	2.26 (1.24)	19	2.12 (1.54)	17
		Old	2.89 (0.94)	83	2.88 (0.86)	17	2.65 (1.37)	17
	Low	Rich	2.22 (1.30)	83	2.29 (1.68)	21	2.75(1.60)	12
		Scientist	2.18 (0.98)	83	2.59 (1.05)	22	3.24 (0.62)	17
		Poor	1.94 (1.05)	83	1.28 (0.96)	18	1.64 (1.08)	14
		Homeless	1.73 (1.06)	83	1.05 (1.35)	19	1.91 (1.56)	12
Competence	High	American	2.25 (0.81)	83	2.89 (0.81)	19	3.47 (0.62)	17
		Teacher	2.87 (0.89)	83	3.45 (0.95)	20	3.29 (1.05)	17
		Rich	2.41 (0.86)	83	2.62 (1.24)	21	2.67 (1.72)	12
		Scientist	3.38 (0.84)	83	3.64 (0.79)	22	3.12 (1.22)	17
	Low	Blind	2.14 (1.03)	83	1.00 (1.16)	19	1.71 (1.49)	17
		Old	2.30 (0.87)	83	2.71 (1.36)	17	2.24 (1.25)	17
		Poor	1.95 (0.97)	83	1.56 (0.98)	18	1.86 (1.41)	14
		Homeless	1.58 (1.03)	83	1.26 (1.15)	19	1.50 (1.73)	12

Thus, younger children's judgments were not consistent with the structure of SCM space in that their judgments of warmth were more closely linked with the competence position than with the warmth position. Older children's judgments were linked to both warmth and competence, and only adults made warmth judgments that were solely predicted by the group's position in warmth space.

Turning to competence ratings, both SCM warmth, $F(1, 875.49) = 7.80$, $p = .005$, and SCM competence, $F(1, 882.54) = 227.37$, $p < .001$, significantly predicted competence. The influence of SCM competence was qualified by a significant interaction with age, $F(2, 873.86) = 16.39$, $p < .001$, such that the relationship was weaker among 6-year-olds and 10-year-olds when compared with adults; the child samples did not differ from each other (adults vs. 6-year-olds: $b = .70$, $SE = .19$, $p < .001$; adults vs. 10-year-olds: $b = .85$, $SE = .17$, $p < .001$; 6-year-olds vs. 10-year-olds: $b = .14$, $SE = .24$, $p = .544$). To further investigate this interaction, we again conducted separate analyses for each age group. SCM competence predicted competence as expected among all three age groups (adults: $F(1, 579) = 138.03$, $p < .001$; 10-year-olds: $F(1, 129.65) = 69.16$, $p < .001$; 6-year-olds: $F(1, 120) = 32.07$, $p < .001$), although it grew stronger as a function of age. However, the relationship between SCM warmth and competence, which was significant in the main model, was small and nonsignificant in each age group considered independently, suggesting at best a small effect (adults: $F(1, 579) = 1.03$, $p = .310$; 10-year-olds: $F(1, 146.82) = 1.31$, $p = .254$; 6-year-olds: $F(1, 120) = 2.41$, $p = .124$).

Examining children's comparative warmth and competence placements

Statistical analyses involving the proportions given in Table 1 are complicated by the interdependence between items, precluding direct comparison of means (e.g., high rates of "nicer" judgments for one group necessitate lower rates of "nicer" judgments for some other group). Thus, we elected to simply analyze the proportion of times in which groups expected to differ from one another in warmth or competence actually differed in comparison with chance responding. Table 1 displays these proportions separately for each age group. As indicated previously, in the adult sample all of the target groups fell into the appropriate positions regarding relative warmth and competence as predicted by the SCM.

Among 10-year-olds, all but two groups were appropriately positioned by both warmth and competence ($p < .05$), with the exceptions being the relative warmth positioning for homeless people and the relative competence position for rich people, although both trended appropriately ($p < .10$). Thus, although 10-year-olds were not as consistent as adults, their comparative judgments suggested a better alignment with SCM expectations than the direct ratings revealed. Data for 6-year-olds revealed a stark contrast with the older age groups, with 6-year-olds making the appropriate positioning only 6 of 16 times ($p < .05$), with 2 more trending in the expected direction. Furthermore, 5 of those 6 were for competence and only 1 was for warmth, again suggesting earlier sensitivity to the competence dimension.

Discussion

This study examined whether the dimensions of warmth and competence, which well characterize adult judgments of social groups, also characterize children's judgments. A primary goal was to determine whether children, like adults, see warmth and competence as independent dimensions. If not, we sought to adjudicate among three plausible alternatives, namely that children would collapse warmth and competence into a single evaluative dimension (primacy of valence hypothesis), that children would be sensitive to variation in warmth prior to showing sensitivity to competence (primacy of warmth hypothesis), and that children would show sensitivity to variation in competence before showing sensitivity to warmth (primacy of competence hypothesis).

Although the overall pattern of results revealed here is somewhat complex, we begin by noting that our findings provide strong evidence against the independence hypothesis; warmth and competence judgments were highly correlated in both 6- and 10-year-olds, becoming independent only in adults. Thus, the independence revealed in past adult work is something that emerges only fairly late in childhood, sometime after 10 years.

Neither the primacy of warmth hypothesis nor the primacy of competence hypothesis was strongly supported. Children were, broadly speaking, sensitive to cues that influenced adult judgments of

warmth as well as cues that influenced adult judgments of competence; this can clearly be seen in the scatterplots in Fig. 2, which show that children placed a number of groups in both the high and low regions of both warmth and competence space (i.e., above and below the *x*-axis and to the left and right of the *y*-axis). To elaborate, if children were initially insensitive to competence cues in general (as predicted by the primacy of warmth view), we would expect little vertical dispersion along the competence dimension; conversely, if children were initially insensitive to warmth cues in general (as predicted by the primacy of competence view), we would expect little horizontal dispersion along the warmth dimension. Instead, there is substantial dispersion along both dimensions in the continuous measures, suggesting sensitivity to both types of cues.

However, the nature of children's sensitivity to warmth and competence clearly differs from that shown by adults in that children's warmth and competence ratings were highly correlated. Broadly speaking, this is compatible with the primacy of valence view, in which children merge both warmth and competence cues into a single evaluative judgment. Thus, children appear to have an undifferentiated notion of group value that does not fully distinguish warmth from competence, at least not on the sorts of measures used here.

Interestingly, however, the nature of influence *across* dimensions was not fully symmetrical, with a group's competence position in SCM space affecting children's ratings of that group's warmth more than its warmth position affected children's ratings of its competence. To elaborate, for younger children, ratings of warmth were predicted solely from a group's position in competence space (high or low); for older children, ratings of warmth were predicted from a group's position in both warmth and competence space; and for adults, ratings of warmth were predicted solely from group's position in warmth space. By contrast, both children's and adults' ratings of competence were strongly predicted from a group's position in competence space, whereas the group's position in warmth space exerted only a weak influence on competence ratings (an effect that was significant in a combined model but not independently significant in any age group).

A full interpretation of this asymmetry will require further research, but we suggest that children's warmth judgments initially represent a general summary evaluation that incorporates all information relevant to the group's value (including both warmth and competence cues). Put differently, the evaluative summary suggested by the primacy of valence hypothesis appears, in younger children, primarily in their judgments of warmth. By contrast, competence judgments are, by 6 years of age, at least largely distinct from warmth. In this sense, our data also provide some support for certain aspects of the primacy of competence hypothesis in that competence emerges as a distinct domain prior to warmth emerging as a distinct domain. Thus, although children's judgments do differentiate groups along both the warmth and competence dimensions, only their differentiation of competence appears to be uniquely sensitive to a single type of information, that is, information that adults see as relevant for specific judgments of competence.

Because children's perceptions of warmth are heavily influenced by factors that affect solely adult judgments of competence, children's warmth judgments diverge more markedly from adult judgments than do their judgments of competence. This is most visible in the comparative items, where participants directly contrasted pairs of groups in warmth and competence (Table 1). As shown there, 6-year-olds' comparative responses placed only one of the groups in the expected warmth position but placed six of eight groups in the expected competence position; by contrast, 10-year-olds placed seven of eight groups in the expected position along each dimension. These results lend further support to our claim that younger children's judgments of competence are more closely matched to adult judgments than are their judgments of warmth due to the latter also incorporating competence information.

This asymmetry in the relationship between warmth and competence during early childhood may help to interpret past research showing that children sometimes conflate warmth and competence judgments (Stipek & Tannatt, 1984) and that they seek information more reliably from competent informants than from warm informants (Stephens & Koenig, 2015). In the former case, our data suggest that such crossover influences will be much stronger in one direction, from competence to warmth, than in the other direction, from warmth to competence. In the latter case, our data suggest that for younger participants, pitting warmth against competence is more challenging than we might have thought because cues to competence directly affect judgments of warmth.

Although the two measures of warmth and competence that we employed produced broadly similar patterns of results, as we alluded to above, the comparative items (Table 1) appeared to reveal an earlier sensitivity to warmth as an independent dimension. Although 6-year-olds did not clearly differentiate warmth groups on the comparative items, 10-year-olds did, suggesting an ability to discriminate the groups that did not appear as clearly on the open-ended ratings. The comparative items require a forced-choice response and so do not allow children to rate both groups as equal on a dimension as might occur, for example, via a positivity bias in ratings. Thus, the inclusion of the comparative items provided an independent window into children's understanding of these social groups. Future work investigating children's social beliefs could perhaps benefit from including comparative items in addition to the more common Likert scale-type items.

These findings have potentially wide-ranging consequences for how children form broader representations of social groups. In particular, they suggest that children might have particular difficulty in entertaining the notion of a highly competent, high-status group that is not also high in warmth. In other words, information concerning social status appears to infect children's judgments of group warmth. This phenomenon could help to explain why children sometimes positively evaluate high-status out-groups even when those out-groups engage in discriminatory or oppressive behavior directed at children's in-group (as in the case of Black and Colored children in South Africa; Dunham, Newheiser, Hoosain, Merrill, & Olson, 2014; Newheiser, Dunham, Merrill, Hoosain, & Olson, 2014).

Some limitations of the current inquiry should be acknowledged. Most prominent, we measured warmth and competence with questions about niceness and smartness, which are unlikely to be perfectly coextensive with broader conceptions of warmth and competence. Similarly, we included only a limited set of groups and cannot be sure that the pattern of findings we describe would extend across the intergroup domain. Furthermore, we employed cartoon drawings to enhance experimental control, but such a choice always represents a trade-off with ecological validity, and future work could benefit from employing more naturalistic stimuli. Each of these issues could be readily addressed by including a refined set of items and a more expansive set of groups.

Perhaps our most intriguing finding is the asymmetric line of influence in which information about competence influences children's judgments of warmth but not vice versa. However, our data are correlational, and a future investigation could also test these relationships in a causal design where children are provided with new information regarding warmth or competence and the influence of that information on the other dimension is then assessed; such work might also benefit from including novel groups about which children cannot be anchored to previously acquired stereotypes.

With these limitations in mind, the current study is nonetheless significant as the first to examine the dimensions that children use to judge a range of social groups. Our data suggest that 6-year-olds employ an undifferentiated notion of warmth that is not distinct from competence, whereas 10-year-olds are beginning to differentiate the dimensions, although they have not done so fully. Judgments of warmth and competence plausibly predict how individuals act, feel, and judge social groups (e.g., Cuddy, Fiske, & Glick, 2008). Thus, examining the developmental emergence of these dimensions offers insight into how broader social attitudes and beliefs are acquired, including beliefs about social status and the distribution of resources within a society. The current study suggests that beliefs about warmth are not initially independent from other forms of social judgment, with potentially profound implications for how the social order is conceived.

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