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Abstract: Recent theoretical discussion of the influence of between- and within-culture factors on social behaviors suggests that both approaches may be useful. The present study was designed to investigate the joint influence of sociocultural (between-group) and individual (within-group) factors on resource allocation preferences. Brazilian (n = 166) and European-American (n = 99) children with ages ranging from 37 to 140 months were administered a resource allocation task, which consisted of distributing rewards to themselves or to an acquaintance. As expected, individualistic resource allocation preferences decreased with age, whereas competitive and cooperative resource allocation preferences increased with age. Culture group, the task-specific cognitive demands, and the gender of the child, however, moderated these age differences. For example, gender differences in resource allocation preferences were stronger among Brazilians as compared to European-Americans and stronger in the reduced cognitive demand condition. Models of cooperative and competitive behaviors that consider the role of culture group, gender, and cognitive development and applied implications are discussed.

Keywords: Gender; Culture; Cooperation; Competition; Prosocial behaviors

I. Introduction

Recently, there is an increasing consensus among cross-cultural researchers that value-based psychological outcomes vary more as a function of within- than between-group variables (Haidt, Koller, & Dias, 1993; Markus & Kitayama, 1991; Miller & Hersoff, 1992; Wainryb & Turiel, 1995). Wainryb and Turiel (1995) argued that informational assumptions (a within-group variable) would be expected to better explain variations in moral judgments than between-group variables (e.g., individualism-collectivism). In addition, Miller and Bersoff (1992) found larger differences in moral-based outcomes in some within-group variables than in between-group variables. However, many theorists (e.g., Bond, Leung, & Wan, 1982; Greenfield & Suzuki, 1998; Kim & Choi, 1994; Kim, Triandis, Kagitcibasi, Choi, & Yoon, 1994; Leung & Bond, 1984; Triandis, 1989,1995) have emphasized the importance of between-group variables, and particularly individualism and collectivism, in explaining cultural or group differences in social behaviors. Because both approaches acknowledge the importance of group variation in social behaviors, it is likely that analysis of one or the other may lead to limited findings and conclusions.

The current study was guided by Knight, Bernal, and Carlo's (1995) proposed model of value-based social behaviors that emphasizes the joint influence of socialization and cognitive developmental factors, and represents an application of multiplicative models. According to these authors, cognitive development influences the rate of acquisition and complexity of value-based behaviors, whereas socialization influences the specific nature of those behaviors. The role of socialization is crucial and is predicted to differentially influence social behaviors as a function of culture group. Cooperative, competitive, and individualistic preferences would be expected to become more group-specific as the child's ability to encode, abstract, and enact the rules of conduct from their sociocultural experiences increase (Knight et al., 1995). Moreover, Knight, Cota, and Bernal (1993) found that family socialization experiences influenced the child's ethnic identity and that, in turn, influenced resources allocation preferences. Thus, facilitation of the cognitive skills required for enacting resource allocation preferences would be hypothesized to magnify group-specific resource allocation preferences. This theoretical model, however, can be extended to include other within-group variables related to cognitive development (e.g., age of a child) and on which socialization experiences may be different (e.g., gender of a child).

An assumption of the current research is that individuals differ in social value orientation (Messick & McClintock, 1968; Van Lange & Kuhlman, 1994) and that these orientations are a function of social context. Furthermore, these dispositions systematically influence individuals' interpretations of interdependent situations and subsequent behaviors. Prior scholars (e.g., Knight & Dubro, 1984a, 1984b; Kuhlman, Brown, & Teta, 1992; MacCrimmon & Messick, 1976; McClintock & Liebrand, 1988; McClintock, Messick, Kuhlman, & Campos, 1973) have conceptualized and operationally defined cooperative, competitive, and individualistic social values linked to specific outcome preferences in resource allocation tasks. There are three preferences that represent cooperative social values: (a) altruism, maximizing the outcome of another; (b) equality, minimizing the dif-

ference between one's own and another's outcome; and (c) group enhancement, maximizing joint gains irrespective of the specific distributions of rewards to oneself and a peer. There are two preferences that represent competitive social values: (a) rivalry, minimizing the outcome of another; and (b) superiority, maximizing one's own relative outcome (i.e., getting as much more than the other as possible). Finally, there is one preference that represents an individualist social value: individualism, maximizing one's own outcome (i.e., getting as much for one's self, irrespective of the other's outcome). These theoretically derived resource allocations are supported by empirical evidence generated from research with children (e.g., Chao, Knight, & Dubro, 1986; Knight & Dubro, 1984a, 1984b) and are consistent with recent research (e.g., Van Lange & Kuhlman, 1994) and traditional behavioral typologies (Deutsch, 1960). However, the empirical evidence has not provided support for altruism and rivalry preferences in children and these will not be considered further.

Past research has indicated that there are different information processing requirements associated with individualistic, cooperative (i.e., equality and group enhancement), and competitive (i.e., superiority) allocation preferences (Chao et al., 1986; Knight, Dubro, & Chao, 1985). Task analyses of the traditional two-alternative choice task indicate that there are differential information processing requirements associated with individualistic, cooperative, and competitive resource allocation preferences (see Chao et al., 1986; Knight et al., 1985 for details of the task analyses). These task analyses have also indicated that information processing demands of cooperative allocation preferences are comparable to the competitive allocation preferences, but that each of these outcome preferences requires more extensive cognitive processing than individualistic outcome preferences. The implication is that young children may avoid cooperative and competitive resource allocation preferences because these preferences are relatively taxing for them and they do not have the required cognitive skills.

Cross-cultural investigations of resource allocation behaviors are sparse. The current study represents a comparison of resource allocations across individuals from two communities (Brazil and the United States) that differ along the individualism-collectivism dimension. Brazil has been considered one of the most well-developed, Westernized, and wealthiest countries in South America. It has one of the lowest infant mortality rates in South America, many parts of it are well industrialized, and Brazil has been a social democracy for a relatively long period (Lang, 1988; Poppino, 1973). Researchers (Bontempo, Lobel, & Triandis, 1990; Hofstede, 1982; Hutz, De Conti, & Vargas, 1993) have argued and found that many Brazilians are oriented towards keeping close familial and interpersonal ties and are socialized to value allocentric and collectivist behaviors relative to North Americans, as has been found with Latin Americans in general (e.g., Marin & Triandis, 1985; Triandis, Marin, Lisansky, & Betancourt, 1984). While it has been shown that Latin American samples are more collectivistic in orientation than North American samples, and that Latin Americans are socialized to value allocentric and cooperative behaviors (Dabul, Bernal, & Knight, 1995; Hofstede, 1982; Triandis, Leung, Villareal, & Clack, 1985), we did not assume that our target Brazilian sample and our target North American sample were categorically different in individualism-collectivism. Rather, we assumed that individuals from the Brazilian sample would be relatively more collectivis-

tic (or less individualistic) than individuals from the United States sample.

Value-based family socialization experiences were expected to moderate the relations between cognitive development and resource allocation preferences. Two variables associated with cognitive development were examined in the present study: the cognitive demands of the allocation task and the age of the allocator. Differences in the cognitive demands of resource allocation tasks may result in older children making more complex resource allocations than younger children (Chao et al., 1986). In general, these age differences are analogous to age-related increases in other-oriented modes of prosocial moral judgments (Carlo, Koller, Eisenberg, Da Silva, & Frohlich, 1996; Eisenberg, 1986), greater equity-based distributive justice (Hutz et al., 1993; Murphy-Herman & Herman, 1991), and increases in sharing behaviors (Knight, Bohlmeyer, Stewart, & Harris, 1993; Radke-Yarrow, Zahn-Waxler, & Chapman, 1983). Thus, it was expected that as the age of the child increased and/or the cognitive demands of the allocation task were lessened, more cooperative and competitive resource allocations rather than individualistic resource allocations would be preferred.

However, as predicted by Knight et al.'s (1995) theory, these effects were expected to be moderated by culture group because of culture-specific socialization experiences. Because of their society's collectivist orientation and based on prior findings, Brazilian children were expected to more often make cooperative resource allocations and less often make competitive and individualistic resource allocations than European-American children, but only when the resource allocation task requires relatively lesser information processing skills or when the children are older and have greater information processing skills. Conversely, because of their society's individualist orientation (see Hofstede, 1982; Knight et al., 1995; Triandis, 1995), European-American children were expected to more often make competitive and individualistic resource allocations, and less often make cooperative resource allocations than Brazilian children, but only when the resource allocation task requires relatively lesser information processing skills or when the children are older and have greater information processing skills.

While the joint effects of culture and cognitive development are hypothesized to influence cooperative, competitive, and individualistic preferences, gender may be an additional sociocultural factor (a within-group variable) that could moderate the effects of cognitive development and/or culture, and can be incorporated into Knight et al.'s (1995) theoretical model. Maccoby's (1988) socialization-personality model suggests that girls and boys develop different personality traits, skills, and activity preferences based on differential socialization pressures. Some gender differences are hypothesized to occur because boys are more concerned with dominance (Maccoby & Jacklin, 1974) and activities that are hierarchically organized (Goodwin, 1980). Girls, on the other hand, have less stable activity hierarchies (Maccoby, 1988). Consistent with these theoretical perspectives, some investigators (Chao et al., 1986; Kagan & Madsen, 1972; Knight & Chao, 1989; McClintock & Moskowitz, 1976) have found gender differences in cooperative, competitive, and individualistic resource allocation preferences. Indeed, Knight and his colleagues have found that girls more often prefer cooperative and individualistic, and that boys prefer more competitive, resource allocations in individualistic oriented communities (Knight & Chao, 1989; Knight et al., 1985). However, other scholars have noted that in commu-

nities that promote interdependence (such as collectivistic communities), girls are provided with even more opportunities and are even more strongly encouraged to behave as nurturing and prosocial than boys are (Edwards & Whiting, 1980; Greenfield & Suzuki, 1998). These scholars suggest that collectivist-oriented societies promote more distinct gender role differentiation as compared to individualistic societies. Consistent with this argument, gender differences were more prevalent in communities that fostered interdependence than in communities that fostered independence (Edwards & Whiting, 1980; Whiting & Edwards, 1974).

Based on prior theories (Edwards & Whiting, 1980; Maccoby, 1988), several gender differences in resource allocation preferences were expected. We attempted to extend Maccoby's model by suggesting that the interaction between gender and culture group, rather than culture-specific or gender-specific socialization experiences, would result in different socialization experiences and ultimately in differences in allocation preferences. That is, differences in allocation preferences could be a function of the different socialization experiences of European-American boys, Brazilian boys, European-American girls, and Brazilian girls. Moreover, based on prior theory and research (see Knight et al., 1995), gender differences in resource allocation preferences were expected particularly when the resource allocation task required relatively lesser information processing skills or when the children are older and have greater information processing skills.

In summary, it was hypothesized that Brazilians would more often prefer cooperative and less often prefer competitive resource allocations than European-Americans as the age of the allocator increased and as the cognitive demands of the task were lessened. Furthermore, with age, girls should prefer more cooperative and boys should prefer more competitive resource allocations. As noted earlier, reducing the task-specific cognitive demands was expected to facilitate complex resource allocation preferences. Consequently, culture group and gender differences in resource allocation preferences were expected to be greater: (a) when the cognitive demands of the task were reduced, (b) among the older children, and (c) among the Brazilians.

2. Method

2.1. Participants

The sample consisted of 265 children from urban communities, 99 European-Americans (52 girls and 47 boys), and 166 Brazilians (83 girls and 83 boys) children, ranging from 37 to 140 months of age. The European-American children (M_{age} = 85.2 months, SD = 29.2) and Brazilian children (M_{age} = 84.6 months, SD = 22.6) were similarly distributed across ages. Furthermore, the grade levels across the two samples were comparable. Letters were sent to the parents of these school children requesting permission for their child to participate in the study.

The children from the United States were mostly White and from middle- to upper-middle class public schools in an urban area (population of approximately 1 million) in the southwest United States (Tucson, AZ). These children were from predominantly well-educated, two-parent families. The children from Brazil were also predominantly White

and selected from middle-class public schools in an urban area (population of approximately 1.2 million) in southeast Brazil (Porto Alegre, Rio Grande do Sul). Parents of these children had between 11 and 15 years of education, many parents were self-employed in small businesses, and most children were from two-parent households. Thus, children from the two samples were relatively similar in demographic characteristics.

2.2. Apparatus

Children completed an individually administered social decision making task that required them to indicate which resource allocation they preferred In each of 36 randomly ordered resource allocation pairs. Each resource allocation consisted of tokens (pennies for European-American children and bottle caps for Brazilian children) for the subject and tokens for a peer. With respect to peer selection, children nominated classmates who were not their best friends or extremely disliked. A classmate was then randomly selected from this nominated list and served as the peer in the allocation task. The nine resource allocation pairs were all possible combinations of one to three tokens for the subject and one to three tokens for the peer.

Each pair of resource allocations was presented by placing tokens in each quadrant of a 22 × 28 cm white card with a bold vertical line down the middle and a dashed horizontal line separating the top and bottom (see Fig. 1). The tokens were evenly spaced along the bottom (the subject's resource) and the top (the peer's resource) on each side of the bold vertical line. For example, one of the resource allocation pairs was presented by placing three tokens for the subject and one token for the peer on the left side of the bold vertical line and two tokens for the subject and two tokens for the peer on the right side of the bold vertical line. For this example, if the child preferred the right allocation over the left allocation, he or she may be expressing a preference for equality (cooperation). If the child preferred the left allocation over the right allocation, he or she may be expressing a preference for superiority (competition) or individualism. Other resource allocation pairs differentially combine individualism with other preferences.

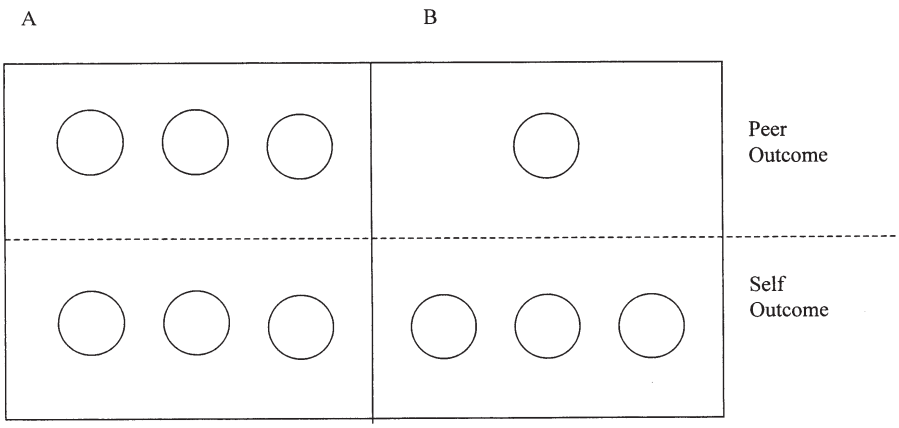

Fig. 1. An equality (A) and superiority (B) resource allocation pair. The circles within each box represent bottle caps (or pennies).

Children were told that they would have to exchange the tokens for prizes. Children also knew what the prizes were before the experiment started and were given the opportunity to identify the prizes that they desired ahead of time. The children knew that they would have to exchange their tokens to get the prizes they wanted. The experimenters ensured that the exchange rate between tokens and prizes was the same for Brazilians and European-Americans. The prizes were the same for Brazilian and European-American children and included pens, pencils, crayons, and small toys and puzzles.

2.3. Procedure

Children were told they would be interacting with people from the local university who were interested in the way children make decisions. The experimenters explained the task as follows:[1]

> Look through these prizes and see if there are any you like. Is there any you like? Now I want you to play a game. In this game, you will be able to get some of these prizes for yourself and some for Mary (a randomly selected peer's name was used here). Look at this piece of paper. See this solid line down the middle and this dotted line across the piece of paper. I am going to put some tokens on this paper. Some of the tokens will be for you and some will be for Mary. After we are finished with the game, you can go back to your classroom. When we finish playing with all of your classmates, we will give you the prizes you wanted for the tokens you have. Now let me show you how the game works. I am going to put some tokens below and some above the dotted line and on each side of the solid line. The tokens below the dotted line will be yours and we will put them in this cup (a clear plastic cup was placed in front of the child). The tokens above the dotted line will be Mary's and we will put them in this cup (a second clear plastic cup was placed above the experimental apparatus but below a card with the peer's name on it). But you and Mary can only have the tokens on one side of the solid line. And you get to decide which side of the solid line you and Mary get the tokens off.
>
> Now, let's be sure you understand how the game works. Let's suppose I put these tokens on the card. Can you point to the tokens on this side of the solid line (experimenter placed his or her hand on the left side of the solid line) that are for you? Can you point to the tokens on this side (experimenter place his or her hand on the right side of the solid line) of the solid line that are for Mary? Now can you point to the tokens on this side of the solid line (pointing to the right side of the solid line) that are for you? And can you point to the tokens on this side of the solid line (pointing to the left side of the solid line) that are for Mary? That's good! (If the child had been correct, if the child was not correct, the experimenter went back and reexplained the portion of the task that gave them trouble.)
>
> So what will happen now in this game is that I will put some tokens on each side of the solid line for you and some for Mary. You then decide from which side of the solid line you want to take tokens for you and Mary. Now remember, you and

[1] The verbal instructions were the same for both nationality groups (instructions were translated into Portuguese and then backtranslated into English).

Mary can only have the tokens off on one side of the solid line. And remember, you and Mary can buy some prizes with the tokens. So, the more tokens you get, the more prizes you can buy. Are you ready?

Each child was randomly assigned to either a standard cognitive demand condition or a reduced cognitive demand condition (see Chao et al., 1986). In the standard cognitive demand condition, tokens were placed on the card and the child indicated which resource allocation he or she preferred. In the reduced cognitive demand condition, tokens were placed on the card and the experimenter described the absolute and relative number of tokens for the child and the peer before the child indicated which resource allocation he or she preferred (i.e., the experimenter said, e.g., "On this side you get two tokens and [the peer's name] gets one token, so you get one token more than [peer's name]. On this side you get three tokens and [the other child's name] gets three tokens, so you both get the same number of tokens."). The reduced cognitive demand condition was designed to reduce the information processing demands of the cooperative and competitive decisions by having the experimenter perform the necessary mathematical operations required for these resource allocations.

Researchers assessing the validity of this behavioral measure have demonstrated associations between allocation preferences and verbal reports among children (Knight & Chao, 1991; Knight & Dubro, 1984b), other measures of social motivation (Kagan & Knight, 1981; Kuhlman & Marshello, 1975; Liebrand, 1984), and sociometric evaluations (Bem & Lord, 1979; Knight, 1981). In addition, there is evidence that this type of resource allocation tasks is ecologically valid (e.g., Bem & Lord, 1979; Knight & Chao, 1991).

3. Results

3.1. Data analytic approach

An individualized multiple regression procedure was used to identify resource allocation preferences and this procedure has been used regularly in past research (see, e.g., Knight & Chao, 1991; Knight & Dubro, 1984a, 1984b). A multiple regression equation was generated for each child using three outcome characteristics as predictors of a resource allocation preference index (e.g., cooperation). The three outcome characteristic predictors were: own gain—the number of tokens for the child in the outcome; peer gain—the number of tokens for the peer in the outcome; and equal gain—the absolute value of the difference between own and peer gain in that outcome. These three outcome characteristics were linearly orthogonal to one another and were entered simultaneously into the regression equations. The resource allocation preference criterion was the number of times the resource allocation was preferred over the other resource allocations. Each child indicated his or her resource allocation preference for all possible pairwise combinations of resource allocations. The minimum possible resource allocation preference index was zero when a resource allocation was not preferred over any of the other resource allocations. The maximum possible resource allocation preference index was eight when a resource allocation was preferred over all of the other resource allocations.

This descriptive analysis was used because it produces a distinct pattern of standardized partial regression coefficients (*B*s) for each of the most common social decisions (allocation preferences) among children in this age range (Chao et al., 1986; Knight & Chao, 1991; Knight & Dubro, 1984b). Although these individualized regression analyses violate the assumption of independence of observations for significance testing in regression analysis, the *B*s were used for scaling purposes, not for hypothesis testing purposes. An individualistic preference was characterized by a high positive *B* for own and a near zero *B*s for peer and equal gains. A superiority (competitive) preference was characterized by a high positive *B* for own gain, a high negative *B* for peer gain, and a near zero *B* for equal gain. An equality (cooperative) preference was characterized by near zero *B*s for own and peer gains and a high negative *B* for equal gain (the negative sign for the equal gain *B* occurs because a low score for the equal gain predictor represents the maximum equality). A group enhancement (cooperative) preference, and equality plus individualistic (cooperative) preferences (maximizing one's own gain as well as minimizing the relative difference between one's own gain and a peer) were further identified for both samples. For classification purposes, *B*s with a magnitude of 0.30 or above were considered high.

To make the data comparable to previous studies and because of the infrequency of some of the resource allocation groups, both European-American and Brazilian children originally identified as preferring group enhancement, equality plus individualism, or equality resource allocations were reclassified as preferring a cooperative resource allocation. The individualized multiple regression analyses thus produced three groups of regression equations representing three groups of children who made different social resource allocations.[2]

3.2. Descriptive statistics

Descriptive statistics for the group classifications were as follows. For European-Americans: 34% of the children (n = 34) preferred individualistic resource allocations (B = mean B, R^2 = mean R^2: B_{own} = 0.91, B_{peer} = 0.02, B_{equal} = – 0.01, R^2 = .88), 56% of the children (n = 55) preferred competitive resource allocations (B_{own} = 0.83, B_{peer} = – 0.45, B_{equal} = – 0.02, R^2 = .92), and 10% of the children (n = 10) preferred cooperative resource allocations (B_{own} = 0.82, B_{peer} = 0.16, B_{equal} = – 0.24, R^2 = .85). Those children that preferred cooperative allocations nearly always had high positive *B*s for own gain. For instance, these children more often preferred three bottle caps (or pennies) for themselves and three bottle caps (or pennies) for their peer (i.e., equality) than two bottle caps (or pennies) for themselves and two bottle caps (or pennies) for their peers (i.e., equality that does not maximize one's own gains).

For Brazilians: 32% of the children (n = 53) preferred individualistic resource allocations (B_{own} = 0.88, B_{peer} = 0.01, B_{equal} = 0.01, R^2 = .82), 29% of the children (n = 48) pre-

[2] For European-American children: seven made equality plus individualism resource allocations (B_{own} = 0.85, B_{peer} = 0.11, B_{equal} = -0.36, K = .90), and three made group enhancement resource allocations (B_{own} = 0.74, B_{peer} = 0.28, B_{equal} = 0.04, R2 = .74). For Brazilian children: 47 made equality (or equality plus individualism) resource allocations (B_{own} = 0.39, B_{peer} = 0.17, B_{equal} = -0.56, R2 = .69), and 18 made group enhancement resource allocations (B_{own} = 0.66, B_{peer} = 0.53, B_{equal} = 0.02, R2 = .80).

ferred competitive resource allocations (B_{own} = 0.77, B_{peer} = –0.52, B_{equal} = –0.02, R^2 = .91), and 39% of the children (n = 65) preferred cooperative resource allocations (B_{own} = 0.50, B_{peer} = 0.26, B_{equal} = –0.40, R^2 = .74). As seen with the European-American children, those Brazilian children that preferred cooperative decisions nearly always had high positive *B*s for own gain.

3.3. Data analysis

3.3.1. Analyses of the joint relations of cognitive development, gender and culture group

To examine the joint effects of age, culture group, gender, and task form condition (cognitive demand condition), an initial hierarchical discriminant function analysis was conducted on individualism, competition, and cooperation. Discriminant function analysis is a least squares technique appropriate for the analysis of a categorical criterion variable. It should be noted that discriminant function analysis is robust to violations of multivariate normality and homogeneity of the variance-covariance matrices caused by categorical predictors. In this analysis, the main effects of age (in months), gender, culture group, and condition (all variables were entered as dummy coded vectors except for age, which was entered as a continuous variable) were entered first, followed by all possible two-way interactions, and then by all possible three-way interactions. The four-way interaction term was not entered because of statistical power considerations.

The analysis produced two discriminant functions that correctly classified 58.87% of the cases into resource allocation preference groups. The first function, $\chi^2(20, N = 265) = 117.56$, $p < .001$, $r_c = .50$, accounted for 62.9% of the explainable between group variance (i.e., 62.9% of the explained variance). The second function, $\chi^2(9, N = 265) = 45.13$, $p<.001$, $r_c = .40$, accounted for 37.1 % of the explainable between group variance. The variance explained by the first function is 1.7 times greater than the variance explained by the second function. The analysis indicated that the Age, Condition, Culture Group × Age, Gender × Age × Condition, and Gender × Age × Culture Group vectors resulted in significant ($p < .05$) change in Rao's V (24.00, 13.67, 36.66, 30.88, and 6.48, respectively).

Based on the expectation that condition would lead to a number of age main effects and interaction effects, and because condition was the only manipulated variable, two hierarchical discriminant analyses (paralleling the initial analysis) were performed: first for the data from the standard cognitive demand condition, and then for the data from the reduced cognitive demand condition. In both analyses, the main effects of age (in months), gender, and culture group were entered first, followed by all possible two-way interactions.

3.3.2. Results for the standard cognitive demand condition

For the standard cognitive demand condition, the analysis produced two discriminant functions that correctly classified 62.31% of the cases into social resource allocation preference groups. The first function, $\chi^2(8, N = 130) = 51.58$, $p < .001$, $r_c = .47$, accounted for 62.1% of the explainable between-group variance. The second function, $\chi^2(3, N = 130) = 20.11$, $p < .001$, $r_c = .38$, accounted for 37.9% of the explainable between group variance. The variance explained by the first function is 1.7 times greater than the variance

Table 1
The percentage of children's resource allocation preferences in the standard cognitive demand condition in each age and gender group

	Resource allocation preference			
Group	*n*	Individualism (%)	Competitive (%)	Cooperative (%)
Age group				
37–71	35	71.4	8.6	20.0
72–105	56	41.1	39.3	19.6
106–140	39	20.5	41.0	38.5
Gender				
Girls	66	40.9	27.3	31.8
Boys	64	45.3	35.9	18.8

The data presented are row percentages.

explained by the second function. The analysis indicated that the Age, Gender, Culture Group × Age, and Culture Group × Gender vectors resulted in significant ($p < .05$) change in Rao's V (23.91, 6.51, 21.86, and 5.98, respectively).

Although age was used as a continuous variable in the analysis, for purposes of presentation we have categorized age into groups based on prior theory (Hook & Cook, 1979)

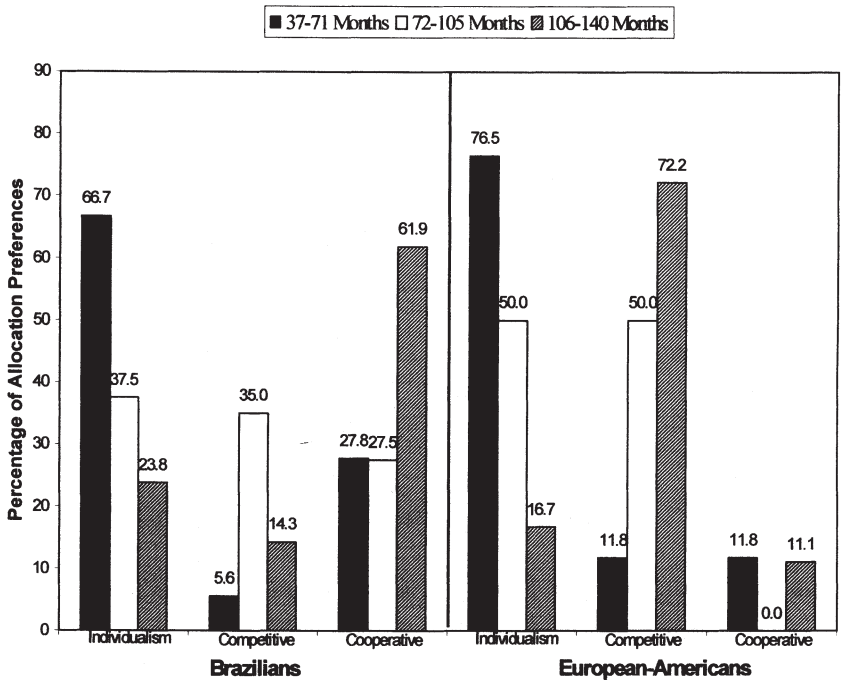

Fig. 2. The percentage of resource allocation preferences as a function of age and nationality group in the standard cognitive demand condition.

and for ease of comparison to prior studies. Children were grouped into three age groups: 37–71 months, 72–105 months, and 106–140 months for all tables and figures. Table 1 presents the percentage of girls and boys and the percentage of each age group in each age group who preferred each resource allocation for the standard cognitive demand condition. With age, the children progressed from preferring individualism to preferring competition and cooperation. In addition, girls more often made cooperative and less often made competitive resource allocations than did boys (although both boys and girls preferred individualistic resource allocations).

These main effects, however, were qualified by both a Culture Group × Age and a Culture Group × Gender interaction. With respect to the former, Fig. 2 presents the distribution (in percentages) of resource allocation preferences for Brazilians and European-Americans broken down by age. In both culture groups, the preference for individualistic resource allocations decreased with age. In contrast, for complex resource allocations, European-Americans increasingly preferred competitive resource allocations, whereas Brazilians increasingly preferred cooperative resource allocations with age.

Fig. 3 presents the distribution of resource allocation preferences for the comparison between the two culture groups broken down by gender: the Culture Group × Gender interaction. Brazilian boys more often preferred individualistic and competitive resource al-

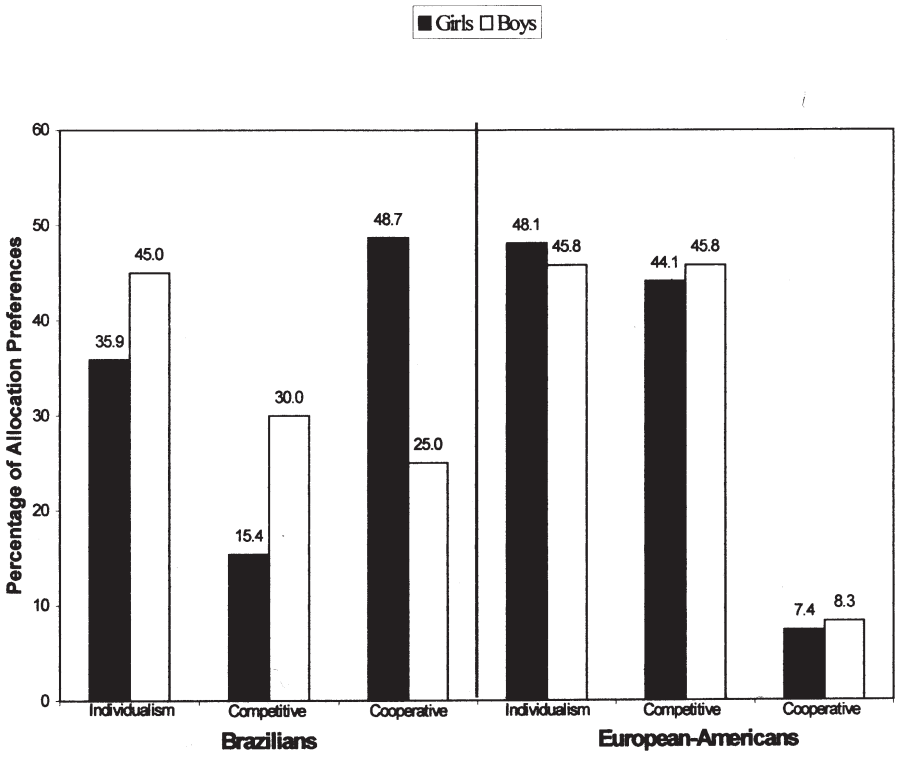

Fig. 3. The percentage of resource allocation preferences as a function of gender and nationality group in the standard cognitive demand condition.

Table 2
The percentage of children's social resource allocation preferences in the reduced cognitive demand condition in each age and nationality group

		Resource allocation preference		
Group	*n*	Individualism (%)	Competitive (%)	Cooperative (%)
Age group				
37–71	52	36.5	30.8	32.7
72–105	59	18.6	50.8	30.5
106–140	24	4.2	66.7	29.2
Nationality group				
Brazilians	87	24.1	34.5	41.4
European–Americans	48	20.8	66.7	12.5

The data presented are row percentages.

locations, while Brazilian girls more often preferred cooperative resource allocations. In contrast, European-American children preferred individualistic and competitive resource allocations.

3.3.3. Results for the reduced cognitive demand condition

The second discriminant analysis addressed differences associated with the reduced cognitive demand condition. This analysis produced one discriminant function that cor-

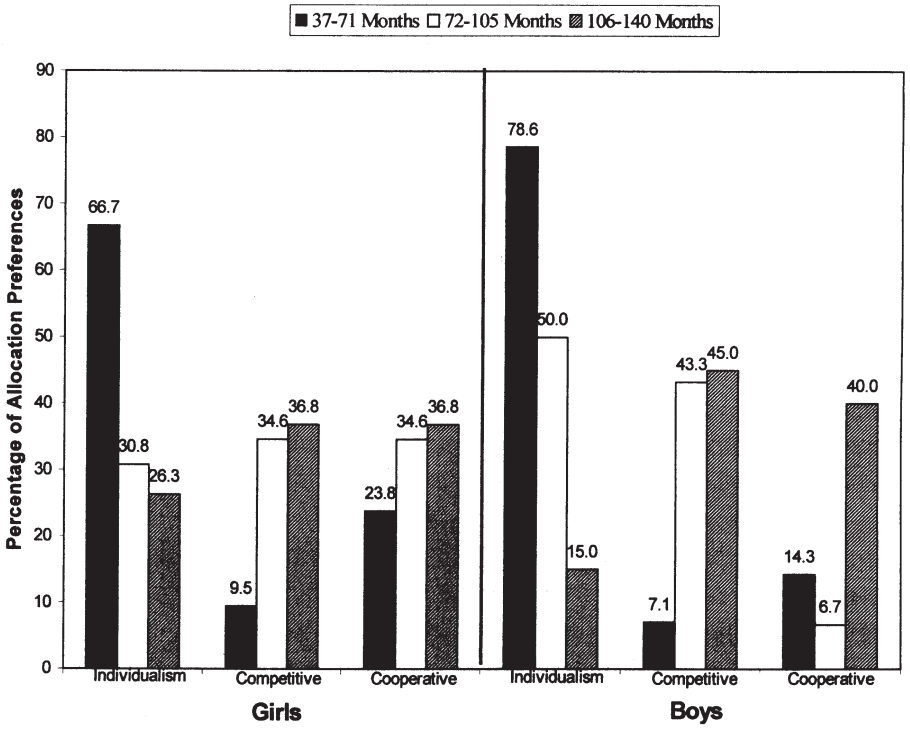

Fig. 4. The percentage of resource allocation preferences as a function of age and gender group in the reduced cognitive demand condition.

rectly classified 55.56% of the cases into social resource allocation groups. The function, $\chi^2(8, N = 135) = 48.24$, $p < .001$, $r_c = .53$, accounted for 89.2% of the explainable between group variance. The analysis indicated that the Age, Culture Group, and Age × Gender vectors resulted in significant ($p < .05$) change in Rao's V (12.81, 21.88, and 18.83, respectively).

Table 2 presents the percentage of children in each of the three age groups and the two culture groups making each resource allocation. As in the standard cognitive demand condition, with age, the children in the reduced cognitive demand condition progressed from preferring individualistic to preferring competitive and cooperative resource allocations. However, children in the two oldest aged groups preferred competitive resource allocations. With respect to culture group differences, Brazilians more preferred cooperative and less preferred competitive resource allocations than European-Americans.

The main effect of age, however, was qualified by an Age × Gender interaction. Fig. 4 presents the distribution (in percentages) of resource allocation preferences for girls and boys broken down by age. Fig. 4 shows that individualistic resource allocations decreased, and complex (i.e., cooperative and competitive) resource allocations increased, with age for both boys and girls in the reduced cognitive demand condition. For example, In the oldest age group, 100% of the boys and 92% of the girls made competitive or cooperative

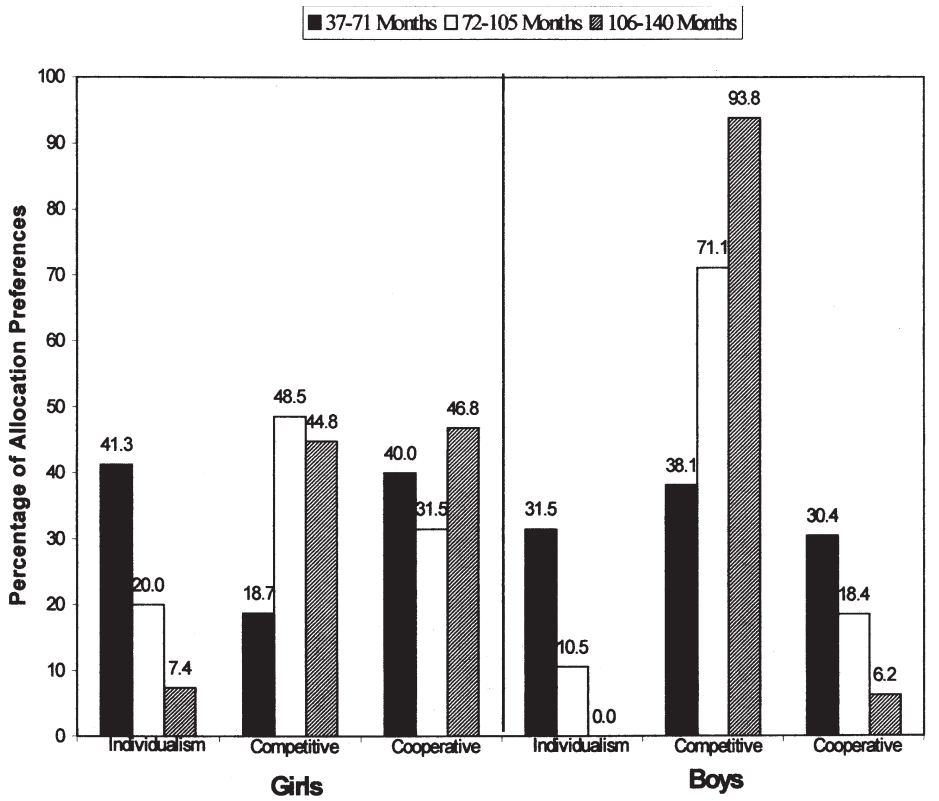

Fig. 5. The percentage of resource allocation preferences as a function of age and gender group in the standard cognitive demand condition.

resource allocations. However, with age, boys increasingly preferred competitive resource allocations, whereas girls' resource allocation preferences were relatively equally distributed across competition and cooperation. (In contrast, Fig. 5 also shows that individualistic resource allocations decreased with age for both boys and girls in the standard cognitive demand condition. However, preferences for cooperative and competitive resource allocations were relatively equally distributed for both the oldest boys and girls in the standard cognitive demand condition.)

4. Discussion

Past research has found that either within-culture variables (Haidt et al., 1993; Miller & Bersoff, 1992; Wainryb & Turiel, 1995) or between-culture variables (Kim & Choi, 1994; Kim et al., 1994; Triandis, 1989, 1995) explain cultural group differences in social behaviors. The current research departed from this either/or proposition and instead demonstrated the importance of theorizing and testing multiplicative relations in both within-group (e.g., cognitive ability, gender) and between-group (e.g., culture group) variables. This multiplicative approach is not new; however, few cross-cultural studies have been conducted in a manner that could provide support for this approach (see Bukowski & Sippola, 1998; Rubin, 1998). The present findings have several important theoretical and applied implications for the study of culture group differences.

The interaction effects suggest that examination of the effects of only age, gender, or culture group provide an incomplete picture of resource allocation preferences. For example, although complex resource allocations increased with age for both culture groups, the European-Americans preferred competitive whereas the Brazilians preferred cooperative resource allocations. In addition, for both culture groups, individualistic resource allocations decreased with age. The findings are consistent with the notion that cultural differences in resource allocation preferences would become stronger with age as a result of the consolidation of group-specific socialization experiences and as a result of increased cognitive ability. For example, a cultural community that emphasizes interdependence might socialize children to prefer cooperative behaviors and these behaviors might be more frequent with advancing cognitive development and as socialization practices consolidate. This perspective seems equally applicable to many European-Americans in that socialization agents in the United States can be expected to transmit values oriented towards individualistic and competitive preferences (Knight et al., 1995). Thus, although complex resource allocation preferences increased with age, the specific form of the preferences was partly dependent upon the cultural context. However, it is difficult to ascertain with certainty whether developmental differences in resource allocation preferences were due to cognitive developmental changes in information processing or whether they were due to cognitive developmental changes in understanding of values. Future researchers could examine these possibilities.

Culture group differences in resource allocation preferences were also moderated by gender in the standard cognitive demand condition. Examination of European-American children's resource allocation preferences revealed that both girls and boys some-

what equally preferred individualism, competition, and cooperation. However, for Brazilian children, boys much more often preferred competitive, somewhat more preferred individualism, and much less often preferred cooperative resource allocations than girls. Thus, the pattern of resource allocation preferences across gender was different for Brazilian and European-American children. That is, gender-typed resource allocation preferences were more pronounced in Brazilian when compared to European-American children. These findings are consistent with prior cultural psychological studies which suggest that gender differences might be stronger in collectivist communities that promote strong socialization pressures on girls to act prosocially and that these differences increase with age (e.g., Edwards & Whiting, 1980). In part, these strong socialization pressures result from early gender-specific assignment to duties and responsibilities that promotes nurturance, prosocial behavior, and respect for others. Indeed, there is evidence that sex role orientation distinctions increase with age in Brazilian culture (Bonamigo & Koller, 1995), and strong gender differences in prosocial moral reasoning increase with age in Brazilians (Carlo et al., 1996). The absence of clear gender differences among the European-American children was somewhat unexpected. However, gender differences in cooperative and competitive behaviors among European-American samples tend to be small in magnitude of effect and somewhat inconsistent (see Knight & Chao, 1989).

There were several other findings of interest, and specifically, with respect to the cognitive demand condition. In the reduced cognitive demand condition, but not in the standard cognitive demand condition, a culture group difference was evident that paralleled the Age × Culture Group interaction discussed above. Brazilians more preferred cooperative and less preferred competitive resource allocations than European- Americans. This was consistent with previous cross-cultural research, which suggests that Brazilians in comparison to European-Americans are more allocentric in orientation (Bontempo et al., 1990), prefer equality decisions (Hutz et al., 1993), and are relatively collectivist (Hofstede, 1982). However, the present study provided converging evidence using a behavioral task, rather than survey methodology (as has been used in many of the prior studies of individualism and collectivism).

Gender differences in cooperative and competitive resource allocation preferences strengthened with age in the reduced cognitive demand condition. In general, girls made less frequent competitive and more frequent cooperative and individualistic resource allocations than boys did with age in the reduced cognitive demand condition. These findings were consonant with research suggesting that girls are more prosocial (e.g., Maccoby & Jacklin, 1974), prefer cooperative distributions (Chao et al., 1986), and have a more cooperative orientation (e.g., Pepitone, 1980) than boys. The pattern of gender differences across these prosocial and cooperative behaviors might be the product of gender-specific socialization pressures including peer interaction styles (Edwards & Whiting, 1993; Maccoby, 1988), more stable dominance hierarchies in boys than girls (Charlesworth & Dzur, 1987), and the preference for girls to form more intimate and for boys to form less intimate friendship groups (Staub & Noerenberg, 1981). However, although girls in general were more cooperative than boys, the present findings suggest that girls actually increased in both cooperative and competitive resource allocation preferences with age. Furthermore, gender differences in cooperative and competitive resource allocation preferences

were somewhat weaker in the standard cognitive demand condition. Thus, prior conceptions of girls as more prosocial and cooperative than boys should be taken with caution and the context of those gender differences should be carefully considered.

Although the protocol was designed to ensure that children understood that the specific token was to be traded for prizes (the prizes were chosen by the children before they made their allocation decisions), it might have been more desirable to use the same tokens for the resource allocation task in both communities. Unfortunately, in the present study, policy guidelines at the school in Brazil would not allow the researchers to use pennies as tokens (to prevent potential conflicts). However, a comparison of the frequency and pattern of resource allocation preferences between similarly aged European-American children from the present study and from the Knight et al. (1985) study (which used poker chips as tokens) shows that the overall pattern of responses and the pattern of responses across ages were very similar. Therefore, it would seem unlikely that the variability in the use of pennies versus some other token would be very impactful upon children's responses, especially when they know that the pennies or tokens will be traded for prizes. Moreover, the fact that the present findings generally confirmed prior research findings concerning culture group, gender, and age differences suggests that the specific token used in these studies might be a minimal concern.

Steinberg and Fletcher (1998) and others (e.g., Baltes, Reese, & Nesselroade, 1988) have outlined several approaches in the study of culture variables. One approach, and arguably the most prevalently used method, is to examine the direct main effect of culture group on variables of interest. A second approach is to control for culture group (through sampling or statistical means), thus treating culture group as a nuisance variable. A third approach is to treat culture as a dynamic process, specifying intervening processes and structures. A final approach is to identify culture group as a moderator (much like a demographic context variable); of specific interest is how the culture group context interacts with individual difference variables (see also Bukowski & Sippola, 1998). The present study adopted this last framework in order to examine the interactive role of culture group and other individual difference and group difference variables on value-based behaviors. One potential value of this theoretical approach is that it acknowledges both between- and within-group variations in behavioral outcomes rather than necessarily pitting these sources of variations against each other. Consequently, potentially valuable information about these sources of variation can be obtained for developing comprehensive models of, and to better predict, behavioral outcomes (compare with the usefulness of personality × situation models of social behaviors; see Kenrick & Funder, 1988).

Moreover, the findings that both individual and (cultural) group level characteristics are useful predictors of reward allocation preferences have important applied implications. For example, the relatively high levels of cooperative behaviors among Brazilian children might be functionally adaptive for children in this culture. Cooperative behaviors among peers in this culture group might facilitate peer group inclusion that, in turn, promote well being by fostering social support. In contrast, relatively high levels of competitive behaviors among children from the United States might be adaptive for success in that particular cultural group context. For example, competitive behaviors might elicit rewards that foster social status or power in the peer group for children in this society (see Greenfield & Su-

zuki, 1998 for other examples). The present findings, however, suggest that other considerations such as gender and cognitive development need to be simultaneously addressed to determine the desired objectives of proposed intervention programs. Thus, in contexts where someone might desire to foster cooperative behaviors among children, it is important to consider both individual (e.g., gender and cognitive development) and contextual (broader cultural context) level variables to develop intervention programs designed to promote such behaviors or to create environments that reward cooperative behaviors.

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